HISD | Research and Accountability
ANALYZING DATA, MEASURING PERFORMANCE.

Compilation of Literature on School Funding Models

2022

COMPILATION OF LITERATURE ON SCHOOL FUNDING MODELS

ANNOTATED BIBLIOGRAPY

1. **Arcalean, C., & Schiopu, I. (2016). Inequality, opting-out and public education funding. *Soc Choice Welf*(46), 811-837. doi:10.1007/s00355-015-0937-9**

In contrast to recent literature, this research showed that when household income heterogeneity is consistent with the skewness of empirical income distributions, inequality can drive education spending in opposite directions in poor and rich economies. The study found that as the average income and public-school enrollment increases, there is a decrease in public spending per student in low-income economies, while it has opposite effects at high income levels. In other words, wealthy economies are more likely to spend more per student in funding public schools, while poorer economies are less likely to use scarce resources on public school funding (p. 811).

2. Baker, B. D., Farrie, D., Sciarra, D. (2018). Is School Funding Fair? A National Report Card. Seventh Edition. *Education Law Center of New Jersey & Rutgers GSE*. Retrieved from https://edlawcenter.org/assets/files/pdfs/publications/Is_School_Funding_Fair_7th_Editi.pdf

Is School Funding Fair? A National Report Card analyzes the condition of state school finance systems with a focus on the fair distribution of resources to the neediest students. The Report Card makes a number of assumptions about how school funding systems should be designed: (1) a fair funding system should provide levels of funding based on student need; (2) student poverty is the most critical variable affecting funding levels and can serve as a proxy for other measures of disadvantage, such as racial segregation, limited English proficiency, and student mobility; (3) fair funding systems are designed “progressively” so that funding increases relative to student poverty; and (4) a sufficient overall level of funding is a crucial starting point for any funding formula to be successful (p. iii).

3. Chambers, J. G., Levin, J. D., & Shambaugh, L. (2010). Exploring weighted student formulas as a policy for improving equity for distributing resources to schools: A case study of two California school districts. *Economics of Education Review, 29*(2), 283-300. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S0272775709001101

This paper presents a case study of two California school districts, San Francisco and Oakland, each of which have implemented their own versions of what is popularly known as a weighted student formula (WSF). One primary goal of the WSF policy is to increase the equity with which resources are distributed to schools. With respect to equity, the findings suggest that for particular schooling levels per-pupil spending became more responsive to student poverty and that the increase in responsiveness appears to have coincided with implementation of the WSF in the two districts. Moreover, each district relies on a different mechanism for driving resources to the schools: San Francisco relying to a greater degree on the unrestricted funds, while Oakland relies more heavily on restricted sources which, as directed by law, drive dollars to special need populations. Interestingly, neither district exhibited any significant change in the distribution of teacher experience after implementation of their SBF models; schools serving the highest proportion of students from low-income families continued to employ teachers with the least experience after implementation of the SBF models. While an additional goal of WSF was to drive more resources down to the school level to be spent, our analysis found little substantial change in the proportion of resources expended at the school versus the district level (p. 283).

4. Dempsey, S., & Fuchs, D. (1993). "Flat" versus "weighted" reimbursement formulas: A longitudinal analysis of statewide special education funding practices. *Exceptional children, 59*(5), 433-443.

Tennessee data were analyzed longitudinally from 1979-80 to 1987-88 in terms of numbers of children placed in a variety of service options. In 1983-84, the Tennessee funding formula was changed from a "flat" rate to a "weighted" formula. The weighted formula was associated with a statistically significant decrease in less restrictive placements and a reliable increase in more restrictive placements. A statewide survey of district special education directors suggested that service needs may have been more likely than monetary incentives to explain the observed changes (p. 433).

5. Edunomics. (2020). *Lessons Learned: Weighted Student Funding.* Retrieved from WSF-Lessons-Learned-Weighted Student Funding.pdf

Over the last two decades, some of the nation's largest districts, including those in New York City, Boston, Denver, Houston, and Chicago, have shifted to using a weighted student funding (WSF) formula to distribute some portion of their total budget. Instead of allocating resources based on instructional delivery models or doling out staff positions to schools based on staffing formulas, these districts use a student-based formula to allocate dollars in fixed increments based on the number and types of students in each school. In these models, each defined student type—such as students living in poverty or with limited English proficiency—generates additional dollars on top of a base fixed-dollar per-pupil sum for all students. Districts' cited goals for WSF include greater spending equity, transparency, flexibility, and school-level autonomy to focus on improving student outcomes (p. 1).

6. Fiske, E. B., & Ladd, H. F. (2010). The Dutch experience with weighted student funding. *Phi Delta Kappan*, *92*(1), 49-53.

Weighted student funding in the Netherlands has clearly brought about a remarkably equitable system for funding primary schools. Our analysis shows that this success is due to powerful structural, political, and cultural features of Dutch society that are ab sent from the American context. These differences suggest that it would be difficult to transfer the full Dutch system to the United States. Although several U.S. cities have used WSF to benefit schools serving large numbers of disadvantaged students, such redistribution does nothing to offset funding disparities across districts. Some conservatives in the United States look to the Dutch experience as evidence that WSF for individual schools could be used to promote more parental choice and school autonomy in U.S. schools. However, they should understand that WSF in the Nether lands emerged because parental choice of school and school autonomy were already in place. For their part, progressives should keep in mind that their agenda? funding equity through significant weighting? could easily fall by the wayside in the absence of strong political leadership promoting that objective (p. 53).

7. Grauwe, A. D. (2005). Improving the quality of education through school-based management: Learning from international experiences. *International review of education*, *51*(4), 269-287. Retrieved from https://link.springer.com/article/10.1007/s11159-005-7733-1

School-based management is being increasingly advocated as a shortcut to more efficient management and quality improvement in education. Research, however, has been unable to prove conclusively such a linkage. Especially in developing countries, concerns remain about the possible detrimental impact of school-based management on school quality; equity among different schools in the same system; the motivation of and relationships between principals and teachers; and financial as well as administrative transparency. The present study defines school-based management and, in view of its implementation in different world regions, examines some of its advantages and disadvantages. In particular, the author explores the strategies which must accompany school-based management in order to ensure a positive impact on quality. These are found to include (1) guaranteeing that all schools have certain basic resources; (2) developing an effective school-support system; (3) providing schools with regular information on their performance and advice on how they might improve; and (4) emphasizing the motivational element in the management work of the school principal (p. 269).

8. Gunnarsson, V., Orazem, P. F., Sánchez, M. A., & Verdisco, A. (2009). Does local school control raise student outcomes? Evidence on the roles of school autonomy and parental participation. *Economic Development and Cultural Change*, *58*(1), 25-52.

This study examines how local control of schools affects student outcomes across eight Latin American countries. We focus on one possible reason for previous mixed findings regarding the impact of school autonomy and/or community participation on learning: that local managerial effort is itself a choice. Any effort to devolve authority to the local school level will require that local school principals, teachers, parents, or community leaders choose to exert effort to manage the school. This endogeneity of local school managerial effort complicates the interpretation of the cross-sectional pattern of learning outcomes and reported school autonomy or local community school participation. We illustrate the problem using a data set composed of individual child achievement test scores for third and fourth graders in eight Latin American countries (pp. 26-27).

9. Hanushek, E. A. (1997). Assessing the Effects of School Resources on Student Performance: An Update. *American Educational Research Association.* 19(2) pp. 141-164. Retrieved from https://www.jstor.org/stable/pdf/1164207.pdf?casa_token=RCBm_mxa6qIAAAAA:Faez40Wmq7swrrG62iEkExbr550PgPEHFXhpKOmGmSdwKWYJ1z5157Pgvth17Ien0qWo_wQREcRGBK8LtPMZcbzj1JJyXsitzpHXoto52hf5r8HvJPM

The relationship between school resources and student achievement has been controversial, in large part because it calls into question a variety of traditional policy approaches. This article reviews the available educational production literature, updating previous summaries. The close to 400 studies of student achievement demonstrates that there is not a strong or consistent relationship between student performance and school resources, at least after variations in family inputs are considered. These results are also reconciled with meta-analytic approaches and with other investigations on how school resources affect labor market outcomes. Simple resource policies hold little hope for improving student outcomes (p. 141).

10. Houston, D. A. (2018). Public School Funding and Postsecondary Outcomes in Illinois: What Is Reasonable to Expect from Illinois' School Funding Reforms? Policy Research. IERC 2018-1. *Illinois Education Research Council*, 1–25. Retrieved from **https://files.eric.ed.gov/fulltext/ED583122.pdf**

The research examines how the previous funding system may have affected student outcomes in light of Illinois' recent school funding reforms and to better understand what we may expect for schools and students given this new system. The data were nested in students within schools and schools within districts. To account for this, I use hierarchical linear modeling and hierarchical logistic regression modeling. The results of the six models indicate that district per-pupil revenue is a significant explanatory and predictive factor in educational outcomes for Illinois public high school students. After accounting for both student- and school-level predictor variables, per-pupil revenue is positively and significantly related to each of the six postsecondary-related outcomes. The findings in this study suggest that, in Illinois, money does matter for educational upward mobility. Per-pupil funding was positively related to three key points in the upward mobility path: the measure of college readiness, college enrollment, and college completion. The findings highlight that school funding matters to educational outcomes, and differential school funding matters even more in Illinois.

11. Ladd, H. F. (2008). Reflections on equity, adequacy, and weighted student funding. *Education Finance and Policy, 3*(4), 402-423.

Within the context of the school finance literature, the concepts of equity and adequacy raise a number of complex definitional and pragmatic issues. The purpose of this article is to clarify those issues and to use those concepts to evaluate the recent policy proposal called weighted student funding (WSF). Though WSF contains some equity-enhancing elements, it could fall short of its equity goals because of imperfect weights. This approach also fails to take full account of the concentrations of challenging-to-educate students and their effects on the distribution of teachers. In addition, the WSF proposal can be faulted for paying no attention to adequacy, potentially stigmatizing individual students, and placing so much focus on individual schools. A more complete evaluation of WSF would require a broader institutional perspective that extends beyond the equity and adequacy considerations of this article (p. 402).

12. Ladd, H. F., & Fiske, E. B. (2011). Weighted student funding in the Netherlands: A model for the US?. *Journal of Policy Analysis and Management, 30*(3), 470-498. Retrieved from **https://www.jstor.org/stable/23018961**

Although a relatively new idea in the U.S., weighted student funding (WSF) for individual schools has a long history in the Netherlands. This country of about 16.5 million people has been using a version of WSF for all its primary schools (serving children from age 4 to 12) for 25 years. In this article we describe and evaluate the Dutch system and explore what insights there might be for the U.S., taking into account the very different cultural and normative contexts of the two countries. We find that, compared to those with few weighted students, Dutch schools with high proportions of weighted students have almost 60 percent more teachers per pupil as well as more support staff per teacher. Even these large resource advantages, however, are not sufficient by themselves to eliminate all quality shortfalls in the high-weight schools, where quality is measured by school policies and practices. We conclude that weighted student funding for schools within districts in the U.S. is not likely to deliver the same highly progressive funding patterns as in the Netherlands because of the complex, multilayered U.S. education system and the absence of a political consensus in favor of generous weights (p. 470).

13. Levin, J., Chambers, J., Ekpstein, D., Mills, N., Archer, M., Want, A. & Lane, K. (2013). Evaluation of Hawaii's Weighted Student Formula. *American Institutes for Research*. Retrieved from https://www.hawaiipublicschools.org/DOE%20Forms/WSF/WeightedStudentFormulaEval061913.pdf

This report discusses how the Hawaii Independent School District explored alternative funding and governance structures and finally adopted the Weighted Student Formula (WSF) in the 2006-07 academic year with the goal of providing a more equitable system of school finance capable of directing higher levels of resources to student populations that were deemed more costly to educate, and usher in a process for increasing local authority which meant the including school leadership, parents and community members over educational decision making. The implementation of Hawaii's WSF resulted in a significant and sustained commitment to funding WSF, individual school flexibility and discretion over funding and innovation, local stakeholders and the surrounding community feeling more empowered vis-à-vis their interaction with the schools and improvement in the equity and transparency of funding (p.130.) The implementation, however, did reveal several challenges. Chief among the challenges was the general worry among the principals and stakeholders about having enough funds available to provide to the individual schools being that the basic services for each school would vary. The second challenge was precisely how to determine the deferential costs given the diversity of students attending each school. Finally, while the principals welcomed the financial autonomy, they expressed concern over true discretion over staffing decisions specifically regarding general quantities of various staff and which staff to hire or dismiss (p. 141). The evaluation revealed four (4) major concluding themes. The first theme is the acknowledgment that WSF appears to have gained widespread acceptance among school leaders and some key stakeholders. The second theme is that WSF has expanded the ability of school leadership to implement customized programs for unique student populations. The third theme is that WSF allows for the creation of new partnerships, but the final theme is that there is a concern about the quality of the education being delivered versus quantity (p. 146).

14. Levin, J., Manship, K., Hurlburt, S., Atchison, D., Yamaguchi, R., Hall, A., & Stullich, S. (2019) Districts' Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings From a National Study. U.S. Department of Education. Retrieved from https://www2.ed.gov/rschstat/eval/title-i/weighted-funding/report.pdf

Over the past 25 years, a small but growing number of school districts have implemented weighted student funding (WSF), a type of school-based budgeting system, as a way to increase school-level autonomy and flexibility and more equitably distribute funding among schools. In these districts, education leaders have implemented policies that allocate dollars to schools rather than staffing positions, using weights to provide higher levels of funding for certain types of students who need additional support, such as students from low-income households, English learners (ELs), and students with disabilities (SWDs). In addition, these systems are intended to provide more autonomy at the school level, shifting more of the decision-making responsibility over resource allocation and school programming to principals and other school stakeholders (such as teachers, parents, and other community members). This study identified 27 school districts that were implementing WSF systems as of the 2018–19 school year; these systems vary considerably in their longevity and in the specific features of their allocation formulas. This report examines how WSF districts have implemented these systems, the types of weights and other adjustments that they used, how they compare with districts that use more traditional resource allocation practices, and funding equity outcomes. The report is based on surveys of district administrators and principals in a nationally representative sample of WSF and non-WSF districts as well as in-depth case studies of nine WSF districts.

15. Los Angeles School Unified School District. (2021, March 23). ***Student-Centered Formula Update.*** Retrieved from http://laschoolboard.org/sites/default/files/03-23-21COWStudentCenteredFundingPresentation.pdf

To better align school funding with school and student needs, the Los Angeles Unified School District updated the school financing model to a Student-Centered model. The update is designed to support school leaders as they meet the heightened learning, physical and social-emotional needs of students, families, and staff members by offering targeted flexibilities. The flexibilities allow them to adapt their budgets based on their unique needs. The Los Angeles Unified School District argues that this shift will increase understanding of how the funding of the district supports the overall district with respect to equity, transparency, and sustainability while simultaneously increasing support and ownership of the new funding formula among school leaders and other community members. The new formula is designed to encourage school leaders to set up their schools differently to better meet the vision of the district and support a high-quality student experience no matter the school they attend or their individual student identities.

16. Martin, C., Boser, U., Benner, M. & Bafour, P. (2018, November 13). ***A Quality Approach to School Funding: Lessons Learned from School Finance Litigation.*** Retrieved from A Quality Approach to School Funding - LessonsLearned From School Finance Litigation_SchoolFunding-report-4.pdf

Reforms must focus on both funding levels and equal access to resources shown to be fundamental to quality education. True educational equity will require two central reforms. First, there need to be additional resources—not the same resources—to meet the needs of at-risk students. Second, there should be accountability frameworks to ensure that the key ingredients to student success—access to early childhood programs, effective teachers, and a rigorous curriculum—are available to students irrespective of their race, zip code, or economic status (p. 2). But allocating equal funding for every student does not guarantee that all students will have a rigorous educational experience. School finance reform must focus on the quality of every school, from the excellence of the instruction to the rigor of the classes (p. 2). Evaluating school finance policies based on equity or adequacy is insufficient. The most common frameworks used in-state school finance cases—evaluating school funding policies based on their equity or adequacy—do not acknowledge that students in poverty need more from their schools than their more affluent peers. Moreover, neither framework requires courts and policymakers to consider the quality of education, including teachers, curriculum, programs, and social supports (p. 4).

17. Miles, K. H., & Roza, M. (2006). Understanding student-weighted allocation as a means to greater school resource equity. ***Peabody Journal of Education, 81*****(3), 39-62.** Retrieved from https://edunomicslab.org/wp-content/uploads/2013/12/117-1.pdf

As attention shifts to how districts allocate resources to schools, student-weighted allocation has emerged as an alternative to traditional staff-based allocation policies. Student-weighted allocation uses student need, rather than staff placement, as the building block of school budgeting. This article examines how the shift to student weighted allocation affected the pattern of resource distribution within 2 districts: the Houston Independent School District and Cincinnati Public Schools. This study provides evidence that student-weighted allocation can be a means toward greater resource equity among schools within districts. Resource equity is defined here in per-pupil needs-weighted fiscal terms (p. 39).

18. Moon, J. (2018.) HISD Decentralization Reform (Part I: Policy Analysis). Rice University's Kinder Institute for Urban Research. Retrieved from https://herc.rice.edu/research/hisd-decentralization-reform-part-1-policy-analysis

The decentralization process that HISD originally undertook was well documented and fairly well structured. Over time, many of the key components of a strong decentralization model were addressed. For example, decision-making was shifted to the campus level. Funding was restructured to provide the principals more flexibility and to redistribute funds to schools from a base amount plus weights for student-level characteristics. However, some components of decentralization have been only partially fulfilled. For instance, in the literature, school choice is important under this model because it fosters competition and innovation as campuses strive to protect their funding by doing the best job they can for students. HISD is an open choice school district in theory; yet in practice, most campuses are using transfer agreements and choice is somewhat constricted. Additionally, research emphasizes the need to review and update the weighting structure frequently. Finally, there are key elements of decentralization that were not implemented. The shift from average to actual teacher salaries was never made, and Small School Subsidies and magnet programs serve to distort the impact of funding redistribution. These findings suggest that there are modifications that could improve the existing model.

19. Moon, J. (2018.) HISD Decentralization Reform (Part II: Principal's Survey). Rice University's Kinder Institute for Urban Research. Retrieved from https://kinder.rice.edu/research/hisds-decentralization-reform-part-2-principal-survey

HISD principals who elected to participate in the survey on average expressed positive statements about their degree program training and current level of efficacy related to their ability to: use data to identify student needs; communicate with teachers to identify student needs; and make staffing decisions to support student needs. They reported having autonomy over making the scheduling, instructional, and staffing decisions that are best for their students. They further reported being supported by HISD central administration in the fundamental roles that principals are expected to fulfill in the current decentralized model: analyzing the data to best determine their students' needs; making staffing, instructional and scheduling decisions based on that analysis; and preparing a budget that reflects those needs. Findings do suggest possible opportunities including professional development for first year principals about how to make staffing decisions to support student needs and a review of the budget analyst protocols and/or an efficiency study of the support provided by budget analysts to each campus.

20. (Moon, J.) Stroub, K. (2019). HISD Decentralization Reform (Part 3: Decentralization and Student Achievement). Rice University's Kinder Institute for Urban Research. Retrieved from https://kinder.rice.edu/research/hisds-decentralization-reform-part-3-decentralization-and-student-achievement

One of the findings in the brief concludes decentralization was not related to increasing test scores of students and was also not related to passing rates of economically disadvantaged students, black or Hispanic students.

21. Moon, J., Potter, D., & Aiyer, J. (2019). HISD Decentralization Reform (Part 4: Funding). Rice University's Kinder Institute for Urban Research. Retrieved from https://herc.rice.edu/research/hisd-decentralization-reform-part-4-funding

In this brief, researchers looked at the general fund budgeting strategy in HISD from 1999-2000 through 2015-16 to see how much money schools received and utilize human resource data from 2013-14 through 2015-16 to learn how they were using it. Middle schools and high schools had larger total general fund budgets and more per-student spending than elementary schools. Small schools had higher per-student spending than non-small schools, even though their total general fund budgets were not different. Schools with a higher proportion of economically disadvantaged students had larger total general fund budgets while having slightly lower per-student spending. Enrollment size was the best predictor of key personnel at a school, with larger schools being more likely to have assistant principals, counselors, nurses and librarians.

22. Moser, M., & Rubenstein, R. (2002). The equality of public school district funding in the United States: A national status report. ***Public Administration Review*****, *62*(1), 63-72.** Retrieved from https://www.jstor.org/stable/3110283

For over 30 years, the distribution of educational opportunities and the equality of education funding across communities has generated considerable interest among policy makers, the public, and the courts. This article takes advantage of national data sets to examine funding equality across school districts in 49 states for fiscal years 1992 and 1995. It presents rankings of each state's funding equality and explores factors that may be related to the level of equality within states and to changes across years. The analyses suggest that, overall, within-state equality improved slightly between 1992 and 1995, although most states' relative rankings changed little during the period. States with fewer school districts relative to students tended to have a more equal distribution of education dollars than states with more districts. States with higher proportions of revenues provided by state governments generally showed a more equitable distribution of resources than states in which districts were more dependent on local revenues (p. 63).

23. Odden, A., & Picus, L. O. (2019). Investing So Schools Work: The Evidence-Based Calculation Tool in Three Pennsylvania School Districts, 1–30. Retrieved from http://picusodden.com/wp-content/uploads/2019/05/Investing-So-Schools-Work-The-Evidence-Based-Model-in-Three-Pennsylvania-School-Districts-Final.pdf

A Metaphor for Understanding the Evidence-Based Funding Model. The EB approach to school finance provides a set of resource and program recommendations that we call the “Education Hybrid Car.” The EB Model, similar to a hybrid car, is designed for high performance with the most efficiency. The school cases that we have studied, and which deploy strategies that are funded by the EB model (e.g., Odden, 2009, 2012), generally produce dramatic improvement in student achievement. Further, many of these schools enroll large percentages of ELL and poverty students so the combined strategies are effective for these students as well. Moreover, it is our professional position that if Pennsylvania provided school funding at the level of the EB model, including the extra resources triggered by the ELL and poverty students, and if schools used the resources in the model as indicated in Chapter 2, then student achievement in the state would dramatically rise, including achievement of ELL and poverty students (p. 4).

24. Ouchi, W. G. (2006) Power to the Principals: Decentralization in Three Large School Districts. ***Organization Science*** **17(2) pp. 298-307.** Retrieved from https://www.jstor.org/stable/pdf/25146033.pdf?casa_token=QgJI8g5Y9sEAAAAA:8Mvue-WDHvw8ii_PjC0PsjlRujhC_SJIlhbRWhcU4X3atElxSJRrwUYfRbomHsIsqSAbIF9LkPbcpzPxhQaSGwMS5sUdApFjO1xLL8CAG7NckCwhb1A

School districts have made several attempts at decentralizing. However, decentralization in school districts can mean so many different things that the term has nearly lost its meaning. This paper reports a study of three large urban school districts that, over almost 30 years, adopted nearly identical approaches to decentralizing, granting control to principals, and expanding freedom of choice for families. In all three cases, the goal of improving student achievement was achieved, although with a very small sample. These three districts are compared to the three largest public districts in North America. The comparisons reveal that the three decentralized districts attained a high level of principal control over school budgets, staffing, schedule, and teaching methods. (p. 298).

25. Petko, M. (2005). Weighted Student Formula (WSF) What Is It and How Does It Impact Educational Programs in Large Urban Districts? Retrieved from https://files.eric.ed.gov/fulltext/ED490831.pdf

The budget system known as weighted student formula (WSF) shows promise in helping large urban school districts provide funding equity to schools. It focuses attention on the individual student and not on the "average" student. Thus, resources are allocated to a school based on the student characteristics of the school's student population. This is a program that should find support within schools that have traditionally struggled with staffing problems due to budgeting systems that view a school district's macro characteristics rather than a school site's micro characteristics. One major concern involves the level of funding, or adequacy. Adequacy is a different concept than equity. Adequacy addresses whether funding is sufficient to meet educational objectives. Currently, WSF does not address this issue. However, WSF may address the issue of efficiency, and the research suggests a tenuous link between efficiency and adequacy. Other concerns center around the issue of capacity. Are there enough resources to provide the level of training necessary for successfully implementing WSF? Will implementation create strain on already overworked professionals? (p. 13).

26. Roza, M., Hagan, K., & Anderson, L. (2021). Variation is the norm: A landscape analysis of weighted student funding implementation. *Public Budgeting & Finance, 41*(1), 3-25. Retrieved from https://onlinelibrary.wiley.com/doi/pdf/10.1111/pbaf.12276

School districts increasingly rely on weighted student funding (WSF), yet there is little research on this allocation model. This study collects more than 70 measures on each of 19 districts using WSF in 2018 for a landscape analysis of formula features and implementation practices. While districts report common reasons for adopting WSF (equity, flexibility, and transparency), we find no standard WSF model. Homegrown formulas and nonformula features and exemptions reflecting local context are the norms, resulting in substantial differences. Nearly all districts continue to budget with average salaries (likely limiting equity) but grant principals flexibility on staffing, stipends, and contracts.

27. Scafidi, B. (2016). The dismal productivity trend for K-12 public schools and how to improve it. *Cato Journal*, 112-141.

The study explored the impact of public-school increases in school staff funding on student academic achievement, such as assessment testing scores and high school graduation rates. A decline in average educator quality (the result of hiring more teachers and nonteaching staff) and increased bureaucracy and paperwork (which is perhaps inherent when more nonteaching staff are employed) may explain why increased staffing in public schools does not appear to have boosted student achievement (p. 121).

28. Sohn, H., Park, H., & Jung, H. (2022, March 15). The Effect of Extra School Funding on Students Academic Achievements under a Centralized School Financing System. *Education Finance & Policy*. Pgs. 1-51. Retrieved from https://doi.org/10.1162/edfp_a_00375

This paper analyzes the effect of providing extra school funding on student achievement under the homogenous school funding system in South Korea. This study exploits an administrative cutoff rule that determines the provision of school funding and uses a regression discontinuity design to identify a causal impact of extra school funding. The analysis finds that a 20% increase in per-pupil funding for underperforming schools reduced the number of below-average students in mathematics, English, social studies, and science by 19.7%, 17.0%, 16.1%, and 18.1% compared to the control-side means. The research findings suggest that additional funding for underperforming schools to promote vertical equity would improve students' academic outcomes if it were distributed directly to underperforming schools and used to provide new academic programs to students (p. 1).

29. Syverson, E., & Duncombe, C. (2022). Student counts in K-12 funding models. Education Commission of the States. Retrieved from https://www.ecs.org/wp-content/uploads/Student-Counts-in-K-12-Funding-Models.pdf

This policy brief explored the diverse funding models that states are using to make public school funding decisions. One funding model is student-based foundation where districts receive a base amount of funding per student, with additional money or weights added to provide additional support to students with a higher need (per unit allocation, PUA). A second funding model is resource-based allocation where all districts receive a minimum base amount of resources. Resources could be staffing, services or programs, and are often based on a ratio of students to staffing (full time equivalent, FTE). Finally, some states us a hybrid model that combine aspects of student-based foundation models, resource-based allocation models and various cost factors. The brief reported that the state of Texas uses a student-based foundation funding model to make public school funding decisions (p 2).

30. Verstegen, D. A., & Jordan, T. S. (2009). A fifty-state survey of school finance policies and programs: An overview. *Journal of Education Finance*, 213-230.

This overview provides a synthesis of a comprehensive survey of school finance programs in the 50 states conducted in 2006-07. Information was provided by chief state school finance officers or persons with expertise in a state's public school funding-allocation system. Brief descriptions of the major Pre-K-12 funding formulae, district-based finance components, student-based finance components, and revenue and expenditure information were provided for each of the 50 states. Results show an increase in states' use of foundation-type programs; changes as a result of state-level accountability systems, including increased recognition of the differentiated needs of students; and an increase in state support for capital outlay. Consistent with court decisions, states appear to be taking a more active role in the design of public school finance programs that recognize the differences in the needs of pupils, schools, and school districts. (p. 213).

1

Soc Choice Welf (2016) 46:811–837
DOI 10.1007/s00355-015-0937-9

ORIGINAL PAPER

Inequality, opting-out and public education funding

Calin Arcalean[1] · **Ioana Schiopu**[1]

Received: 14 September 2014 / Accepted: 23 November 2015 / Published online: 21 December 2015

Abstract We investigate the effect of inequality on the political support for public education funding in a model of endogenous fertility and school choice. In contrast to recent literature we show that when household income heterogeneity is consistent with the skewness of empirical income distributions, inequality can drive education spending in opposite directions in poor and rich economies. A mean preserving spread increases tax rates and public school enrollment, but decreases public spending per student in low income economies, while it has opposite effects at high income levels. An increase in the average income level can also have non-monotonic effects.

1 Introduction

Public provision of basic education is a major form of redistribution virtually everywhere. As income inequality is on the rise in most countries, investigating the repercussions for public education funding becomes a relevant issue given the particular role of human capital differences in perpetuating economic and social disparities. So far however, empirical work on the link between redistribution and inequality has generated, across a variety of time periods and datasets, rather inconclusive results

We thank Chiara Binelli, Christian Bredemeier, Matthias Doepke, Gerhard Glomm, Volker Meier, Wolfram Richter, Holger Sieg, the editor Marc Fleurbaey and two anonymous referees for useful comments and suggestions. Financial support from Banc Sabadell, the Spanish Ministry of Education and Science (Grant ECO2011-2492) and Generalitat de Catalunya (Grant SGR 2014-1079) is gratefully acknowledged. The usual caveat applies.

✉ Ioana Schiopu
ioana.schiopu@esade.edu

1 ESADE Business School, Ramon Llull University, Avenida de Torreblanca 59, 08172 Sant Cugat del Vallès, Barcelona, Spain

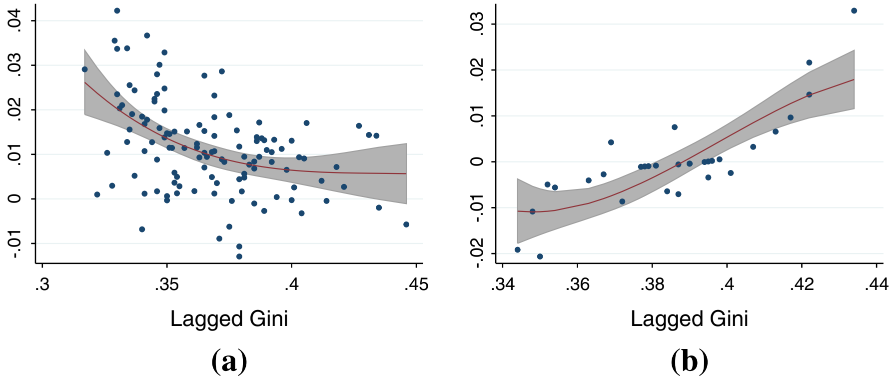


Fig. 1 Public education revenues per pupil and inequality. *Notes* the analysis uses decadal US state-level panel data, 1970–2000. The dependent variable is per pupil state revenues, expressed as a share of state income per capita. The semiparametric fixed effects estimator of Baltagi and Li (2002) is used to partial out control variables including a full set of fixed effects. **a**, **b** depict the nonparametric relation between the resulting error component and the 10 years lagged Gini index, for states with per capita lagged income below and respectively above an income threshold set equal to 1.09 of the sample median value. Results are robust to alternative income thresholds. *Shaded bands* are 95 % confidence intervals based on robust, state level clustered, standard errors. See Appendix 3 for details on the estimation, variable definitions and data sources

indicating a more complex, potentially nonlinear relation.[1] For example, a look at public education funding across US states reinforces this view. Figure 1 suggests the relationship between inequality and per pupil state revenues, conditional on a set of standard controls, may change depending on the level of per capita income. These findings seem to warrant further theoretical efforts aimed at better understanding specific redistribution mechanisms.

In this paper we study a political economy model of public education provision with a private schooling option and endogenous fertility decisions. Importantly, we allow household income heterogeneity to be consistent with the skewness of empirical income distributions, where the median is lower than the mean income. Tax financed uniform public education quality is insufficient for rich parents who choose to send their children to a private school.[2] This generates an endogenous income threshold that separates public and private school users. Ceteris paribus, the higher the public school quality, the lower the private enrollment share. Reflecting a quantity–quality trade-off, households opting for private education choose a lower fertility rate than those opting for public schooling. For transparency, fertility is constant within groups.

The equilibrium public spending arises as the politically mediated balance between the conflicting interests of public and private school users. On the one hand, those

[1] A number of papers have found that support for redistribution is weaker in more unequal or more heterogenous societies (Goldin and Katz 1997; Alesina et al. 1999, 2001; Lindert 1996; Luttmer 2001). Perotti (1996) finds no relationship between inequality and redistribution in democracies. More recently, Boustan et al. (2010) find that rising inequality is associated with higher local revenue collection and expenditures.

[2] The 2011/7 OECD report 'PISA in Focus' states that in the 26 economies surveyed, "the typical student enrolled in private schools outperforms the typical public school student" with the "private school advantage" being "equivalent to three-quarters of a year's worth of formal schooling."

opting for private schooling want to minimize the tax burden. On the other hand, those who choose public schooling, want to ensure adequate spending per student. In this setting we study how the political balance and thus the equilibrium education spending and enrollment respond in two counterfactual experiments: (a) a mean preserving spread of the income distribution and (b) an increase in the tax base keeping income dispersion constant.

First, we show that inequality can drive education spending in opposite directions in poor and rich economies. A mean preserving spread increases tax rates (spending per capita) and public school enrollment, but decreases public spending per student in low income economies, while it has opposite effects at high income levels. A marginal increase in the tax base, holding income dispersion constant, can also have non-monotonic effects. Furthermore, tax base and inequality effects on redistribution depend critically on the parental preferences for quality versus quantity of children.

When inequality increases, the tails of the income distribution (the poor and rich groups) get larger, while the middle income group shrinks. In a poor economy where fertility rates are high and/or the tax base is low, public schools are of low quality, so a large share of the middle income households use private schools (the endogenous income threshold is far from the right tail). A mean preserving spread produces a replacement of these families by high fertility low income families that choose public education. This shift in school choice dominates the negative effect on redistribution generated by a larger rich group. Consequently, the interests of the poor dominate and thus the support for public education increases. However, the endogenous enrollment in public school rises at a faster rate than resources, depressing spending per student. In contrast, when the tax base is high, as in a rich economy, most households from the middle group use public education (the indifference income threshold is close to the right tail). The replacement of families from the middle group by poor ones does not produce a large positive effect on the support for redistribution as the two groups have the same school choice. Thus the larger rich income group steers the political process in their favor, lowering the tax rate and spending on public education. However, the overall public spending per student increases as resources decrease at a lower rate than the endogenous enrollment.

As a benchmark, we focus on probabilistic voting with households that have uniform political power. Asymmetric distribution of political power is typically associated with authoritarian regimes or partially democratic countries. However, it can also arise in well established democracies if, as documented by the literature on political participation, voter turnout varies systematically with demographic characteristics. We extend the model to include an income based index of political power and study its properties. The effects on per student spending and enrollment in public schools are preserved under an empirically relevant degree of political power. In contrast to the benchmark model however, the tax rate can decrease even in the poor economies when inequality increases, depressing the public spending per student even further.

Our results are significant in at least three dimensions. First, we conceptually decompose inequality variation into a tax base change and a pure income dispersion effect and explain the non-trivial role each component plays in determining public spending for education and enrollment in public schools. Second, the theoretical analysis helps illuminate empirical work. On the one hand, the non-monotonic response of redistribution in our framework may justify some of the conflicting results obtained so far in the literature. On the other hand, and more importantly, we provide an alternative framework to think about differences in redistribution through public education. For example, while typical regressions include the median income, our theory suggests controlling for the mean income both directly and through its interactions with dispersion measures. Finally, our results imply a novel mechanism of inequality amplification arising through the endogenous determination of public education spending. To the extent spending per student is important for human capital formation, and thus, future income, diverging public education funding at different mean income levels can widen the initial income disparities.

1.1 Connections to the literature

Our paper contributes to the theoretical literature studying the effects of inequality on public goods provision and income redistribution. While some political economy papers argue that higher inequality leads to more redistribution through higher taxation (Meltzer and Richard 1981; Persson and Tabellini 1994; Bénabou 1997), others find that more unequal or more heterogenous societies spend less on public goods (Soares 1998; de la Croix and Doepke 2009). Glomm (2004) finds that the relationship between inequality and the amount of redistribution through public education services depends on the elasticity of substitution between consumption and the quality of education in the parent's utility. He finds that for empirically relevant value of this parameter, higher inequality generates less redistribution.

Bénabou (1997, 2000) and Lee and Roemer (1998) focus on capital market imperfections to show that non-monotonic responses of redistribution to inequality are possible. Fernandez and Levy (2008) also find a non-monotonic effect of increased diversity in a model with income and preference heterogeneity. Complementary to these studies, we obtain a non-monotonic effect of inequality on redistribution at different levels of the average income per capita stemming from endogenous fertility and education choices. Also, in these papers, redistribution occurs through progressive taxation (Bénabou 2000) or the provision of universal public education (Lee and Roemer 1998). In the latter case, private and public investments in education are complements, but only the rich households top up. In contrast, we focus on public education funding when the rich can opt out of the public system.

While the paper builds on de la Croix and Doepke (2009), our analysis focuses on the effects of inequality on redistribution rather than on the nature of the implemented education system (segregation vs. integration). Using a uniform distribution and a normalized mean income (tax base), they obtain a positive relationship between higher inequality and public spending per pupil. Our framework is different in three important ways. First, we allow for changes in the mean income who in turn affect the size of the tax base. This allows us to study the effects of exogenous changes in the mean income of the economy. Second, we build our analysis on empirically relevant income distributions (rightly skewed). The implicit asymmetry in the mass of rich and poor households generates equilibrium schooling and aggregate fertility outcomes that depend on both income dispersion and the mean income. In contrast with previous literature, in our model the effects of higher income dispersion on spending and enrollment in public schools are non-monotonic in the mean income of the economy. Thus, we recover the result of de la Croix and Doepke (2009) as a particular case and show that inequality can generate a lower public spending per pupil for economies with lower mean income or higher fertility preferences. Finally, we introduce a parsimonious and tractable index of political power that derives naturally from the underlying income distribution and has a straightforward data counterpart. In our framework a unique equilibrium always exists for empirically relevant values of the political power parameter.

In contrast to models that study how sorting across communities affects public goods provision and inequality,[3] in this paper we study how education funding responds to exogenous changes in inequality, driven by national or global factors (e.g. skill biased technological change, international trade) rather then by sorting incentives. Recent empirical studies (e.g. Cutler et al. 1999; Rhode and Strumpf 2003 and Baicker et al. 2012) have shown that even in the United States, the textbook example of Tiebout sorting, segregation across communities has been constant or even declined, suggesting that the rise in income inequality across school districts, metropolitan statistical areas or states in recent decades cannot be explained by Tiebout sorting alone.

The remainder of the paper is structured as follows. Section 2 presents the model. Section 3 defines the equilibrium and derives the main analytical results. Section 4 documents significant participation differences in local politics related to public education provision and extends the benchmark model by incorporating political power. Section 5 concludes. Proofs are relegated to Appendix 1. Appendix 2 is devoted to robustness analysis.

2 The model

2.1 The economy

The economy is populated by a large number of households, which are heterogenous in income. The mass of households is normalized to one. Each household consists of an adult and a number of children. Children are educated either in public schools, which are financed by a consumption tax, or in private schools, financed by parental spending. Household income is distributed according to a *Pareto* distribution, with p.d.f. f and c.d.f. F, with parameters $x_l > 0$ and $\alpha > 2$, and support $x \in [x_l; \infty)$.[4] The Pareto distribution is used for tractability reasons (see also Lee and Roemer 1998). Other distributions used in the literature yield similar qualitative results. As a robustness check, in Appendix 2 we replicate the main results numerically using a log-normal income distribution.

[3] See, for example, Epple et al. (1993), Epple and Platt (1998), Bénabou (1994, 1996), Fernandez and Rogerson (1996), Bearse et al. (2001).

[4] The p.d.f. is given by $f(x) = \alpha x_l^{\alpha}/x^{\alpha+1}$, for $y > y_l$ and zero otherwise. The c.d.f. is $F(x) = 1-(x_l/x)^{\alpha}$.

The mean and standard deviation of the income distribution are given by:

$$\mu = \frac{\alpha}{\alpha - 1} x_l \quad \text{and} \quad \sigma = \frac{x_l}{\alpha - 1}\sqrt{\frac{\alpha}{\alpha - 2}}. \tag{1}$$

Adults derive utility from net of tax consumption c, the number of children n and the quality of their education h, which can be private or public. Private education has a unit price. Let s denote the quality of public schools. Households can opt out of publicly provided education and send their children to a private school of quality e^r. Following de la Croix and Doepke (2009), the preferences are given by:

$$u(c, n, h) = \ln(c) + \gamma\left[\ln(n) + \eta \ln(h)\right], \tag{2}$$

where $h = s, e^r$, $\gamma > 0$ and $\eta \in (0, 1)$.

The assumption of logarithmic utility is consistent with the empirical evidence, which suggests that income and substitution elasticities of education spending have similar magnitudes (see Gradstein et al. 2004, pg. 50–51 for a discussion).

The government taxes the consumption of all households at the constant rate τ. Tax revenues are used to finance public education of uniform quality given by spending per student.

The public policy is determined through a probabilistic voting mechanism described below. Private choices on fertility and education are made before voting on the quality of public education takes place. Agents have perfect foresight regarding the outcome of the voting process. Thus, in equilibrium, the expected spending per student in public education equals the level chosen by voting.

This timing reflects the sizeable differences in the relative costs and time horizons of the decisions involved. While public education spending is usually decided through yearly budget votes, fertility and child rearing decisions cannot be easily adjusted at this frequency and depend largely on "pre-determined" characteristics, such as income, education level, race, religion, etc. A similar argument applies to the choice between public and private schooling, which in general are tightly connected to residential choice and therefore can entail substantial switching costs.[5]

Furthermore, under perfect foresight, a quantity–quality trade-off maps fertility decisions into consistent school choices. Therefore, even if households decide on private vs. public education after policies are set, as long as fertility decisions occur before the vote on public education quality, the same equilibrium will obtain as under the original timing.[6]

2.2 Household's problem

Rearing children involves a time cost. Denote by $\phi \in (0, 1)$ the fraction of the parent's time spent raising a child, and with U^p and U^r the utility of households whose children

[5] de la Croix and Doepke (2009) also conclude that in countries where the educational and residential segregation are correlated, private decisions generate strong lock-in effects.

[6] See Dottori and Shen (2013) for a related discussion.

are educated in the public and private schools, respectively. Given the expected quality of publicly provided education $E[s]$ and the tax rate τ, a household with income x that chooses public education solves the following problem:

$$\max_{\{c\geq 0, n\geq 0\}} U^p(c, n, E[s]) = \ln(c) + \gamma \ln(n) + \gamma\eta \ln(E[s]), \tag{3}$$

$$\text{s.t. } c(1+\tau) \leq x(1-\phi n). \tag{4}$$

The solution of problem (3) is $n^p = \gamma/[\phi(1+\gamma)]$.

On the other hand, a household choosing private education solves:

$$\max_{\{c\geq 0, n\geq 0, e^r\geq 0\}} U^r(c, n, e^r) = \ln(c) + \gamma \ln(n) + \gamma\eta \ln(e^r), \tag{5}$$

$$\text{s.t. } c(1+\tau) + ne^r \leq x(1-\phi n). \tag{6}$$

The solutions to the problem (5) are $n^r = [\gamma(1-\eta)]/[\phi(1+\gamma)]$ and $e^r = \phi\eta x/(1-\eta)$.[7] Comparing n^p and n^r we see that while fertility rates are constant within each group, households that choose private schooling have a lower fertility than those sending their children to public schools. Consumption of both household types is a constant share of income $c = x/((1+\gamma)(1+\tau))$.[8]

Substituting n^p in (3) and n^r and e^r in (5) we obtain the indirect utilities of households that choose public and private schooling, respectively:

$$V^p(x, s, \tau) = \ln\left[\frac{x}{(1+\gamma)(1+\tau)}\right] + \gamma \ln\left[\frac{\gamma}{\phi(1+\gamma)}\right] + \gamma\eta \ln(E[s]) \tag{7}$$

and

$$V^r(x, \tau) = \ln\left[\frac{x}{(1+\gamma)(1+\tau)}\right] + \gamma \ln\left[\frac{\gamma(1-\eta)}{\phi(1+\gamma)}\right] + \gamma\eta \ln\left[\frac{\phi\eta x}{1-\eta}\right]. \tag{8}$$

A household will choose public education if and only if $V^p(x, s, \tau) \geq V^r(x, \tau)$. This inequality is satisfied for households with income lower than a threshold $\widetilde{x}$, given by:

$$\widetilde{x} = \frac{(1-\eta)E[s]}{\delta\phi\eta}, \quad \text{where} \quad \delta = (1-\eta)^{\frac{1}{\eta}} \in (0, 1), \tag{9}$$

where $E[s]$ represents the expected quality of education.

[7] The constant fertility and share of education spending in total income are due to homothetic preferences over the bundle (c, n, h). However, numerical simulations show results are preserved in a framework with non-homothetic preferences as long as the share of private education spending is increasing in income. Thus the fertility differential between the rich and poor households increases with income. Consider the following example: $u(c, n, h) = \ln(c) + \gamma[\ln(n) + \eta \ln(h+\kappa)]$, where $\kappa > 0$. This yields $e^r/y = (y\eta\phi - \kappa)/((1-\eta)y)$, with $\partial(e^r/y)/\partial y > 0$, and $n^r = \gamma y(1-\eta)/((1+\gamma)(y\phi - \kappa))$, where $\partial n^r/\partial y < 0$.

[8] de la Croix and Doepke (2009) obtain similar results assuming an income tax and tax deductibility of private education spending.

Households choose the school type taking the other households' decisions as given. Denote by Ψ the fraction of *households* that choose public schooling:

$$\Psi = F(\widetilde{x}) = \int_{x_l}^{\widetilde{x}} f(x)dx = 1 - \left(\frac{x_l}{\widetilde{x}}\right)^{\alpha}. \tag{10}$$

The fraction of children in public schools is then given by:

$$N = \frac{n^p \Psi}{n^p \Psi + n^r(1-\Psi)}. \tag{11}$$

Substituting the expressions for n^p and n^r we obtain:

$$N = \frac{\Psi}{(1-\eta) + \eta\Psi} > \Psi. \tag{12}$$

2.3 Government budget constraint

The government budget is balanced:

$$\int_{x_l}^{\widetilde{x}} sn^p f(x)dx = \tau \int_{x_l}^{\infty} \frac{x}{(1+\gamma)(1+\tau)} f(x)dx, \tag{13}$$

where the left-hand side is the total public education spending, and the right-hand side the collected tax revenues from both types of households (public and private school users, respectively). The right-hand side of (13) shows clearly that the fraction of income that is taxable is constant across income groups and is equal to $1/((1+\gamma)(1+\tau))$. As a result, the total tax base is constant and does not depend on the fraction of households choosing private schooling. Integrating over the support of the distribution, the right-hand side of the government budget constraint becomes $\tau\mu/((1+\gamma)(1+\tau))$, where $\mu = \int_{x_l}^{\infty} xf(x)dx$ is the average income and also the tax base. Using the expression for n^p in the left-hand side, we can express the quality of public schooling as a function of the fraction of households that choose public schools, Ψ, and the tax rate, τ:

$$s\Psi\frac{\gamma}{\phi} = \frac{\tau\mu}{1+\tau}. \tag{14}$$

2.4 Voting on public education funding

Public policies are determined through probabilistic voting. This approach allows smooth aggregation of preferences under opting out and, more importantly, provides a general treatment for the cases, often seen in reality, in which the median voter is no longer pivotal, either by design (e.g. qualified majority required to pass legislation) or due to political power considerations (e.g. voter turnout varies systematically with demographic characteristics). We study the latter in detail in Sect. 4.

The voting problem is unidimensional, i.e. once the tax rate is chosen, the spending per student s is determined from (14). Consider a set-up with two political parties, each proposing a program. Voters care about the education policy proposed but also about a second dimension of the electoral platform, called "ideology". The probability that an individual votes for a party thus depends on her ideological bias toward the party's proposed platform. The results of the elections are a random event, each party having a probability of winning.

The ideological preferences are assumed to be orthogonal to those on public policy. Thus, the probability that a person votes for a certain party (and the party vote share) is a smooth function of the distance between the two platforms. This framework has a unique equilibrium in which both parties converge to the same platform (see Persson and Tabellini 2002), which maximizes the following social welfare function:

$$W(\tau) = \int_{x_l}^{\widetilde{x}} V^P(x, n^p, s, \tau) p(x) f(x) dx + \int_{\widetilde{x}}^{\infty} V^R(x, n^r, e^r, \tau) p(x) f(x) dx, \tag{15}$$

subject to the government budget constraint (14).

The first (second) term of the welfare function is the aggregate utility of the households that choose public (private) education, respectively. The term $p(x)$ captures the political power of the group. We first assume $p(x) = 1$, that is, all voters have the same political power. We relax this assumption in Sect. 4.

Since fertility and education choices are determined before the vote takes place, the income threshold $\widetilde{x}$ is taken as given in the maximization of 15.

Substituting the indirect utility functions, (7) and (8), in (15) and grouping terms, we get:

$$\begin{aligned} W(\tau) = \ln\left(\frac{1}{(1+\gamma)(1+\tau)}\right) + \gamma \ln\left[\frac{\gamma}{\phi(1+\gamma)}\right] + \gamma\eta \ln(s(\tau)) \int_{x_l}^{\widetilde{x}} f(x)dx \\ + \int_{\widetilde{x}}^{\infty} \left\{\gamma \ln(1-\eta) + \gamma\eta \ln\left[\frac{\phi\eta x}{1-\eta}\right]\right\} f(x)dx. \end{aligned}$$

Since only the first and the third term are functions of the policy variables, the welfare can be rewritten (with abuse of notation) as

$$W(\tau) = -\ln(1+\tau) + \gamma\eta\Psi \ln(s(\tau)), \tag{16}$$

where $\Psi(\widetilde{x})$ is taken as given. Substituting s from (14) and taking the first order condition with respect to τ yields:

$$\tau = \gamma\eta\Psi. \tag{17}$$

Everything else equal, the tax increases with the households' concern for children as well as with the fraction of households using public education. In the next section we define the equilibrium and study its properties.

3 Equilibrium analysis

Definition 1 A politico-economic equilibrium is an income threshold $\widetilde{x}$ satisfying (9), private allocations (c^p, n^p) if $x \leq \widetilde{x}$, (c^r, n^r, e^r) if $x > \widetilde{x}$, and a public policy (s, τ) such that:

(i) household's decisions solve problems (3) or (5), given expected public education quality $E[s]$;
(ii) the government budget is balanced, i.e. it satisfies (14);
(iii) the tax rate τ solves the social welfare maximization problem (15);
(iv) households have perfect foresight: $s = E[s]$.

Next, we solve for the equilibrium threshold $\widetilde{x}$. To minimize clutter, we drop functional dependencies where possible. We use the expression of s, (14), and τ, (17) in (9) to obtain:

$$\widetilde{x} = \frac{\mu}{\delta} \frac{1-\eta}{1+\gamma\eta\Psi(\widetilde{x})}. \tag{18}$$

Using (10) yields the following equation:

$$\widetilde{x} = \frac{\mu}{\delta} \frac{1-\eta}{1+\gamma\eta\left[1-\left(\frac{x_l}{\widetilde{x}}\right)^{\alpha}\right]}. \tag{19}$$

Equation (19) shows that in equilibrium, households' private education decisions are consistent with the aggregate outcomes.

Proposition 1 *There exists a unique and interior equilibrium income threshold* $\widetilde{x}^* \in (x_l, \infty)$ *that solves Eq.* (19) (*proof in the Appendix*).

Note that the equilibrium threshold $\widetilde{x}^*$ is always interior because the support of the income distribution does not have an upper bound. When $\widetilde{x}^* \to \infty$, the fraction of students in public schools goes asymptotically to 1. Equilibrium uniqueness also owes to the endogenous fertility, which ensures that the tax base is independent of public education enrollment and thus the right hand side of Eq. (19) is decreasing in Ψ.

Proposition 1 implies there is a unique equilibrium public spending per student:

$$s^* = \frac{\widetilde{x}^*\phi\eta\delta}{1-\eta} = \frac{\phi\eta\mu}{1+\gamma\eta\left[1-\left(\frac{x_l}{\widetilde{x}^*}\right)^{\alpha}\right]}. \tag{20}$$

We use Eqs. (10) and (20) to express Ψ^* as a function of s^*:

$$\Psi^* = \frac{1}{\gamma\eta}\left(\frac{\phi\eta\mu}{s^*} - 1\right). \tag{21}$$

Using (10) in (12), we obtain the equilibrium enrollment in public schools:

$$N^* = \frac{\Psi^*}{(1-\eta)+\eta\Psi^*}, \quad \text{where} \quad \Psi^* = 1-\left(\frac{x_l}{\widetilde{x}^*}\right)^{\alpha}. \tag{22}$$

In the following, we investigate how changes in the income distribution affect the main policy variables. We focus on two experiments: (a) a change in the average income per capita μ, keeping the standard deviation σ constant and (b) a mean preserving spread in the income distribution (change σ while keeping μ constant).

3.1 A change in the mean income (tax base)

Now we analyze the effects of changing the mean income, μ, on the equilibrium public spending per student s^*, the tax rate τ^*, and enrollment in public schools N^*. Recall that in our model μ also represents the tax base.

Denote by $d(\mu,\sigma) = [x_l(\mu,\sigma)/\widetilde{x}(\mu,\sigma)]^{\alpha(\mu,\sigma)}$. The derivative of N^* with respect to μ is:

$$\begin{aligned}\frac{\partial N^*}{\partial \mu} &= \frac{1-\eta}{[(1-\eta)+\eta\Psi^*]^2}\frac{\partial \Psi^*}{\partial \mu}\\ &= \frac{1-\eta}{[(1-\eta)+\eta\Psi^*]^2}\frac{\phi}{\gamma}\frac{s^*-\mu\frac{\partial s^*}{\partial \mu}}{(s^*)^2},\end{aligned} \tag{23}$$

where

$$\frac{\partial s^*}{\partial \mu} = \frac{\phi\eta\left\{1+\gamma\eta(1-d)+\mu\gamma\eta\dfrac{\partial d(\mu,\sigma)}{\partial \mu}\right\}}{\left[1+\gamma\eta(1-d)\right]^2}. \tag{24}$$

Using (17) and (21) we obtain the change in the equilibrium tax rate with respect to μ:

$$\frac{\partial \tau^*}{\partial \mu} = \gamma\eta\frac{\partial \Psi^*}{\partial \mu}.$$

Thus, $sign(\partial\tau^*/\partial\mu) = sign(\partial\Psi^*/\partial\mu) = sign(\partial N^*/\partial\mu)$. Studying the properties of the function $\partial N^*/\partial\mu$ yields the following results.

Proposition 2 *Let* $\underline{\gamma} = \{[2(1-\eta)/(\delta e)]-1\}/\{\eta[1-e^{-2}]\}$ *and* $\overline{\gamma} = \{[(1-\eta)/\delta]-1\}/\{\eta[1-(1/e)]\}$, *where e is the Euler's constant.*

(1) *If* $\gamma \leqslant \underline{\gamma}$, *then* $\partial N^*/\partial\mu > 0$ *and* $\partial\tau^*/\partial\mu > 0$;
(2) *If* $\gamma \geqslant \overline{\gamma}$, *then* $\partial N^*/\partial\mu < 0$ *and* $\partial\tau^*/\partial\mu < 0$;
(3) *If* $\gamma \in (\underline{\gamma}, \overline{\gamma})$, *then there exist a unique* $\widehat{\mu} \in (0,\infty)$ *such that*
(3.1) *if* $\mu \in (0,\widehat{\mu}]$, *then* $\partial N^*/\partial\mu \leqslant 0$ *and* $\partial\tau^*/\partial\mu \leqslant 0$;
(3.2) *if* $\mu \in (\widehat{\mu},\infty)$, *then* $\partial N^*/\partial\mu > 0$ *and* $\partial\tau^*/\partial\mu > 0$;

(*proof in the Appendix*).

The next corollary establishes sufficient conditions under which the equilibrium spending per student s^* varies positively with the mean income.

Corollary 1 (1) *If* $\gamma \geqslant \overline{\gamma}$, *then* $\partial s^*/\partial\mu > 0$;
(2) *If* $\gamma \in (\underline{\gamma}, \overline{\gamma})$ *there exists* $\widetilde{\mu} > \widehat{\mu}$ *such that* $\partial s^*/\partial\mu > 0$ *on the interval* $\mu \in (0,\widetilde{\mu})$ (*proof in the Appendix*).

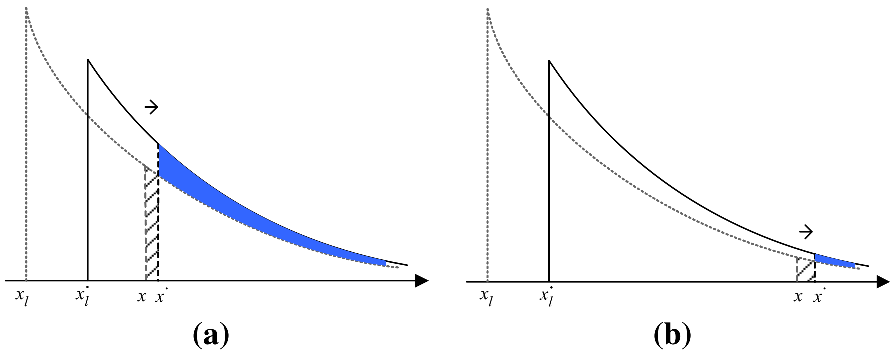


Fig. 2 An increase in the tax base (mean income per capita). An increase in the tax base (mean income per capita), indicated by *dot variables* (e.g. $\mu^{\bullet} > \mu$) and *solid lines*. **a** High fertility preference (γ) or low tax base (μ). **b** Low fertility preference or high tax base. The *arrow* indicates the endogenous change in the indifference threshold. *Dark* (*light*) *shaded areas* represent increases (decreases) in the support for private education

As it is apparent from Proposition 2, the effects of an increase in the tax base depend on γ. Equilibrium fertility allocations n^p and n^r are increasing functions of γ, while private education spending e^r does not depend on γ.[9] We therefore interpret γ as a relative weight of fertility in the parental preferences.

Everything else equal, a marginal increase in the tax base keeping dispersion constant has two effects. As x_l increases, the right tail of the income distribution becomes thicker. The increase in the mass of relatively richer households has a positive effect on the demand for private education. Call this the (exogenous) *shape effect*. Second, it increases the resources available for public education. This makes the households that were previously indifferent between private and public education always choose the latter. Call this the (endogenous) *threshold effect.* The two movements have opposite effects on the tax rate and equilibrium enrollment. The net effect depends on the quality of public education (defined as spending per student) relative to the private option.

Public education quality is low when few resources are available (low μ) or when there are many children enrolled (high γ, i.e. high fertility), corresponding to case 2 and 3.1 in Proposition 2 . Panel a in Fig. 2 shows this case. This implies a relatively large mass of rich households in the right tail choosing, in equilibrium, private education. An increase in μ further increases this mass, generating a large increase in the support for private education (the shape effect). It dominates the higher enrollment in public education by some middle income families caused by the threshold effect. Therefore the equilibrium tax and public enrollment decrease. However, the equilibrium spending per student can increase as the withdrawal of rich households from public education frees some resources.

Panel b in Fig. 2 shows the case when the tax base (μ) is high or fertility preference (γ) is low (regimes 1 and 3.2 in Proposition 2). In this case, the public education resources are high, so only the very rich households prefer private education. Thus, when the tax base increases, the shape effect generates a more modest boost of demand

[9] As γ increases, parents prefer fertility (γ) over quality ($\gamma\theta$) since since $\theta < 1$.

for private education than in the case above. Again, the threshold effect implies borderline households choose public education when average income increases marginally. However, the threshold effect dominates the shape effect in this case. Increased support for public education generates higher enrollment and taxes. Nonetheless, equilibrium spending per student can decrease if the increase in enrollment outpaces that in revenues.

3.2 A mean preserving spread

Next, we analyze the relationship between public policies and inequality—proxied by σ, the standard deviation of the income distribution. We perform a mean-preserving spread and study its implications on equilibrium public spending per student s^*, the tax rate τ^*, and the enrollment in public schools N^*. Taking the derivative of s^* with respect to σ while keeping μ constant yields:

$$\frac{\partial s^*}{\partial \sigma} = \frac{\phi\eta\mu}{\{1+\gamma\eta\,[1-d(\mu,\sigma)]\}^2}\frac{\partial d(\mu,\sigma)}{\partial \sigma}, \tag{25}$$

where $d(\mu,\sigma) = [x_l(\mu,\sigma)/\widetilde{x}(\mu,\sigma)]^{\alpha(\mu,\sigma)}$. Also,

$$\frac{\partial N^*}{\partial \sigma} = \frac{1-\eta}{[(1-\eta)+\eta\Psi^*]^2}\frac{\partial \Psi^*}{\partial \sigma} = -\frac{1-\eta}{[(1-\eta)+\eta\Psi^*]^2}\frac{\phi\mu}{\gamma(s^*)^2}\frac{\partial s^*}{\partial \sigma}$$
$$\frac{\partial \tau^*}{\partial \sigma} = \gamma\eta\frac{\partial \Psi^*}{\partial \sigma}.$$

Thus, $sign(\partial\tau^*/\partial\sigma) = sign(\partial\Psi^*/\partial\sigma) = sign(\partial N^*/\partial\sigma) = -sign(\partial s^*/\partial\sigma)$. Next, we study the properties of functions $\partial s^*/\partial\sigma$, $\partial N^*/\partial\sigma$, and $\partial\tau^*/\partial\sigma$. The results are summarized in the following proposition:

Proposition 3 *Let* $\underline{\gamma} = \{[2(1-\eta)/(\delta e)]-1\}/\left\{\eta\left[1-e^{-2}\right]\right\}$ *and* $\overline{\gamma} = \{[(1-\eta)/\delta] - 1\}/\{\eta\,[1-(1/e)]\}$, *where e is the Euler's constant.*

(1) *If* $\gamma \leqslant \underline{\gamma}$, *then* $\partial\tau^*/\partial\sigma < 0$, $\partial N^*/\partial\sigma < 0$, $\partial s^*/\partial\sigma > 0$;
(2) *If* $\gamma \geqslant \overline{\gamma}$, *then* $\partial\tau^*/\partial\sigma > 0$, $\partial N^*/\partial\sigma > 0$, $\partial s^*/\partial\sigma < 0$;
(3) *If* $\gamma \in (\underline{\gamma}, \overline{\gamma})$, *then there exist a unique* $\widehat{\mu} \in (0,\infty)$ *such that*
(3.1) *if* $\mu \in (0,\widehat{\mu}]$, *then* $\partial\tau^*/\partial\sigma \geqslant 0$, $\partial N^*/\partial\sigma \geqslant 0$, $\partial s^*/\partial\sigma \leqslant 0$;
(3.2) *if* $\mu \in (\widehat{\mu},\infty)$, *then* $\partial\tau^*/\partial\sigma < 0$, $\partial N^*/\partial\sigma < 0$, $\partial s^*/\partial\sigma > 0$;

(*proof in the Appendix*).

The intuition of these results is the following. A mean preserving spread decreases the size of the middle class, adding mass to the tails of the income distribution (poor and rich households). This is the shape effect. Whether support for public education increases or not following this change in the shape of the distribution depends on the initial *location* of the indifference threshold. Moreover, the endogenous response of this threshold to higher inequality generates an additional effect.

Again, consider the case of low public education quality (low μ or high γ), corresponding to cases 2 and 3.1 in Proposition 3, and shown in panel a of Fig. 3. This

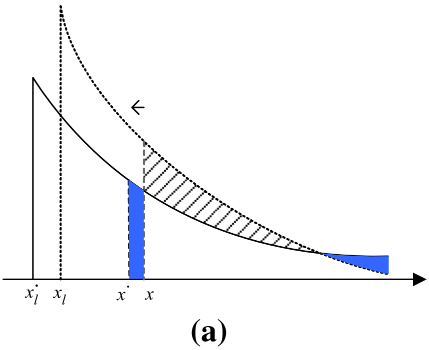


Fig. 3 A mean preserving spread. A mean preserving spread, indicated by *dot variables* (e.g. $\sigma^{\bullet} > \sigma$) and *solid lines*. **a** High fertility preference (γ) or low tax base (μ). **b** Low fertility preference or high tax base. The *arrow* indicates the endogenous change in the indifference threshold. *Dark* (*light*) *shaded areas* represent increases (decreases) in the support for private education

implies that many rich and middle income households choose the private option. Thus, the indifference threshold lies relatively far from the right tail, in some middle income range. First, there are *two opposing shape effects* that arise under a mean preserving spread. On the one hand, the middle class shrinks and so does the support for private education. On the other hand, the mean preserving spread increases the mass of rich households in the right tail who send their children to private education. The overall effect on demand for public education thus depends on the relative magnitude of these opposing effects. Second, when public education is of low quality, an increase in inequality prompts the threshold households to switch to private education, as the mean preserving spread adds more poor, high fertility households in the left tail, which further reduce spending per student. This is the *threshold effect*. In this case, the negative effect on the demand for private education caused by the reduction of middle class dominates the positive effects stemming from the extra mass of rich households as well as the endogenous shift in the income threshold towards private schooling. As a result, the enrollment in public schools goes up and so does the tax rate. Despite the increase in revenues (and the extra resources made available by households who left public schools), spending per student is lower in equilibrium as middle income households (who were choosing lower fertility and private schooling before) have been replaced by low income and high fertility households that benefit from public education.

Conversely, when the tax base (μ) is large or fertility preference (γ) is low, such as in cases 1 and 3.2 in Proposition 3 (panel b of Fig. 3), the resources for public schooling are higher and, compared with the case above, the mass of middle income households that prefer private education is lower. Thus, the negative effect on the demand for private education generated by a reduction of middle income class is weaker and it is likely to be dominated by the positive effect generated by an increase in the mass of rich households (*the shape effects*). Second, there is again a *threshold effect*. In this case, the marginal households strictly prefer public education when inequality increases. Since the indifference threshold is far in the tail, the increase in demand for private education from the extra mass of rich households dominates, generating a decrease in public enrollment and the tax rate. In equilibrium, public school enrollment decreases faster than tax revenue, resulting in an increase in public spending per student. de la Croix and Doepke (2009) obtain this result using a uniform income distribution with normalized mean set equal to one. There, focusing on the empirically relevant case where a majority of the population is in public schools ($\Psi > 1/2$) implies a mean preserving spread always increases the support for private education, as in panel b of Fig. 3 above. However, with a rightly skewed distribution, a mean preserving spread can lead to opposing effects while maintaining $\Psi > 1/2$ since the left tail becomes proportionately fatter (more low income people needed to balance out few very high income individuals) than under a uniform distribution (where the same number of low and high income people are added in the tails).

To sum up, when inequality increases, the size of the poor and rich class increases at the expense of the middle class. When the tax base is low enough, the need for public education spending goes up steeply as a large share of mid income families choosing low fertility and private schooling are now replaced by high fertility low income families that choose public education. Thus, the relatively poorer households steer the political process in their favor, raising the tax rate. As the tax base is a constant share of the mean income, this increases the public spending per capita, or the size of redistribution. When the tax base is high, the interests of the rich households dominate as the shifts in fertility and education choices associated with the mean preserving spread are now weaker. Thus, the tax rate and the size of redistribution go down. Interestingly, the per student spending in public education, being driven by the endogenous response of enrollment, decreases in the first case and increases in the second.

4 Political power

So far we have assumed that each household carries the same weight in the political process. Besides the obvious cases of authoritarian regimes or partially democratic countries, asymmetric distribution of political power can also arise in established democracies if, for example, voter turnout varies systematically with income or demographic characteristics.[10]

In this section we use the benchmark model to implement and study a general, yet parsimonious political power function that assigns more clout to the rich. Next, we show that under fairly general conditions the equilibrium continues to be unique. Finally, we analyze the effects of uneven political representation on the public education budget, enrollment and spending per student.

To model the direct dependence between income and political power, we define

$$p(x) = x^{\nu}, \tag{26}$$

[10] For example, in the 2006 US Congressional elections 50.7 % in the lowest income group (less than \$10,000) registered but only 24.3 % voted, compared to 82.1 % registration and 64.6 % turnout in the highest bracket (\$150,000 and over). See also Verba et al. (1995), Rosenstone and Hansen (1993), Morlan (1984), Hajnal and Lewis (2003).

where x is the income level and $\nu > 0$. The welfare function (15) becomes

$$W(\tau) = \int_{x_l}^{\widetilde{x}} \left\{ \ln\left[\frac{x}{(1+\gamma)(1+\tau)}\right] + \gamma \ln\left[\frac{\gamma}{\phi(1+\gamma)}\right] + \gamma\eta \ln(s) \right\} p(x) f(x) dx$$
$$+ \int_{\widetilde{x}}^{\infty} \left\{ \ln\left[\frac{x}{(1+\gamma)(1+\tau)}\right] + \gamma \ln\left[\frac{\gamma(1-\eta)}{\phi(1+\gamma)}\right] + \gamma\eta \ln\left[\frac{\phi\eta x}{1-\eta}\right] \right\}$$
$$\times\, p(x) f(x) dx.$$

Then, using (26) and retaining the relevant terms simplifies the expression to

$$W(\tau) = -\ln(1+\tau) + \gamma\eta\Psi^p \ln(s). \tag{27}$$

where $\Psi^p = 1 - (x_l/\widetilde{x})^{\alpha-\nu}$. In the following we assume $\alpha > \nu$, so that Ψ^p is interior.

Notice that the only difference relative to (16), the aggregate welfare in the benchmark model, is the weight assigned to public education spending, which here is Ψ^p rather than $\Psi = 1 - (x_l/\widetilde{x})^{\alpha}$. It is easy to see that $\Psi^p < \Psi$. Thus, when political power is directly proportional to income, the interests of the rich (lower taxes) have a higher weight in the aggregate welfare. Since they are using mostly private education, the social welfare function reflects the new political balance by assigning a lower weight to public education provision.

The definition of equilibrium is similar to that in the benchmark model. The optimal tax rate is

$$\tau^p = \gamma\eta\Psi^p,$$

while the private education income threshold is given by

$$\widetilde{x} = \frac{\mu}{\delta}\frac{1-\eta}{\Psi}\frac{\Psi^p}{1+\gamma\eta\Psi^p}. \tag{28}$$

Proposition 4 *Let* $\{2/[(1-\eta)^{1/\eta-1}] - 1\}/\eta$. *If* $\gamma > \underline{\gamma}^p$, *there exists a unique equilibrium income threshold* $\widetilde{x}^* \in (x_l, \infty)$ *that solves Eq.* (28), $\forall \nu > 0$. *Moreover, uniqueness is ensured* $\forall \gamma > 0$, *for sufficiently small* ν (*proof in the Appendix*).

In the benchmark model, higher public education enrollment translates into higher tax revenues as the tax rate increases with the propensity to choose public education and the tax base stays constant. However, now the chosen tax rate reflects the taste of rich households for private education. In the following we study how the main results in the previous section change when we allow for political power.

Notice that the political power specification (26) is a monotonic and continuous function of income. Furthermore, as $\nu \to 0$, the income weights in the social welfare function vanish, yielding the benchmark model. Thus, in the limit, the results derived in Propositions 2 and 3 continue to hold.

Moreover, (26) provides a tractable way of determining the parameter ν based on the income level and the propensity to vote. Thus, knowing that the income groups x_l

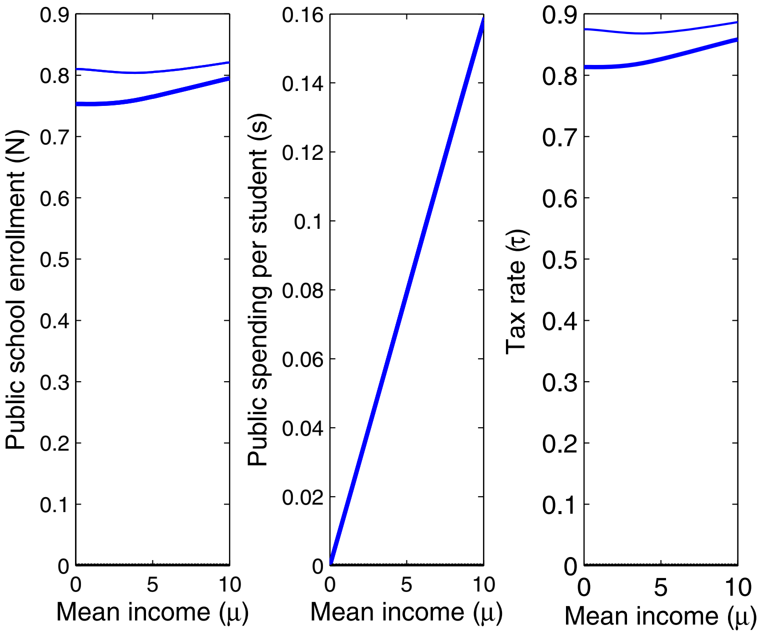


Fig. 4 Tax base effects. Main education variables as a function of the mean income (tax base), keeping dispersion constant, under political power ($\nu = 0.26$, *thick line*) versus benchmark ($\nu = 0$, *thin line*)

and x_h have propensities to vote p_l and p_h respectively, $\nu = \ln(p_h/p_l)/\ln(x_h/x_l)$. According to the 2006 Voter and Registration Supplement of the Current Population Survey, only 20.8 % of those with income under $10K$ voted while among those with income from \$$100K$ to \$$150K$ the turnout was of 60.9 %. Using the midpoints of the two income brackets together with the respective turnout figures yields $\nu = 0.33$. Similar calculations with 2008 data yield $\nu = 0.18$.

For illustration, we replicate the exercises in Propositions 2 and 3 with and without political power. We use $\nu = 0.26$, $\phi = 0.075$, $\eta = 0.4$ and $\gamma = 2.7$ in the benchmark model, corresponding to the case of intermediate fertility rates (case 3).

Figure 4 graphs the three policy variables—public school enrollment, public spending per capita and the tax rate—as functions of the average income per capita, keeping dispersion constant. The thin lines represent the benchmark model and the thick lines the model with political power.

As expected, adding income correlated political weights lowers the tax rates at all income levels. However, lower taxation determines some households to switch to private education and thus enrollment in public schools also declines. Thus, public spending per student declines much less than revenues. Besides these level effects, political power induces tax rates to strictly increase with the mean income. In the benchmark model the tax rates follow a U-shaped pattern as a function of mean income for intermediate values of γ.

The thin lines in Fig. 5 display, from left to right, *changes in the main variables*, for a range of mean incomes when the standard deviation of the distribution increases by

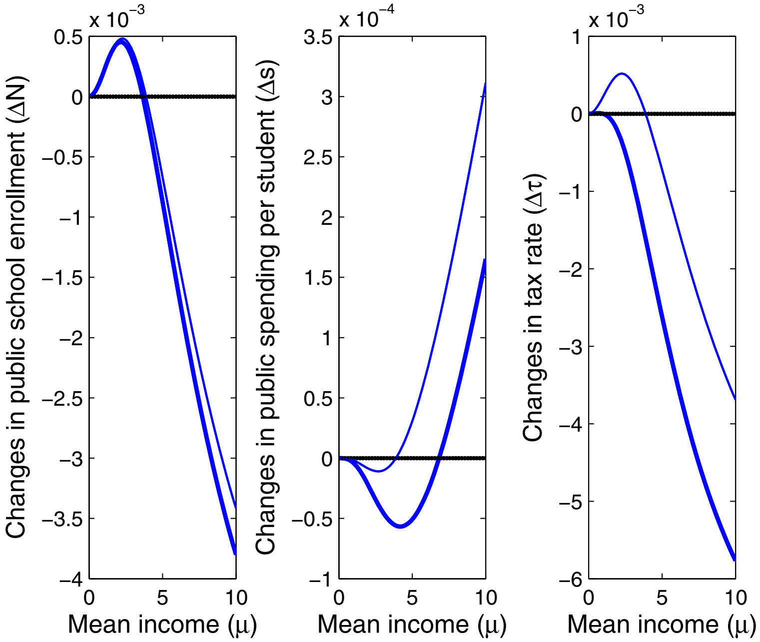


Fig. 5 Effects of a mean preserving spread. *Changes* in the main education variables from a 10 % increase in income dispersion, for a given mean income, under political power ($\nu = 0.26$, *thick line*) versus benchmark ($\nu = 0$, *thin line*)

10 %. Thus, in the leftmost panel, public school enrollment increases with inequality in poor economies but declines in more unequal rich countries, as already shown in Proposition 3. Then, we allow for political power. The thick lines depict similar changes when inequality increases. Rich households now have more power in setting the tax rate, such that higher inequality leads to lower tax rates in all countries as well as more abrupt declines in spending per student in low income economies. Case 3 in Proposition 3 shows that for intermediate values of the altruism coefficient γ, the equilibrium tax rate increases with inequality in poor economies, where the welfare of the relatively more numerous disadvantaged households depends on the quality of public schooling. This effect is overturned by allowing richer households to enjoy political power.

We have shown that augmenting the model to include political power preserves the uniqueness of the politico-economic equilibrium under fairly general conditions and induces the tax rate and the public spending per student to decrease more strongly with inequality. Moreover, while comparative statics results in the benchmark model are preserved for small asymmetries in political power ($\nu \rightarrow 0$), for values of ν consistent with observed turnout levels by income categories, the tax rate can decrease with inequality irrespective of the average income in the economy.[11]

[11] One can show that $\partial\tau^*/\partial\sigma < 0, \forall\mu > 0$ for ν large enough.

5 Concluding remarks

We have analyzed the role of inequality in the determination of public education spending in a voting model with opting out and endogenous fertility. We show that modelling household income heterogeneity to be consistent with the skewness of empirical income distributions has important consequences for the qualitative properties of the political equilibrium. We find a non-monotonic relationship between inequality and per student public spending, depending on (1) the preference for fertility relative to children quality and (2) the average per capita income (the tax base) in the economy. For moderate fertility preferences, we show that a mean preserving spread decreases public spending per student but increases tax rates and public school enrollments when the average income per capita is low, while it has opposite effects in richer economies. A marginal increase in the tax base, holding income dispersion constant, also yields non-monotonic effects. Extending the benchmark model to include income dependent political power reveals that higher inequality can lower tax rates independently of the average income in the economy. This could exacerbate the decrease in public spending per student in poor economies.

For the sake of clarity and comparability with previous literature, the model has been simplified along a number of dimensions. For example, public education has been assumed to be uniform in quality. However, a quantity–quality tradeoff also arises if higher quality public education can be purchased with material resources (e.g. buying a house in a good neighborhood or topping up with private lessons). This will lead to an inverse relation between fertility and income *within* the group of households choosing public education in addition to the existing differences between private and public education takers. Thus, our mechanism relying on fertility differences between the rich and poor would go through. Second, education quality is given by spending per student. In reality the productivity of a given amount of public spending might be reduced by various inefficiencies, e.g. unionization of teachers. In Appendix 2 we show that results hold when the public schools are less efficient than the private ones in the use of resources.

In this paper we have focused on the effect of inequality on redistribution. However, recent macroeconomic literature has emphasized the strong feedback effect of education and fertility differentials on the income distribution. For example, de la Croix and Doepke (2004) study the dynamics of growth and inequality in an economy with endogenous fertility under public vs. private education. They find public education can deliver lower inequality and, in some cases, a higher growth rate. While our results suggest the endogenous determination of public education spending can act as an inequality amplification mechanism, a thorough exploration of these dynamic implications is left for future research. Also, while this paper focuses on the political economy of education spending, optimal policies under opting out deserve further attention.

Our results question the conventional wisdom regarding the redistributive role of public education, an important pillar of the modern welfare state. They suggest the relationship between income inequality and redistribution depends critically on the nature of the redistributive policy at hand, and in particular on the type of adjustments that can be expected from private agents in response to this policy. A careful assessment of these endogenous responses in other spheres of public policy is a potentially fruitful research avenue.

Appendix 1

Proof of Proposition 1 The LHS of Eq. (19) is continuous and increasing in $\widetilde{x}$, while the RHS is continuous and decreasing in $\widetilde{x}$. Moreover, $\lim_{\widetilde{x}\to\infty} LHS(\widetilde{x}) = \infty > \lim_{\widetilde{x}\to\infty} RHS(\widetilde{x}) = \mu(1-\eta)/\left[\delta(1+\gamma\eta)\right]$. Next, $RHS(x_l) = \mu(1-\eta)/\delta = \alpha x_l(1-\eta)/[\delta(\alpha-1)] > LHS(x_l) = x_l$. By the Intermediate Value Theorem, the solution of Eq. (19) is interior and unique.

Proof of Proposition 2 Equation (23) implies that $sign(\partial N^*/\partial\mu) = sign(s^* - \mu(\partial s^*/\partial\mu))$.

The first steps of the proof develop the results needed to find an expression for $s^* - \mu(\partial s^*/\partial\mu)$ that can be signed.

Recall $d(\mu,\sigma) = [x_l(\mu,\sigma)/\widetilde{x}(\mu,\sigma)]^{\alpha(\mu,\sigma)}$ and

$$s^* = \frac{\phi\eta\mu}{1+\gamma\eta(1-d)}. \tag{29}$$

Next, we get $\partial s^*/\partial\mu$:

$$\frac{\partial s^*}{\partial\mu} = \frac{(s^*)^2}{\phi\mu}\left\{\frac{\phi}{s^*} + \gamma\frac{\partial d(\mu,\sigma)}{\partial\mu}\right\}. \tag{30}$$

$$\frac{\partial d(\mu,\sigma)}{\partial\mu} = d(\mu,\sigma)\left[\frac{\partial\alpha}{\partial\mu}\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \alpha\frac{\widetilde{x}^*}{x_l}\frac{\frac{\partial x_l}{\partial\mu}\widetilde{x}^* - x_l\frac{\partial\widetilde{x}^*}{\partial\mu}}{(\widetilde{x}^*)^2}\right] \tag{31}$$

$$= d\left[\frac{\partial\alpha}{\partial\mu}\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \frac{\alpha}{x_l}\frac{\partial x_l}{\partial\mu}\right] - d\frac{\alpha}{\widetilde{x}^*}\frac{\partial\widetilde{x}^*}{\partial\mu}. \tag{32}$$

We use (1) to write x_l and α as functions of the first two moments, μ and σ :

$$x_l(\mu,\sigma) = \frac{\alpha(\mu,\sigma)-1}{\alpha(\mu,\sigma)}\mu, \quad \text{and} \quad \alpha(\mu,\sigma) = 1+\sqrt{1+\frac{\mu^2}{\sigma^2}}. \tag{33}$$

We use (33) to find $\partial x_l/\partial\mu$:

$$\frac{\partial x_l}{\partial\mu} = \frac{\alpha-1}{\alpha} + \frac{\mu}{\alpha^2}\frac{\partial\alpha}{\partial\mu}, \tag{34}$$

where

$$\frac{\partial\alpha}{\partial\mu} = \left(1+\frac{\mu^2}{\sigma^2}\right)^{-1/2}\frac{\mu}{\sigma^2} > 0. \tag{35}$$

Using (34) and

$$\frac{1}{\widetilde{x}^*}\frac{\partial \widetilde{x}^*}{\partial \mu} = \frac{\partial s^*}{\partial \mu}\frac{1}{s^*} \tag{36}$$

in (32), we obtain:

$$\frac{\partial d(\mu,\sigma)}{\partial \mu} = d\left[\frac{\partial \alpha}{\partial \mu}\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \frac{\alpha-1}{x_l} + \frac{\mu}{\alpha x_l}\frac{\partial \alpha}{\partial \mu}\right] - d\frac{\alpha}{s^*}\frac{\partial s^*}{\partial \mu}. \tag{37}$$

We use (37) in (30) and $x_l = (\alpha - 1)\mu/\alpha$. Rearranging terms, we get:

$$\frac{\partial s^*}{\partial \mu}\left(1 + d\frac{\alpha\gamma}{\phi}\frac{s^*}{\mu}\right) = \frac{s^*}{\mu} + \frac{\alpha\gamma}{\phi}\frac{(s^*)^2}{\mu^2}d + \frac{(s^*)^2}{\phi\mu}\gamma d\frac{\partial \alpha}{\partial \mu}\underbrace{\left[\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \frac{\mu}{\alpha x_l}\right]}_{\omega(\mu,\sigma)}. \tag{38}$$

We use (38) and $x_l = (\alpha - 1)\mu/\alpha$ to compute $s^* - \mu(\partial s^*/\partial \mu)$. We obtain:

$$s^* - \mu\frac{\partial s^*}{\partial \mu} = -\frac{\gamma d\frac{(s^*)^2}{\phi}\frac{\partial \alpha}{\partial \mu}\left[\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \frac{\mu}{\alpha x_l}\right]}{1 + d\frac{\alpha\gamma}{\phi}\frac{s^*}{\mu}}. \tag{39}$$

Denote by $\omega(\mu,\sigma) = \ln(x_l/\widetilde{x}^*) + \mu/(\alpha x_l)$. As $\partial\alpha/\partial\mu > 0$, $sign(s^* - \mu(\partial s^*/\partial\mu)) = -sign(\omega(\mu,\sigma)) \Longrightarrow sign(\partial N^*/\partial\mu) = -sign(\omega(\mu,\sigma))$.

Next, we study the $sign(\omega(\mu,\sigma))$. From the expression of $\omega(\mu,\sigma)$ we see that $\omega(\mu,\sigma) \geqslant 0 \Longleftrightarrow \mu/(\alpha x_l) \geqslant \ln(\widetilde{x}^*/x_l) \Longleftrightarrow \widetilde{x}^* \leqslant \widehat{x}$, where $\widehat{x} = x_l e^{\mu/(\alpha x_l)}$.

Using the expressions for x_l and α from (33), we can express $\widehat{x}$ as a function of the first two moments of the income distribution, μ and σ:

$$\widehat{x}(\mu,\sigma) = \mu\frac{z}{z+1}e^{1/z}, \tag{40}$$

where $z = \sqrt{1 + \mu^2/\sigma^2}$ and e is the Euler's constant.

In order to see if $\widetilde{x}^* \leqslant \widehat{x}$ holds, we evaluate the LHS and RHS of equation (19) at $\widehat{x}$. The LHS is increasing in $\widetilde{x}$, while the RHS is decreasing in $\widetilde{x}$. Thus, the inequality $\widetilde{x}^* \leqslant \widehat{x}$ holds if $LHS(\widehat{x}(\mu,\sigma)) \geqslant RHS(\widehat{x}(\mu,\sigma))$, or

$$\underbrace{\delta\frac{z}{z+1}e^{1/z}}_{h(\mu)} \geqslant \underbrace{\frac{1-\eta}{1+\gamma\eta\left[1-e^{-(1+z)/z}\right]}}_{v(\mu)}. \tag{41}$$

Notice that the inequality implies a restriction in μ and σ. In the following, we study the properties of functions $h(\mu,\sigma)$ and $v(\mu,\sigma)$.

$$\frac{\partial h}{\partial \mu} = \left(1 + \frac{\mu^2}{\sigma^2}\right)^{-1/2}\frac{\mu}{\sigma^2}\left[\delta\frac{e^{1/z}}{(z+1)^2} - \delta\frac{ze^{1/z}}{z+1}z^{-2}\right]$$

$$= -\left(1+\frac{\mu^2}{\sigma^2}\right)^{-1/2}\frac{\mu}{\sigma^2}\frac{\delta e^{1/z}}{z(z+1)^2} < 0 \tag{42}$$

$$\frac{\partial v}{\partial \mu} = \frac{e^{-(1+z)/z}}{\left\{1+\gamma\eta\left[1-e^{-(1+z)/z}\right]\right\}^2}\frac{1-\eta}{z^2}\left(1+\frac{\mu^2}{\sigma^2}\right)^{-1/2}\frac{\mu}{\sigma^2} > 0. \tag{43}$$

Consequently, $h(\mu)$ is decreasing and $v(\mu)$ is increasing in $\mu \in (0,\infty)$. Both functions are continuous. In addition, $\lim_{\mu\to 0} h(\mu) = \delta e/2$, $\lim_{\mu\to 0} v(\mu) = (1-\eta)/[1+\gamma\eta(1-e^{-2})]$, $\lim_{\mu\to\infty} h(\mu) = \delta$, and $\lim_{\mu\to\infty} v(\mu) = (1-\eta)/\{1+\gamma\eta[1-(1/e)]\}$.

We distinguish three cases:

(1) $\lim_{\mu\to 0} v(\mu) \geqslant \lim_{\mu\to 0} h(\mu) \iff (1-\eta)/[1+\gamma\eta(1-e^{-2})] \geqslant \delta e/2 \iff \gamma \leqslant \underline{\gamma} = [2(1-\eta)/(\delta e)-1]/[\eta(1-e^{-2})]$; In this case $h(\mu) < v(\mu)$ for any $\mu \in (0,\infty) \Longrightarrow \widetilde{x}^* > \widehat{x} \Longrightarrow \omega(\mu) < 0 \Longrightarrow \partial N^*/\partial\mu > 0$;

(2) $\lim_{\mu\to\infty} v(\mu) \leqslant \lim_{\mu\to\infty} h(\mu) \iff \gamma \geqslant \overline{\gamma} = [(1-\eta)/\delta - 1]/\{\eta[1-(1/e)]\}$; In this case $h(\mu) > v(\mu)$ for any $\mu \in (0,\infty) \Longrightarrow \widetilde{x}^* < \widehat{x} \Longrightarrow \omega(\mu) > 0 \Longrightarrow \partial N^*/\partial\mu < 0$;

(3) $\begin{cases} \lim\limits_{\mu\to 0} v(\mu) < \lim\limits_{\mu\to 0} h(\mu) \\ \lim\limits_{\mu\to\infty} v(\mu) > \lim\limits_{\mu\to\infty} h(\mu) \end{cases} \iff \begin{cases} \gamma > \underline{\gamma} = [2(1-\eta)/(\delta e)-1]/[\eta(1-e^{-2})] \\ \gamma < \overline{\gamma} = [(1-\eta)/\delta - 1]/\{\eta[1-(1/e)]\} \end{cases}$

In this case, by the Intermediate Value Theorem, the two function intersect once in $\widehat{\mu} \in (0,\infty)$. There are two subcases here:

(3.1) $\mu \in (0,\widehat{\mu}] \Longrightarrow h(\mu) \geqslant v(\mu) \Longrightarrow \widetilde{x}^* \leqslant \widehat{x} \Longrightarrow \omega(\mu) \geqslant 0 \Longrightarrow \partial N^*/\partial\mu \leqslant 0$;

(3.2) $\mu \in (\widehat{\mu},\infty) \Longrightarrow h(\mu) < v(\mu) \Longrightarrow \widetilde{x}^* > \widehat{x} \Longrightarrow \omega(\mu) < 0 \Longrightarrow \partial N^*/\partial\mu > 0$.

Proof of Corollary 1 We use Eq. (38). As $\partial\alpha/\partial\mu > 0$, if $\omega(\mu,\sigma) > 0$ then $\partial s^*/\partial\mu > 0$. As established in Proposition 2, $\omega(\mu,\sigma) > 0$ when $\gamma \geqslant \overline{\gamma}$ or when $\gamma \in (\underline{\gamma},\overline{\gamma})$ and $\mu \in (0,\widehat{\mu})$.

Consider the case when $\gamma \in (\underline{\gamma},\overline{\gamma})$. As the RHS of Eq. (38) contains some other positive terms in addition to $\omega(\mu,\sigma) \Longrightarrow$ there exists $\widetilde{\mu} > \widehat{\mu}$ such that $\partial s^*/\partial\mu > 0$ on the interval $\mu \in (0,\widetilde{\mu})$.

Proof of Proposition 3 Equation (25) implies that $sign(\partial s^*/\partial\sigma) = sign(\partial d(\sigma)/\partial\sigma)$.

Taking the derivative of $d(\sigma) = [x_l(\sigma)/\widetilde{x}(\sigma)]^{\alpha(\sigma)}$ with respect to σ we get:

$$\frac{\partial d(\sigma)}{\partial\sigma} = d(\sigma)\left[\frac{\partial\alpha}{\partial\sigma}\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \alpha\frac{\widetilde{x}^*}{x_l}\frac{\frac{\partial x_l}{\partial\sigma}\widetilde{x}^* - x_l\frac{\partial\widetilde{x}^*}{\partial\sigma}}{(\widetilde{x}^*)^2}\right] \tag{44}$$

$$= d(\sigma)\left[\frac{\partial\alpha}{\partial\sigma}\ln\left(\frac{x_l}{\widetilde{x}^*}\right) + \frac{\alpha}{x_l}\frac{\partial x_l}{\partial\sigma}\right] - d(\sigma)\frac{\alpha}{\widetilde{x}^*}\frac{\partial\widetilde{x}^*}{\partial\sigma}. \tag{45}$$

Next, we calculate $\partial \widetilde{x}^*/\partial \sigma = (\partial s^*/\partial \sigma)(1-\eta)/\phi\eta\delta$, $\partial \alpha/\partial \sigma = -(\mu^2/\sigma^3)\left[1+(\mu/\sigma)^2\right]^{-1/2} < 0$, $\partial x_l/\partial \sigma = (\mu/\alpha^2)(\partial \alpha/\partial \sigma) < 0$. We use (45) in the expression of $(\partial s^*/\partial \sigma)$, (25), and group terms to obtain:

$$\frac{\partial s^*}{\partial \sigma}\underbrace{\left\{1+\frac{\mu d(\sigma)}{1+\gamma\eta[1-d(\sigma)]^2}\frac{\alpha}{\delta}\frac{1-\eta}{\widetilde{x}^*}\right\}}_{+} = \underbrace{\frac{\phi\eta\mu d(\sigma)}{1+\gamma\eta[1-d(\sigma)]^2}}_{+}\underbrace{\frac{\partial \alpha}{\partial \sigma}}_{-}\underbrace{\left[\ln\left(\frac{x_l}{\widetilde{x}^*}\right)+\frac{\mu}{\alpha x_l}\right]}_{\omega(\mu,\sigma)}. \tag{46}$$

From the expression above we can see that $sign(\partial s^*/\partial \sigma) = -sign(\omega(\mu,\sigma))$. Also, $sign(\partial N^*/\partial \sigma) = sign(\partial \tau^*/\partial \sigma) = sign(\omega(\mu,\sigma))$.

We studied the properties of the function $\omega(\mu,\sigma)$ in the proof of Proposition 2. Thus, there are three cases:

(1) $\gamma \leqslant \underline{\gamma} = [2(1-\eta)/(\delta e)-1]/[\eta(1-e^{-2}] \Longrightarrow \omega(\mu) < 0 \Longrightarrow \partial \tau^*/\partial \sigma < 0, \partial N^*/\partial \sigma < 0, \partial s^*/\partial \sigma > 0$;

(2) $\gamma \geqslant \overline{\gamma} = [(1-\eta)/\delta - 1]/\{\eta[1-(1/e)]\} \Longrightarrow \omega(\mu) > 0 \Longrightarrow \partial \tau^*/\partial \sigma > 0, \partial N^*/\partial \sigma > 0, \partial s^*/\partial \sigma < 0$;

(3) $\gamma \in (\underline{\gamma}, \overline{\gamma})$. There are two subcases here:

(3.1) $\mu \in (0, \widehat{\mu}] \Longrightarrow \omega(\mu) \geqslant 0 \Longrightarrow \partial \tau^*/\partial \sigma \geqslant 0, \partial N^*/\partial \sigma \geqslant 0, \partial s^*/\partial \sigma \leqslant 0$;

(3.2) $\mu \in (\widehat{\mu}, \infty) \Longrightarrow \omega(\mu) < 0 \Longrightarrow \partial \tau^*/\partial \sigma < 0, \partial N^*/\partial \sigma < 0, \partial s^*/\partial \sigma > 0$.

Proof of Proposition 4 Denote $z = (x_l/\widetilde{x}) \in (0, 1]$. Then, the equilibrium enrollment is determined by

$$\frac{x_l}{z} = \frac{\mu}{\delta}\frac{1-\eta}{1-z^\alpha}\frac{1-z^{\alpha-\nu}}{1+\gamma\eta\left(1-z^{\alpha-\nu}\right)} \tag{47}$$

Denote the left and the right hand sides of (47) with LHS and RHS respectively. It is easy to verify that $\lim_{z\to 0} LHS = +\infty$ and $\lim_{z\to 1} LHS = x_l$, $\lim_{z\to 0} RHS = \mu(1-\eta)/(\delta(1+\gamma\eta))$. Using l'Hospital rule,

$$\lim_{z\to 1} RHS = \frac{\mu(1-\eta)}{\delta}\frac{-(\alpha-\nu)z^{\alpha-\nu-1}}{-z^{\alpha-\nu-1}[\alpha z^\nu(1+\gamma\eta(1-z^{\alpha-\nu}))+(1-z^\alpha)\gamma\eta(\alpha-\nu)]}$$

or $\lim_{z\to 1} RHS = \mu(\alpha-\nu)(1-\eta)/(\delta\alpha)$. Clearly, LHS is monotonically decreasing in z. The RHS can be first decreasing and then increasing in z since

$$\frac{\partial RHS}{\partial z} > 0 \Leftrightarrow \frac{1-z^{\alpha-\nu}}{1-z^\alpha}z^\nu\left(1-\frac{\gamma\eta}{1+\gamma\eta}z^{\alpha-\nu}\right) > \frac{\alpha-\nu}{\alpha(1+\gamma\eta)}$$

and since $(1-z^{\alpha-\nu})\left(1-\gamma\eta/(1+\gamma\eta)z^{\alpha-\nu}\right)/(1-z^\alpha) > 1, \forall z \in (0, 1]$, a sufficient condition for $\partial RHS/\partial z > 0$ is $z > ((\alpha-\nu)/(\alpha(1+\gamma\eta)))^{1/\nu}$. (i) Thus a sufficient condition for uniqueness is

$$RHS_{z=0} < LHS_{z=1} \Leftrightarrow \mu(1-\eta)/(\delta(1+\gamma\eta)) < x_l \tag{48}$$

If furthermore $RHS_{z=1} > LHS_{z=1} \Leftrightarrow \mu(\alpha-\nu)(1-\eta)/(\delta\alpha) > x_l \Leftrightarrow \nu < \alpha - (\alpha-1)\delta/(\alpha(1-\eta))$, the equilibrium enrollment is interior, otherwise $z = 1$ ($\widetilde{x}^* = x_l$). Using the definition of δ and (33) in (48) and solving for γ results in $\gamma > \underline{\gamma}^p = \{\alpha/[(\alpha-1)(1-\eta)^{1/\eta-1}] - 1\}/\eta > 0$. Thus, if household's concern for children is high enough, there is a unique equilibrium threshold for private enrollment. As $\underline{\gamma}^p$ is decreasing in α, an upper bound of $\underline{\gamma}^p$ that does not depend on the parameters of the income distribution is obtained at the minimum value for α. Thus, $\lim_{\alpha\to 2} \underline{\gamma}^p = \{2/[(1-\eta)^{1/\eta-1}] - 1\}/\eta$.

(ii) Intuitively, as ν goes to zero, the problem is reduced to the benchmark, which has a unique equilibrium. Since $\partial LHS/\partial z < 0$, imposing $\partial RHS/\partial z > 0$ guarantees uniqueness. This condition can be further rewritten as

$$\begin{aligned}&(1-z^{\alpha-\nu})\left[\alpha z^{\nu}(1+\gamma\eta(1-z^{\alpha-\nu})) + \gamma\eta(1-z^{\alpha})(\alpha-\nu)\right]\\ &\quad > (\alpha-\nu)(1-z^{\alpha})(1+\gamma\eta(1-z^{\alpha-\nu})).\end{aligned}$$

The inequality holds for any $z < 1$ as $\nu \to 0$.

Appendix 2

Simulation results using a log-normal income distribution

In Fig. 6 we replicate the main results using a log-normal income distribution.

Different productivity of education spending in the public system

Let $0 < b < 1$ the relative productivity of public spending in the public sector. Thus the utility of a household that chooses public education becomes: $U^p(c, n, E[s]) = \ln(c) + \gamma\ln(n) + \gamma\eta\ln(bE[s])$. Fertility rates in the two groups do not change relative to the benchmark model. However, the opting-out threshold is smaller for a given level of public education spending (more households opt out): $\widetilde{x} = (1-\eta)bE[s]/(\delta\phi\eta)$. The equilibrium threshold becomes $\widetilde{x} = b(\mu/\delta)(1-\eta)/(1+\gamma\eta\Psi(\widetilde{x}))$. The expressions of the equilibrium tax and education spending are not altered. The implied lower and upper bounds of the preference parameter γ for which the non-monotonic effects of inequality and tax base occur (case 3 in Propositions 2 and 3) become $\underline{\gamma} = [2b(1-\eta)/(\delta e) - 1]/[\eta(1-e^{-2})]$ and $\overline{\gamma} = [b(1-\eta)/\delta - 1]/\{\eta[1-(1/e)]\}$. The upper bound $\overline{\gamma} > 0$ when $b > (1-\eta)^{\frac{1}{\eta}-1}$. Using $\eta = 0.635$ as in de la Croix and Doepke (2003) implies a minimum value of relative efficiency of 0.56. If $b = 0.75$ the implied fertility rates for households using a public school are in an empirically relevant range: between 0 and 6.11 per person, or between 0 and 12.22 per woman. Consequently, the main results hold in this framework too.

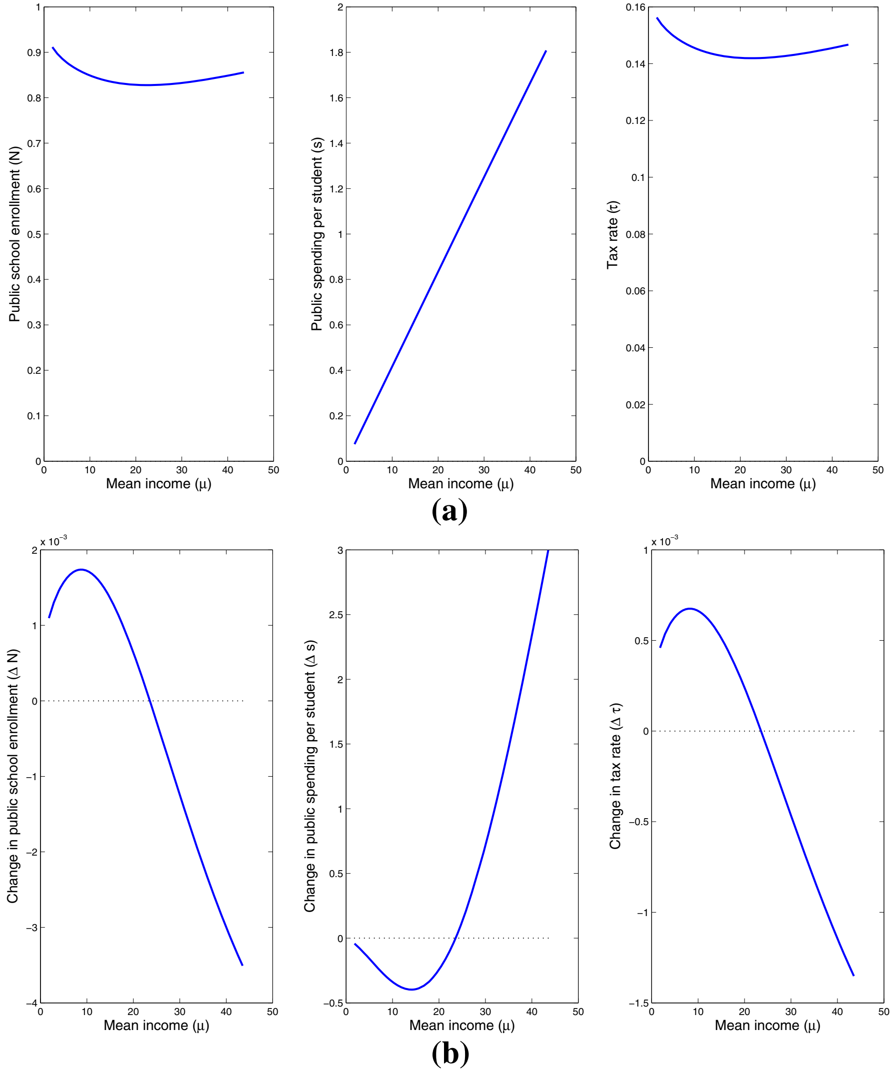


Fig. 6 Simulation results using a log-normal income distribution. **a** Tax base effects. **b** Mean preserving spread. Main education variables as a function of the mean income, keeping dispersion constant (**a**) and *Changes* in main variables in response to a 10 % increase in dispersion, at each level of mean income (**b**). We follow de la Croix and Doepke (2003) and set $\eta = 0.635$, $\phi = 0.025$, $\gamma = 0.27$ implying $n^r = 1.03$ and $n^p = 2.83$. The benchmark income standard deviation is set at 27

Appendix 3

Graphs are constructed using the estimator implemented by Libois and Verardi (2013). Panel decadal data covers the 50 US states during the period 1970–2000. The dependent variable is per pupil state revenues for public elementary and secondary schools, expressed as a share of state income per capita. Parametric controls include state and time fixed effects, federal and local level revenues per pupil, also expressed as a share of real state income per capita, the share of non-white population, the Herfindahl racial diversity index, the share of over 65, the share of college graduates and the share living in poverty. Table 1 outlines the summary statistics definitions and the data sources.

Table 1 US states data: definitions, summary statistics and sources

Variable description	Mean	Std. dev.	Min.	Max.	Source
Average income per capita, real 1990 USD	16,229.62	4242.89	7499	28,766	Census Bureau
Gini index (family income)	0.38	0.03	0.32	0.47	Census Bureau
Local revenues per pupil, share in income per capita	0.1	0.04	0.01	0.22	NCES
State revenues per pupil, share in income per capita	0.02	0.01	0.01	0.05	NCES
Federal revenues per pupil, share in income per capita	0.1	0.04	0	0.18	NCES
Herfindahl Racial diversity index	0.13	0.05	0.05	0.37	Census Bureau
Share 65+	0.26	0.09	0.09	0.42	Census Bureau
Share with college	0.1	0.02	0.02	0.17	Census Bureau
Share in poverty	0.76	0.16	0.18	1	Census Bureau
Share non-white	0.15	0.12	0	0.76	Census Bureau
N	200				

References

Alesina A, Baqir R, Easterly W (1999) Public goods and ethnic divisions. Q J Econ 114(4):1243–1284

Alesina A, Glaeser E, Sacerdote B (2001) Why doesn't the US have a European-style welfare system? Brookings Pap Econ Act 2:187–277

Baicker K, Clemens J, Singhal M (2012) The rise of the states: U.S. fiscal decentralization in the postwar period. J Public Econ 96:1079–1091

Baltagi BH, Li D (2002) Series estimation of partially linear panel data models with fixed effects. Ann Econ Finance 3(1):103–116

Bearse P, Glomm G, Ravikumar B (2001) Education finance in a dynamic Tiebout economy. Mimeo, Indiana University Bloomington

Bénabou R (1994) Human capital, inequality, and growth: a local perspective. Eur Econ Rev 38(3–4):817–826

Bénabou R (1996) Heterogeneity, stratification, and growth: macroeconomic implications of community structure and school finance. Am Econ Rev 86(3):584–609

Bénabou R (1997) Inequality and growth. NBER working papers

Bénabou R (2000) Unequal societies: income distribution and the social contract. Am Econ Rev 90(1):96–129

Boustan L, Ferreira F, Winkler H, Zolt EM (2010) Inequality and local government: evidence from U.S. cities and school districts, 1970–2000. Law and economics workshop, Berkeley Program in Law and Economics, UC Berkeley

Cutler DM, Glaeser EL, Vigdor JL (1999) The rise and decline of the American Ghetto. J Polit Econ 107(3):455–506

de la Croix D, Doepke M (2003) Inequality and growth: why differential fertility matters. Am Econ Rev 93(4):1091–1113
de la Croix D, Doepke M (2004) Public versus private education when differential fertility matters. J Dev Econ 73(2):607–629
de la Croix D, Doepke M (2009) To segregate or to integrate: education politics and democracy. Rev Econ Stud 76(2):597–628
Dottori D, Shen I-L (2013) Low skilled immigration and the expansion of private schools. J Econ Theory 148(5):2124–2149
Epple D, Filimon R, Romer T (1993) Existence of voting and housing equilibrium in a system of communities with property taxes. Reg Sci Urban Econ 23(5):585–610
Epple D, Platt GJ (1998) Equilibrium and local redistribution in an urban economy when households differ in both preferences and incomes. J Urban Econ 43(1):23–51
Fernandez R, Levy G (2008) Diversity and redistribution. J Public Econ 92(5–6):925–943
Fernandez R, Rogerson R (1996) Income distribution, communities, and the quality of public education. Q J Econ 111(1):135–164
Glomm G (2004) Inequality, majority voting and the redistributive effects of public education funding. Pac Econ Rev 9(2):93–101
Goldin C, Katz LF (1997) Why the United States led in education: lessons from secondary school expansion, 1910 to 1940. NBER working papers
Gradstein M, Justman M, Meier V (2004) The political economy of education: implications for growth and inequality. MIT Press Books, The MIT Press, Cambridge
Hajnal ZL, Lewis PG (2003) Municipal institutions and voter turnout in local elections. Urban Aff Rev 38(5):645–668
Lee W, Roemer JE (1998) Income distribution, redistributive politics, and economic growth. J Econ Growth 3(3):217–240
Libois F, Verardi V (2013) Semiparametric fixed-effects estimator. Stata J 13(2):329–336
Lindert PH (1996) What limits social spending? Explor Econ Hist 33(1):1–34
Luttmer EFP (2001) Group loyalty and the taste for redistribution. J Polit Econ 109(3):500–528
Meltzer AH, Richard SF (1981) A rational theory of the size of government. J Polit Econ 89(5):914–927
Morlan RL (1984) Municipal versus national election voter turnout: Europe and the United States. Polit Sci Q 99:457–470
Perotti R (1996) Growth, income distribution, and democracy: what the data say. J Econ Growth 1(2):149–187
Persson T, Tabellini G (1994) Is inequality harmful for growth? Am Econ Rev 84(3):600–621
Persson T, Tabellini G (2002) Political economics: explaining economic policy. MIT Press Books, The MIT Press, Cambridge
Rhode PW, Strumpf KS (2003) Assessing the importance of Tiebout sorting: local heterogeneity from 1850 to 1990. Am Econ Rev 93(5):1648–1677
Rosenstone SJ, Hansen JM (1993) Mobilization, participation, and democracy in America. Macmillan Publishing Company, New York
Soares J (1998) Altruism and self-interest in a political economy of public education. IGIER working paper, Bocconi University
Verba S, Lehman SK, Brady HE (1995) Voice and equality: civic voluntarism in American politics. Harvard University Press, Cambridge

2

Is School Funding Fair? A National Report Card

SEVENTH EDITION: FEBRUARY 2018

Bruce D. Baker, Rutgers University
Danielle Farrie, Education Law Center
David Sciarra, Education Law Center

EDUCATION LAW CENTER

RUTGERS
Graduate School of Education

About the Authors

Bruce D. Baker is a professor in the Department of Educational Theory, Policy and Administration in the Graduate School of Education at Rutgers University. He is co-author of *Financing Education Systems* with Preston Green and Craig Richards, author of numerous peer-reviewed articles on education finance, and sits on the editorial boards of the *Journal of Education Finance* and *Education Finance and Policy.* He also serves as a research fellow for the National Education Policy Center.

David G. Sciarra is Executive Director of the Education Law Center (ELC) in Newark, New Jersey. A practicing civil rights lawyer since 1978, he has litigated a wide range of cases involving socioeconomic rights, including affordable housing, shelter for the homeless, and welfare rights. Since 1996, he has litigated to enforce access for low-income and minority children to an equal and adequate education under state and federal law, and served as counsel to the plaintiff students in New Jersey's landmark *Abbott v. Burke* case. He also does research, writing, and lecturing on education law and policy in such areas as school finance, early education, and school reform.

Danielle Farrie is Research Director at the Education Law Center (ELC). She conducts analysis to support litigation and public policy for ELC and partner organizations. Before joining ELC, she conducted research in the field of urban education on such topics as school choice, racial segregation, and school segregation. She has also co-authored peer-reviewed articles on how race affects perceptions of school quality and on parental involvement among low-income families. She holds a Ph.D. in sociology from Temple University.

Please visit www.schoolfundingfairness.org to download the report, explore findings with interactive graphics and download complete datasets for further analysis.

Table of Contents

Executive Summary

"Is School Funding Fair? A National Report Card" analyzes the condition of state school finance systems with a focus on the fair distribution of resources to the neediest students. The Report Card makes a number of assumptions about how school funding systems should be designed:

- A fair funding system should provide levels of funding based on student need.
- Student poverty is the most critical variable affecting funding levels and can serve as a proxy for other measures of disadvantage, such as racial segregation, limited English proficiency, and student mobility.
- Fair funding systems are designed "progressively" so that funding increases relative to student poverty.
- A sufficient overall level of funding is a crucial starting point for any funding formula to be successful.

The Seventh Edition of the Report Card examines the fiscal condition of the nation's schools using data from 2015.

The Fairness Measures

The report evaluates states on the basis of four separate, but interrelated, fairness measures. These measures are designed to provide meaningful comparisons among states by taking into account factors that influence education costs, such as geography, regional labor markets, and population density, where appropriate. The measures are:

- **Funding Level:** Using figures adjusted to account for a variety of interstate differences, this measure allows for a comparison of the average state and local revenue per pupil across states. States are ranked from highest to lowest in per pupil funding.
- **Funding Distribution:** This measure shows whether a state provides more or less funding to schools based on their poverty concentration. States are evaluated as "regressive", "progressive", or "flat" and are given letter grades that correspond to their relative position compared to other states.
- **Effort:** This measures differences in state spending relative to a state's fiscal capacity. States are ranked according to the ratio of state spending on education to gross state product (GSP) and personal income.
- **Coverage:** This measures the proportion of school-aged children attending the state's public schools and also addresses the income disparity between families using public and nonpublic schools. States are ranked according to both the proportion of children in public schools and the income ratio of public and nonpublic school families.

Summary of Findings

The report's core findings include:

- **Funding levels** continue to be characterized by wide disparities among states, with gaps between the highest and lowest funded states actually growing. The funding differential between the highest (New York) and lowest (Idaho) funded states is over $12,400.

- The majority of states have unfair funding systems with “flat” or “regressive” **funding distribution** patterns that ignore the need for additional funding in high-poverty districts. In 2015, only eleven states had progressive funding systems, down from a high of twenty-two in 2008.
- Whether measured in relation to a state’s economic productivity or personal income, the **fiscal effort** that states exert varies widely. States with the lowest effort spend on schools about $25 of every $1,000 in economic productivity, while the highest effort states spend $50. Similarly, in relation to personal income, the lowest effort states allocate $29 for every $1,000 in aggregate income compared to $64 in the highest effort state.
- **Coverage** is a relatively stable indicator, but it demonstrates the degree to which wealthier families in some states opt out of the public education system, potentially affecting the public and political will necessary to improve school funding. The percentage of school-aged children enrolled in public schools ranges from 78% in Hawaii, to a high of 93% in Utah.
- Only two states, New Jersey and Wyoming, are positioned relatively well on all **four indicators**.
- California, Florida, Louisiana and Tennessee are poorly positioned on all **four fairness measures**. All three states receive a ”C” in Funding Distribution (no additional funding for poor districts). They rank in the lower half of states on Funding Level, and have below average Effort levels and poor Coverage.

Resource Allocation Indicators

Fair school funding delivers adequate resources where they are needed most to support students’ academic progress. The report explores the consequences of funding fairness, or lack thereof, for schools and students through the following three resource allocation indicators:

- **Early Childhood Education**: Enrollment of low-income students in early childhood education lags behind that of their wealthier peers in nearly all states. The states with the greatest disparities in preschool enrollment are more likely to have regressively distributed funding.
- **Wage Competitiveness**: A fair school funding system should provide districts with the opportunity to attract and retain high quality teachers. Competitive salaries are one way to attain that goal, but average teacher salaries in most states are below those of their non-teacher counterparts. States with higher funding levels are able to offer more competitive salaries, while in the lowest funded states teacher salaries are the least competitive with other professions.
- **Pupil-to-Teacher Ratios**: An equitable distribution of school staff in districts and states is one of the most meaningful outcomes of fair school funding. Twenty-nine states had a flat or regressive distribution, meaning that higher poverty districts had the same

number or more pupils per teacher. Unsurprisingly, the states with the fairest distribution of staff were also more likely to have a fair distribution of funding.

This edition of the National Report Card, like its precursors, demonstrates that school funding remains stubbornly unfair in most states. As a result, states have failed to create finance systems that support improved student outcomes, especially among the nation's low-income students.

Introduction

The National Report Card was first published in 2010. Since then, a growing body of research has convincingly demonstrated that money does, in fact, make a difference in improving educational opportunities for the nation's schoolchildren. In just the last few years, a body of rigorous empirical studies has shown that:

- Increased funding leads to greater and more fairly distributed education resources. When states make a greater fiscal effort to fund their schools, school spending goes up, and that translates into higher staffing levels, smaller class sizes and more competitive wages for teachers.[1]
- States that invest in the resources that matter – low pupil-to-teacher ratios, especially for high poverty districts, and competitive wages – tend to have higher academic outcomes among children from low-income families and smaller income-based achievement gaps.[2]
- Adequacy-oriented school funding reforms between 1990 and 2011 achieved their goals of improving educational opportunity by raising achievement among students in low-income districts. In fact, states with reform saw decreasing achievement gaps over the period studied, while states without school finance reform saw their achievement gaps increase.[3]
- School funding reform also leads to improvements far beyond test scores. A study of school finance reforms of the 1970s and 80s finds that increased spending led to higher high school graduation rates, greater educational attainment, higher earnings and lower rates of poverty in adulthood.[4]

Money matters because the availability and level of resources in schools matter.[5] Fair and equitable state finance systems must be at the center of efforts to improve educational outcomes and reduce stubborn achievement gaps among students. Yet in the face of compelling evidence, most states still have not enacted school funding reforms to meet the needs of all students, especially those who are most vulnerable because of poverty, disability, or lack of English fluency.

[1] Bruce D. Baker, Danielle Farrie, David Sciarra. 2016. "The Changing Distribution of Educational Opportunities: 1993-2002." In *The Dynamics of Opportunity in America: Evidence and Perspectives,* eds. Irwin Kirsch and Henry Braun. Educational Testing Service.
[2] Baker, Bruce D., Danielle Farrie, David Sciarra. 2016. Mind the Gap: 20 Years of Progress and Retrenchment in School Funding and Achievement Gaps. Educational Testing Service, Research Report No. RR-16-15.
[3] Julien Lafortune, Jesse Rothstein, Diane Whitmore. 2016. Can school finance reforms improve student achievement? Washington Center for Equitable Growth.
[4] C. Kirabo Jackson, Rucker Johnson, Claudia Persico. 2014. How Money Makes a Difference: The Effects of School Finance Reforms on Outcomes for Low Income Students. Stanford Center for Opportunity Policy in Education.
[5] For a review, see Bruce D. Baker. 2017. How Money Matters for Schools. Learning Policy Institute.

The National Report Card evaluates and compares the extent to which state school funding systems ensure equality of educational opportunity for all children. The goal is to provide data and information for a better understanding of the fairness, or lack thereof, of existing public education finance systems. Our hope is that, armed with this information, lawmakers, educators, advocates and citizens can improve resources and outcomes for school children in their states.

Analyzing School Funding Fairness

To effectively analyze how well states fund public education, one critical question must be answered: What is fair school funding? ***In this report, "fair" school funding is defined as a state finance system that ensures equal educational opportunity by providing a sufficient level of funding that is distributed to districts within the state to account for additional needs generated by student poverty.***

The National Report Card measures the fairness of the school finance systems in all 50 states and the District of Columbia according to the definition above. The central purpose of the Report Card is to evaluate the extent to which state systems ensure equality of educational opportunity for all children, regardless of background, family income, where they live, or where they attend school. Equal educational opportunity means that all children and all schools have access to the teachers, support staff and other essential resources needed to provide them with the "opportunity to learn."

Fair School Funding is a State Responsibility

In the United States the responsibility for funding K-12 education falls to each individual state. As a result, the 50 states and the District of Columbia each have their own unique system for funding their schools. In total, revenues for public elementary and secondary schools are 9% federal, 46% state and 45% local. While the majority of funding is split between state and local revenue sources, the decision about how those revenues are allocated is wholly determined by state policy. Some state finance systems, such as those in Illinois and New Hampshire, provide the majority of revenues through local sources, while others, such as those in Vermont, New Mexico and Minnesota, are heavily reliant on state revenues.

One of the most important features of a fair school finance system is its effectiveness in accounting for the ability of local districts to generate revenue. A greater reliance on state funding does not necessarily lead to a fairer system. The central question is: Are state revenues targeted to districts that have weak fiscal capacity, or is state funding blind to local ability to raise funds, exacerbating inequities? It is critical for states to design systems in which the interaction of local and state revenues results in an adequate level and equitable distribution of funds. If this is not the case, it is the responsibility of state elected officials to enact reforms .to ensure fairness in the system.

The Fairness Principles

The National Report Card is built on the following core principles:

- Varying levels of funding are required to provide equal educational opportunities to children with different needs.

- The costs of education vary based on geographic location, regional differences in teacher salaries, school district size, population density, and various student characteristics. It is critical to account for as many of these variables as possible, given the availability of reliable data.

- The level of funding should increase relative to the level of concentrated student poverty — that is, state finance systems should provide more funding to districts serving larger shares of students in poverty. Economists often evaluate systems as "progressive" or "regressive." As used in this report, a "progressive" finance system allocates more funding to districts with high levels of student poverty; a "regressive" system allocates less to those districts; and a "flat" system allocates roughly the same amount of funding across districts with varying needs.

- Student poverty — especially concentrated student poverty — is the most critical variable affecting funding levels. Student and school poverty correlates with, and is a proxy for, a multitude of factors that increase the costs of providing equal educational opportunity — most notably, gaps in educational achievement, school district racial composition, English-language proficiency, homelessness, and student mobility. State finance systems should deliver greater levels of funding to higher-poverty settings, while controlling for differences in other cost factors.[6]

- While the distribution of funding to account for student need is crucial, the overall funding level in states is also a significant element in fair school funding. Without sufficient base or foundational funding, even a progressively funded system will be unable to provide equitable educational opportunities.

- The sufficiency of the overall level of funding in any state can be assessed based on comparisons to other states with similar conditions and similar characteristics. Using available national data, average differences in state and local revenues between states, as well as within states, can be projected and indexed to compare expected state and local revenues per pupil under a given set of conditions. These expected values are derived from a statistical model that predicts funding levels while controlling for various school district characteristics. These predicted funding levels allow for more direct comparison of districts having similar characteristics across states.

---

[6] Current data do not permit inclusion of measures for additional student characteristics, e.g., disability or limited English proficiency, without compromising the relationship between school funding and poverty, the main focus of this analysis. For more information, see the technical appendix.

Why Measure Fairness?

Based on these core principles, the data and measures presented in the National Report Card focus on the central question of state school finance systems: Do they support equal educational opportunity for all students and, in particular, for low-income students in school districts with concentrated poverty? Put simply, does a particular state fairly fund its public schools?

Without a state-by-state commitment to enact progressive finance systems that address existing funding inequities, education policies and initiatives to improve overall achievement, while also reducing gaps between the lowest and highest performing students, will continue to falter. Only with strong systems of public education built on sufficient funding, distributed progressively, will states be able to implement and sustain the initiatives necessary to boost student achievement. Policymakers, educators, business leaders, parents — and the public at large — urgently need better and more reliable information to understand the fairness of existing finance systems, identify problems with those systems, and devise and implement policy solutions to advance school funding fairness.

Existing Measures of State School Finance

While several reports analyze state school funding systems, they fail to adequately or accurately capture the differences in spending levels among states and the distribution of funds within states.

The National Center for Education Statistics (NCES) publishes the most commonly used metric for state school funding: state and local revenue per pupil. This is a fairly straightforward measure, but one that ignores the complexity of comparing funding levels among states. Without any adjustments for the characteristics of the students served or for differences in regional purchasing power, this measure is unsatisfactory for making state comparisons.

In their annual *Quality Counts* report, *Education Week* publishes state school finance data using four indicators measuring "Equity" and four indicators measuring "Spending." *Education Week* does make adjustments for student characteristics by "weighting" student enrollments to account for student poverty, while adjusting for regional cost differences.[7] However, the poverty weight is hypothetical, not based on research on the additional costs of serving poor students in each state. In addition, the equity measures do not distinguish whether disparities are the result of progressive or regressive school funding, ignoring a basic tenet of funding fairness.

Education Trust, a Washington D.C.-based advocacy group, has published multiple reports addressing funding gaps between high and low poverty districts and high and low minority districts. The most recent analysis adjusts for regional cost differences and student poverty,

---

[7] A "weighting" is an adjustment to per-pupil revenue or expenditure data designed to address differences in needs and costs.

using a "conservative" poverty weight of 1.4, likely underestimating the additional costs required to serve these students.[8] In addition, focusing only on funding gaps at the extremes of poverty and minority concentration ignores whether these gaps are representative of funding patterns for the state as a whole.

The U.S. Education Department (ED) publishes a measure of funding equity in the "Education Dashboard." Similar to Education Trust, the ED measure shows the difference in per-pupil spending in the highest and lowest quartile districts by poverty. Users can select a "preferred" weighted adjustment for student poverty in 10% increments from 0-100%. However, the most recent data posted are from 2007-08.

More recently, the Urban Institute and EdBuild have adopted a regressive/progressive framework in reports on school funding. The Urban Institute measures progressiveness as the relative spending levels between poor and nonpoor students. This is accomplished by calculating per pupil spending averages weighted, respectively, by the number of poor and nonpoor children in each district.[9] This methodology adjusts for wage differences, but does not include other district characteristics that can influence costs.

EdBuild also categorizes states as progressive or regressive using cost-adjusted funding gaps between the highest and lowest poverty quartiles. They adjust enrollments by various poverty weights ranging from 1.0 to 1.6 to demonstrate how few states meet an equity target by providing additional funding for students in poverty.[10] Again, the poverty weights are hypothetical and do not reflect the true costs of educating poor students in each state.

Research Method

The National Report Card addresses the shortcomings in these reports by:

- Using actual state and local revenues at the district level to characterize the overall pattern of each state's funding relative to student poverty, not limited to funding at the extremes of poverty concentration;
- Adjusting revenues for numerous external cost factors allowing legitimate comparisons among states;
- Including additional indicators to evaluate the economic and political context for establishing fair school funding; and
- Including resource allocation measures that demonstrate how funding fairness influences the distribution of actual resources for students and teachers.

[8] Ed Trust bases this weight on the federal Title I formula and concedes that it is likely an underestimate.
[9] Chingos, Matthew M. & Kristen Blagg. 2017. Do Poor Kids Get Their Fair Share of School Funding? Urban Institute.
[10] EdBuild. 2014. Resource Inequality: Shortchanging Students.

Some of the indicators are quite straightforward, using publicly available data reported at the state level to compose indices that can be easily ranked. Others require more advanced statistical methods in order to control for extraneous factors that influence funding and resource allocation.

The four fairness measures and three resource allocation indicators are described briefly below. For more information on data sources and the details of the construction of these indicators see Appendix A. A more detailed technical report on the data and methodology is available at www.schoolfundingfairness.org. Limited longitudinal data is presented in Appendix B and C, and the full range of data is available online.[11]

The Fairness Measures

The National Report Card consists of four separate but interrelated fairness measures. The four measures are:

- *Funding Level* – This measures the overall level of state and local revenue provided to school districts and compares each state's average per-pupil revenue with that of other states. To recognize the variety of interstate differences, each state's revenue level is adjusted to reflect differences in regional wages, poverty, economies of scale, and population density.
- *Funding Distribution* – This measures the distribution of funding across local districts within a state, relative to student poverty. The measure shows whether a state provides more or less funding to schools based on their poverty concentration, using simulations ranging from 0% to 30% child poverty.[12,13]
- *Fiscal Effort* – This measures differences in state spending for education relative to state fiscal capacity. The report includes two measures of "Fiscal Effort:"1) the ratio of state spending to gross state product (GSP), and 2) the ratio of state spending to aggregate personal income.
- *Coverage* – This measures the proportion of school-aged children attending the state's public schools. The share of a state's students in public schools, and the median household income of those students, is an important indicator of the distribution of funding relative to student poverty (especially where more affluent households opt out

[11] Year-to-year comparisons rely on updated models, and therefore may not align exactly with previously published results.
[12] Poverty is measured using the Census definition of poverty, rather than free or reduced lunch (FRL) eligibility, which is more commonly used in education. The Census poverty threshold in 2015 was approximately $24,000 for a family of four. FRL eligibility is set at 185% of the Census poverty threshold, approximately $44,400. See Appendix D to compare measures.
[13] Hawaii and the District of Columbia are excluded from this analysis because they are single-district systems. Alaska is also excluded because the state's unique geography and sparse population, so highly correlated with poverty, result in inconsistent estimates of within-state resource distribution.

of public schooling, choosing parochial or private schools or home schooling) and the overall effort to provide fair school funding.

States are evaluated by two methods – a grading curve and rank. Funding Distribution and Fiscal Effort, the two measures over which states have direct control, are given letter grades that are based on the typical grading "curve" and range from "A" to "F."[14] Funding Level and Coverage are ranked because these measures are influenced not only by state policy, but also by other historical and contextual factors.

The four fairness measures are comparative in nature, determining how an individual state compares to other states in the nation or region. States are *not* evaluated using specific thresholds of education costs and school funding that might be "adequate" or "equitable" if applied nationally or regionally. This type of evaluation would require positing hard definitions of education costs and student need based on the complex conditions in each state, including the state's unique content and performance standards. Such an exercise is beyond the scope of this report.

Resource Allocation Indicators

Fair school funding delivers adequate resources where they are needed most. The effective use of education funding can lead to adequate staffing of schools; a full, rich curriculum; and effective class sizes, all of which can improve student outcomes.

The following three indicators of how states allocate resources are included in the report:

- *Early Childhood Education* – This measures enrollment rates in early childhood education programs by income level. Access to early learning opportunities, especially for low-income students, is a key indicator of a state's commitment to providing equal educational opportunities and reducing achievement gaps.

- *Wage Competitiveness* – This indicator uses wage data to compare compensation between teachers and non-teachers who have similar education levels, experience, and hours worked. The index is expressed as the ratio between teacher wages and non-teacher wages to evaluate whether the teaching profession is economically competitive in each state.

[14] To calculate grades, a standardized score (z-score) is calculated as the state's difference from the mean, expressed in standard deviations. Grades are as follows: A = 2/3 standard deviation above the mean ($z > 0.67$); B = between 1/3 and 2/3 standard deviations above the mean ($.33 < z < .67$); C = between 1/3 standard deviation below and 1/3 standard deviation above the mean ($-.33 < z < .33$); D = between 1/3 and 2/3 standard deviations below the mean ($-.33 > z > -.67$); F = 2/3 standard deviation below the mean ($z < -.67$). In some cases, the tables show states that have the same numerical score but different letter grades because their unrounded scores place them on opposite sides of the grading cutoffs.

- *Teacher-to-Student Ratios* – This measures district staffing patterns, comparing teacher-to-student ratios in high poverty and low poverty districts. A fair distribution of staffing resources would result in higher teacher-to-student ratios in high poverty districts. An unfair distribution would result in comparable teacher-to-student ratios in schools, regardless of student poverty, or fewer teachers in high poverty districts.

A Note on Interpretation

The goal of the National Report Card is to use available data to encourage a more sophisticated and nuanced discussion of fair school funding. When examining the state-by-state evaluations in the next sections, it is important to consider a few points. First, because the evaluations are comparative and not benchmarked to a defined outcome, high grades or rankings do not indicate that states have met a fair school funding threshold. Instead, they demonstrate that some states are doing better than others, even if improvement is still needed.

Second, the fairness measures are interrelated and complex. Each of the indicators is important in its own right, but it is also important to consider the interplay between measures. For example, a state that ranks well in distribution, but very low in overall funding levels, is unlikely to meaningfully address the needs of students.

Third, each state's finance system is embedded in a complicated historical, political and economic landscape. This report does not address these complex factors or their influence. The findings, however, can be useful in new or ongoing efforts to reform the finance systems to recognize the demographic and resource needs of all students.

Evaluating the States

Fairness Measure #1: Funding Level

School funding analyses that rely on raw per pupil funding calculations to compare spending by state do not account for the complex differences among states and school districts that affect education costs. To put states on a more equal footing, we have constructed a model of school funding that predicts average funding levels while controlling for the following: student poverty, regional wage variation, and school district size and density. The funding levels presented here are predicted by the model at a 20% poverty rate, close to the national poverty rate (19%).

There continue to be wide disparities in funding among states. In 2015, funding levels ranged from a high of $18,719 in New York, to a low of $6,277 in Idaho. This means the average student in Idaho has access to only one-third of the funding available to a similar student in New York. These vast disparities suggest wide variations in the educational opportunities provided to students by each state.

Relative funding rankings remain consistent over time, with a few notable exceptions. Since 2007, Illinois's rank improved from 28th to 16th, and North Dakota improved from 40th to 19th. Florida declined from 24th to 41st, and Georgia dropped from 22nd to 37th. (See Figure 1)

Fairness Measure #2: Funding Distribution

The funding distribution measure addresses the key question of whether a state's funding system recognizes the need for additional resources for students in settings of concentrated student poverty. States are classified as progressive if high poverty (30%) districts receive at least 5% additional funds over low poverty (0%) districts; regressive if high poverty districts receive 5% less funding than low poverty districts; and flat if they fall in between.

In 2015, eleven states had progressive funding distributions, down from a high of twenty-two in 2008. Twenty states were flat, meaning they had no substantial variation in funding between high poverty and low poverty districts. Seventeen states had regressive funding patterns (see Figure 2).

Utah, Delaware and Minnesota are the most progressive states and provide their highest poverty districts with, on average, over 30% more funding per student than their lowest poverty districts. In the most regressive states – Nevada, Illinois and North Dakota – students in high poverty districts get less than 75 cents for every dollar received by their low poverty counterparts. (See Figure 2)

Figure 1. Predicted Funding Level, 2015

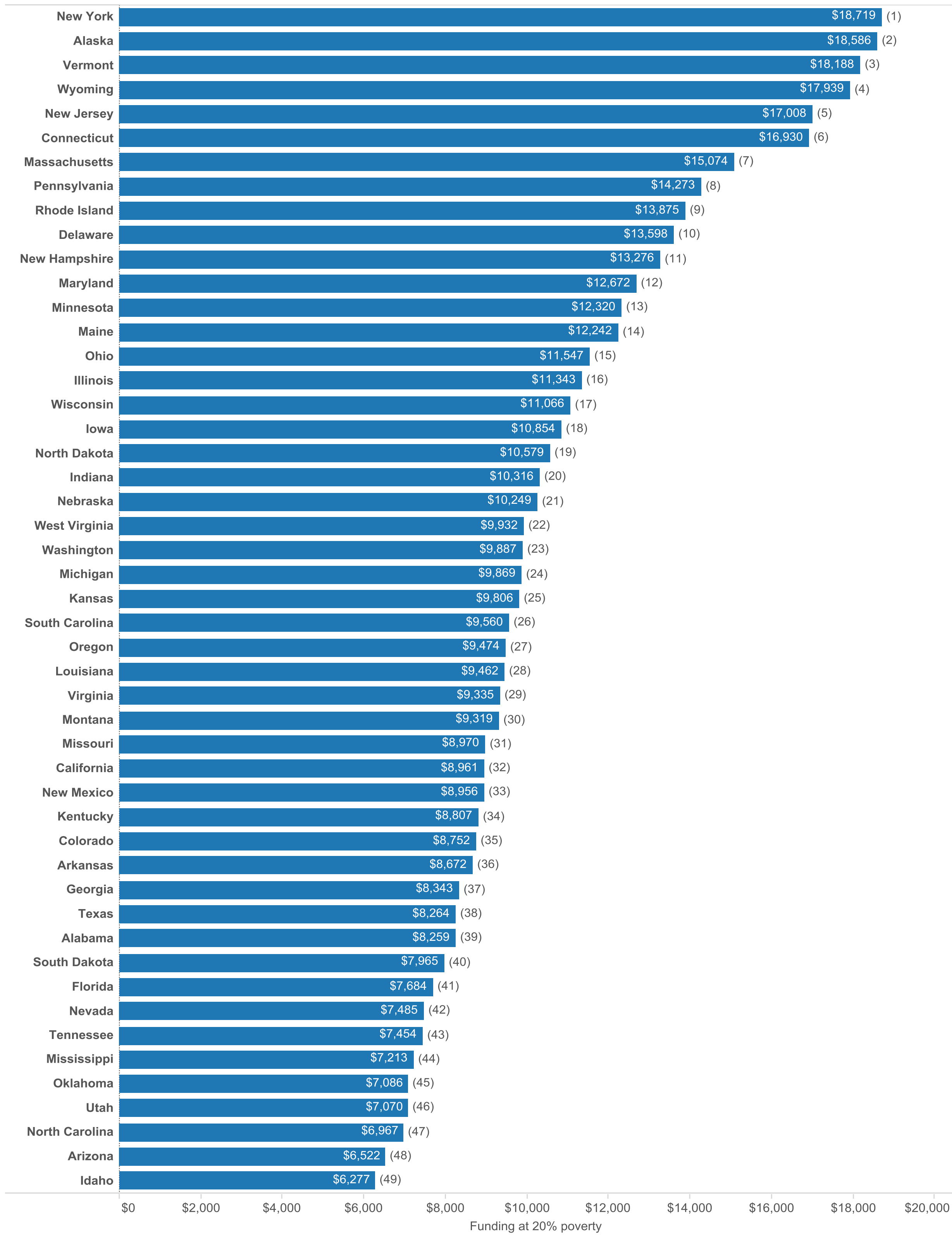
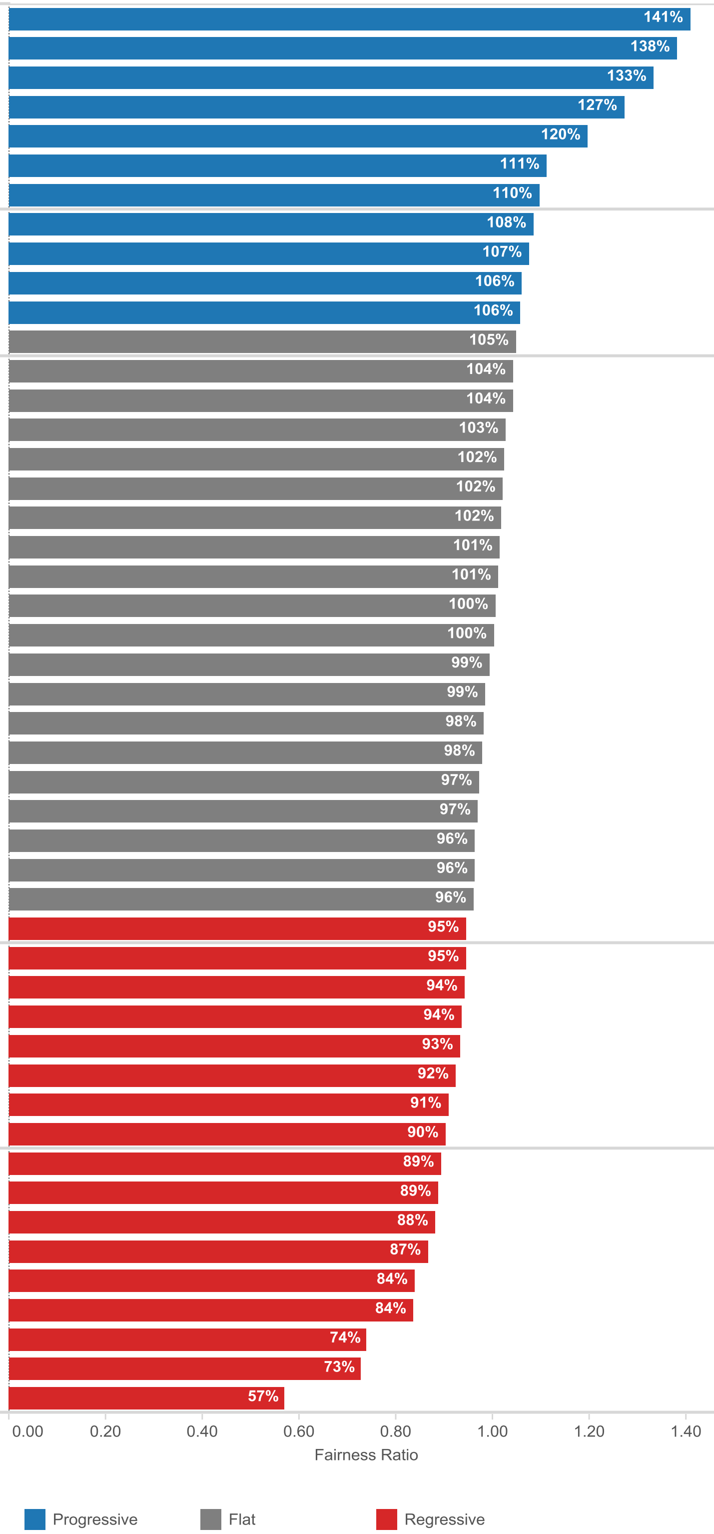


Figure 2. State Funding Distribution, 2015

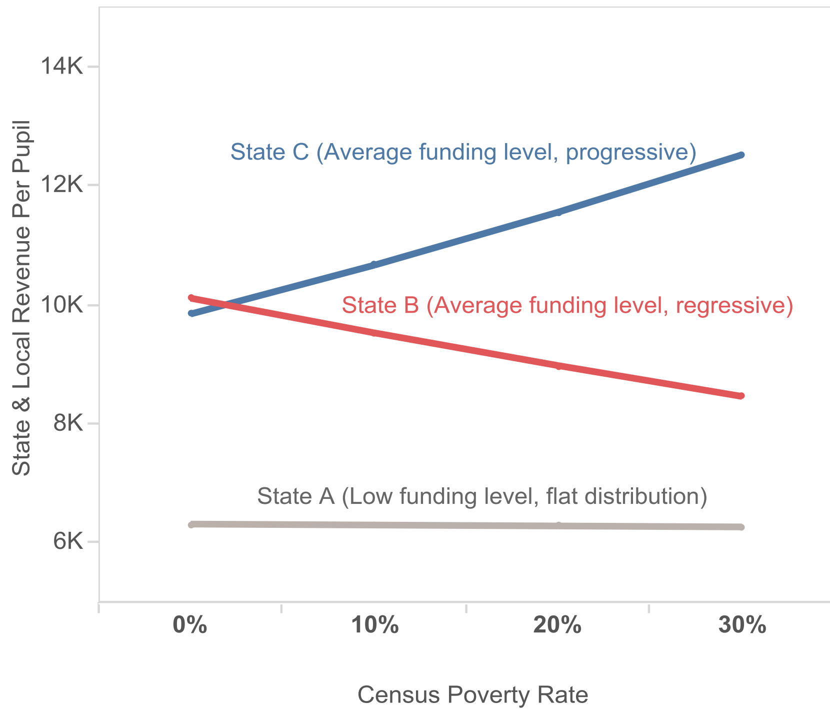
Fairness Grade	State	0% Poverty	30% Poverty	Fairness Ratio
A	**Utah**	$5,628	$7,924	141%
	Delaware	$10,963	$15,144	138%
	Minnesota	$10,175	$13,557	133%
	Ohio	$9,836	$12,510	127%
	New Jersey	$15,095	$18,054	120%
	Wyoming	$16,704	$18,590	111%
	Massachusetts	$14,172	$15,546	110%
B	**Georgia**	$7,907	$8,569	108%
	Arkansas	$8,264	$8,883	107%
	Colorado	$8,418	$8,924	106%
	Wisconsin	$10,663	$11,273	106%
	North Carolina	$6,753	$7,077	105%
C	**Indiana**	$10,040	$10,456	104%
	Louisiana	$9,211	$9,590	104%
	South Carolina	$9,385	$9,649	103%
	California	$8,817	$9,034	102%
	Oklahoma	$6,986	$7,137	102%
	West Virginia	$9,810	$9,994	102%
	Mississippi	$7,149	$7,245	101%
	Kansas	$9,735	$9,842	101%
	Kentucky	$8,780	$8,821	100%
	Vermont	$18,168	$18,199	100%
	Idaho	$6,308	$6,261	99%
	Florida	$7,759	$7,646	99%
	Pennsylvania	$14,437	$14,192	98%
	Michigan	$10,011	$9,799	98%
	Tennessee	$7,589	$7,387	97%
	Oregon	$9,670	$9,377	97%
	Nebraska	$10,502	$10,125	96%
	Washington	$10,146	$9,760	96%
	New York	$19,240	$18,464	96%
	Connecticut	$17,568	$16,620	95%
D	**Iowa**	$11,266	$10,653	95%
	New Hampshire	$13,818	$13,013	94%
	Rhode Island	$14,487	$13,579	94%
	Texas	$8,646	$8,079	93%
	New Mexico	$9,447	$8,719	92%
	Maryland	$13,495	$12,279	91%
	Montana	$9,975	$9,006	90%
F	**Alabama**	$8,899	$7,956	89%
	Virginia	$10,105	$8,972	89%
	Arizona	$7,098	$6,252	88%
	South Dakota	$8,763	$7,593	87%
	Maine	$13,744	$11,553	84%
	Missouri	$10,102	$8,452	84%
	North Dakota	$12,932	$9,569	74%
	Illinois	$14,029	$10,199	73%
	Nevada	$10,892	$6,205	57%



State Fairness Profiles

State fairness profiles capture two pieces of information that should be considered in tandem when evaluating funding systems. The profile for three hypothetical states is presented in Figure 3. State A is low-funding with a "flat" distribution. States B and C share a common level of funding for districts with 0% poverty. But State B has a downward or "regressive" funding distribution, while State C has an upward or "progressive" distribution, resulting in markedly different funding levels for high-poverty districts in each state.

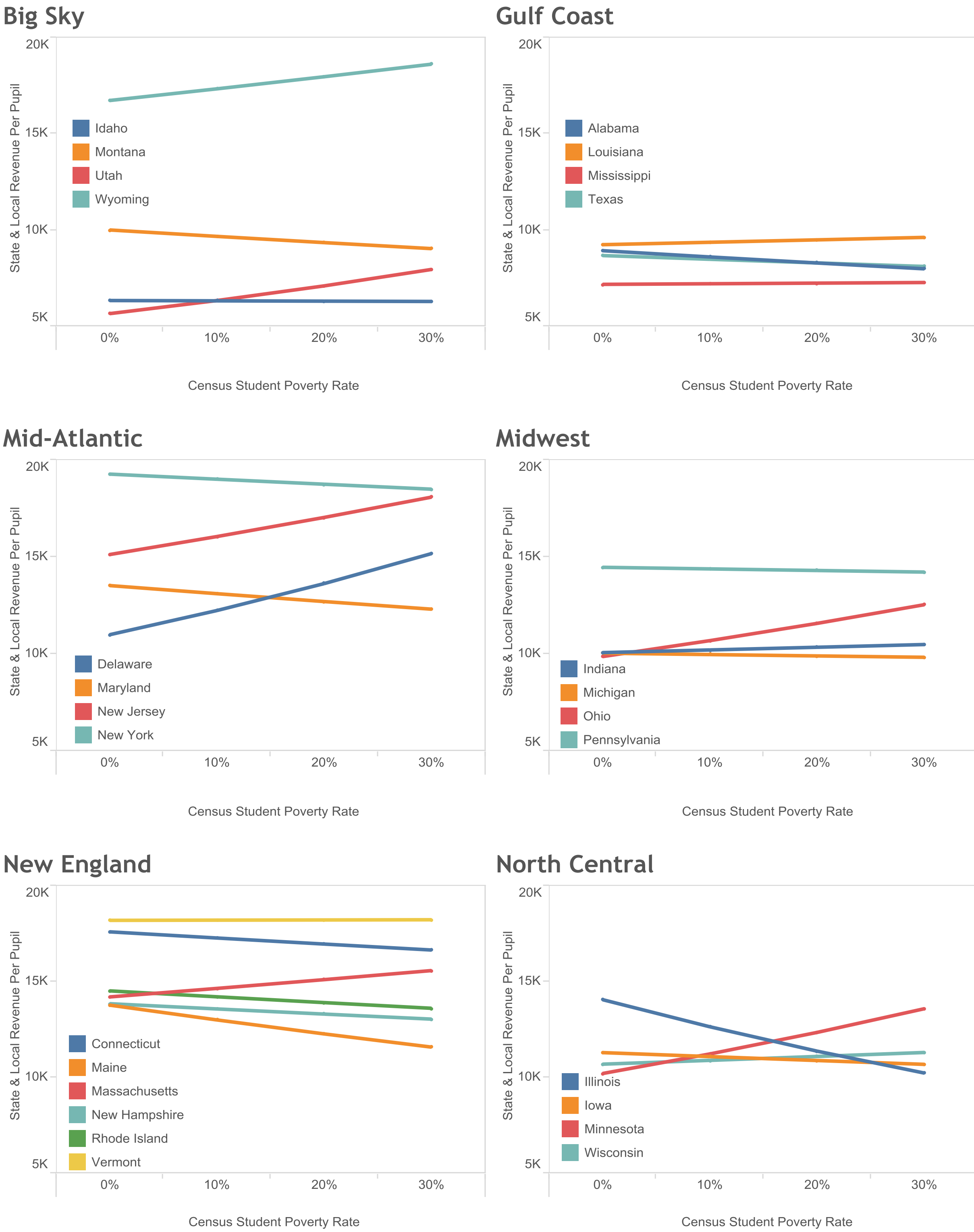
Figure 3. State Fairness Profiles



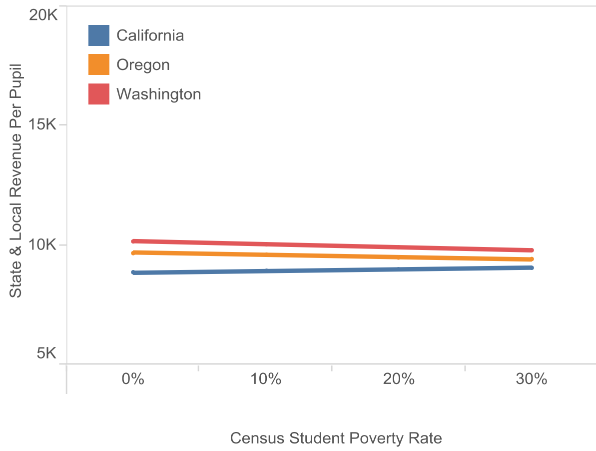
Regional funding profiles are presented in the figures below.[15] Each profile compares both funding level and funding distribution among states in the same geographic area. These regional groupings allow for a more accurate comparison of states that have similar characteristics, such as poverty rates and variations in cost. For customizable state comparison, visit our website to access interactive data charts.

[15] The regional groupings are borrowed from Nate Silver's electoral analysis. These categories group states based not only on geography, but also in terms of social and economic characteristics (www.fivethirtyeight.com).

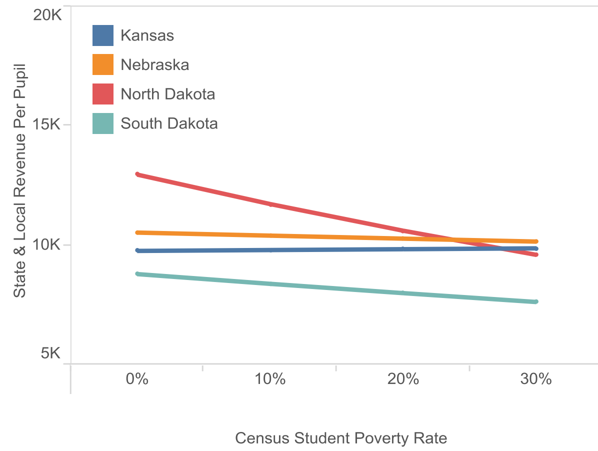
Figure 4. State Fairness Profiles



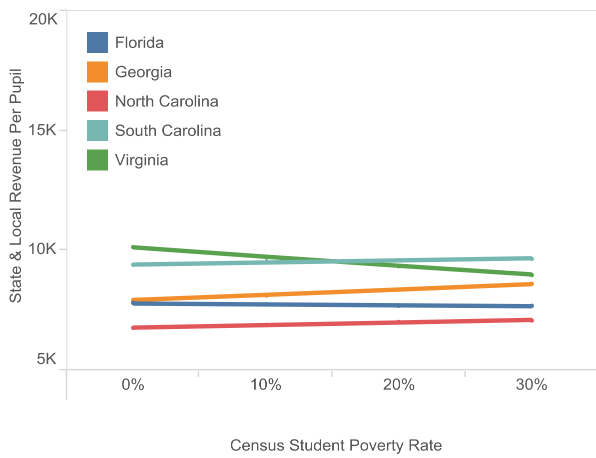
Pacific



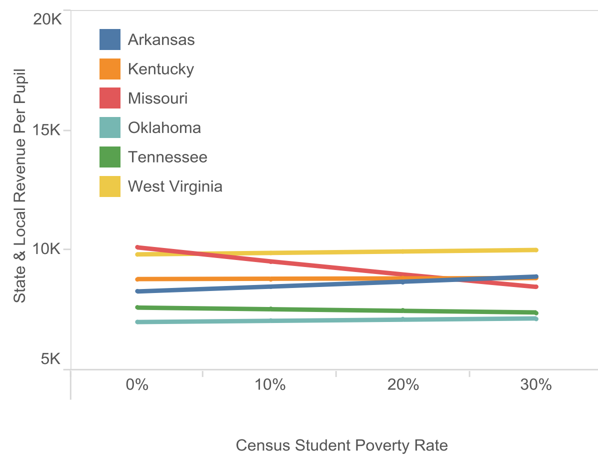
Prairie



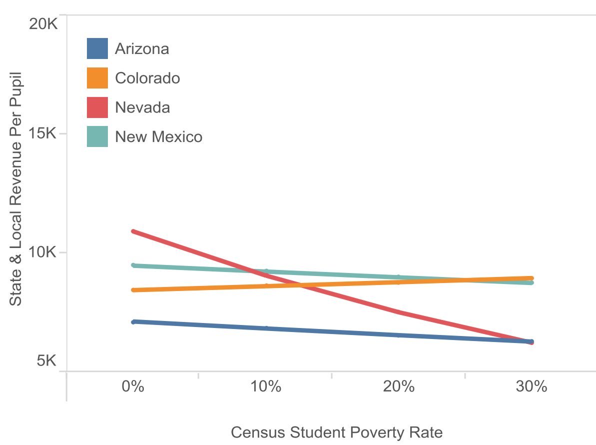
South Coast



Southeast



Southwest



Fairness Measure #3: Fiscal Effort

The Fiscal Effort index measures local and state spending on education in relation to a state's ability to generate revenue. Two measures of fiscal effort are taken into account: one based on a state's economic productivity, or gross state product (GSP), and the second based on aggregate personal income. Fiscal effort based on gross state product represents a state's ability to generate revenue from economic productivity, for example, corporate income and proceeds from natural resources. Fiscal effort based on personal income represents residents' income capacity to pay taxes to support public services. The measures are expressed as the dollars spent on education for every $1,000 generated in economic productivity or personal income.

It is important to consider how states' relative wealth and fiscal effort interact. Wealthy states can exert relatively low effort and still generate comparatively high funding levels. Conversely, a state with low economic output could make relatively high effort and still have poorly funded schools.

In general, states rank similarly whether measuring effort through gross state product or personal income. States such as Alaska, New Jersey, New York, Vermont, and Wyoming all have relatively high fiscal effort, whether measuring spending against GSP or personal income. On the other hand, states such as Arizona, California, Colorado, Hawaii, North Carolina, and Nevada exert low fiscal effort on both measures. One exception is Delaware, a state with high corporate revenues from the financial industry, but lower than average personal incomes. As a result, its fiscal effort is low in relation to GSP, but higher than average relative to income.

Figure 5. Fiscal Effort – Gross State Product, 2015

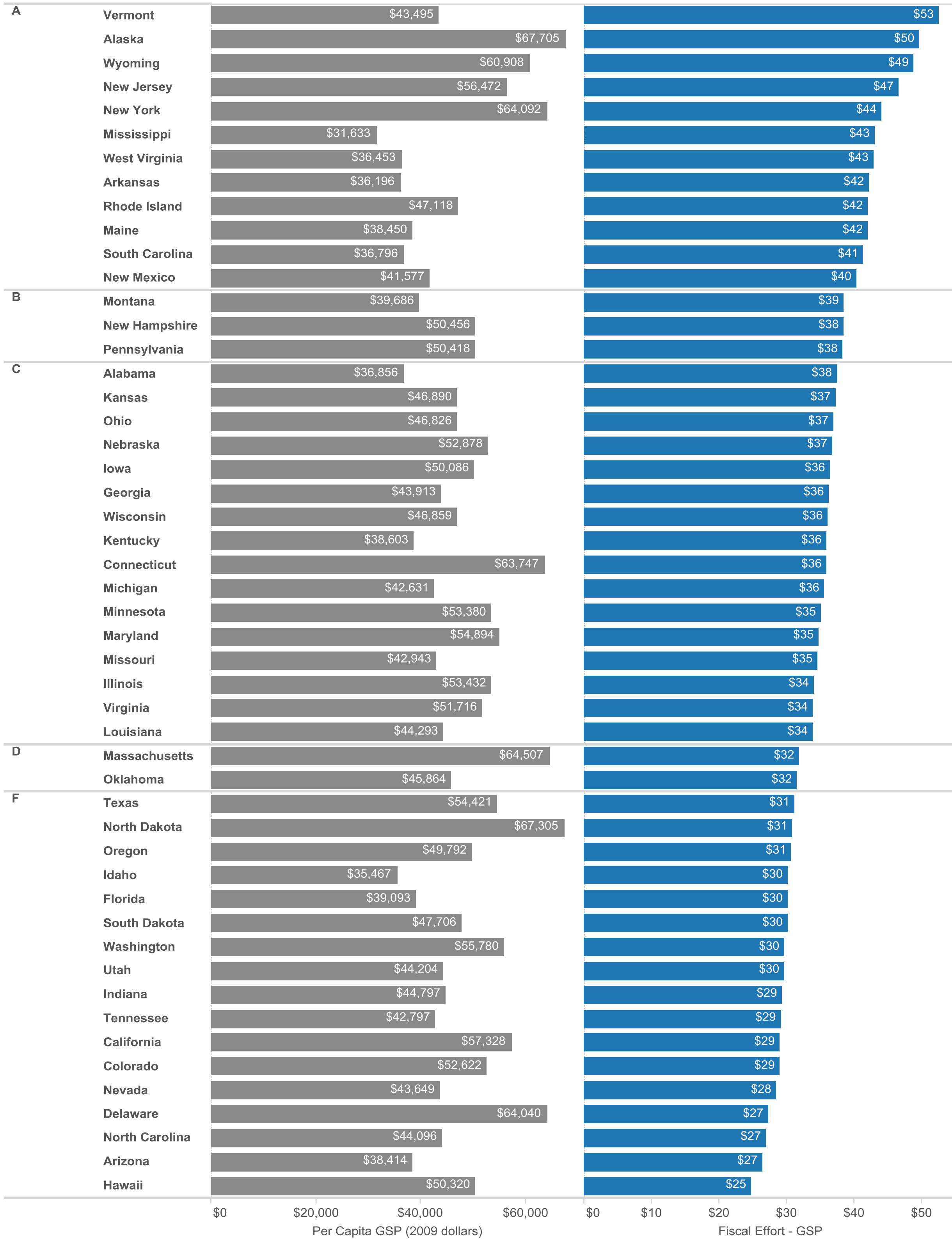
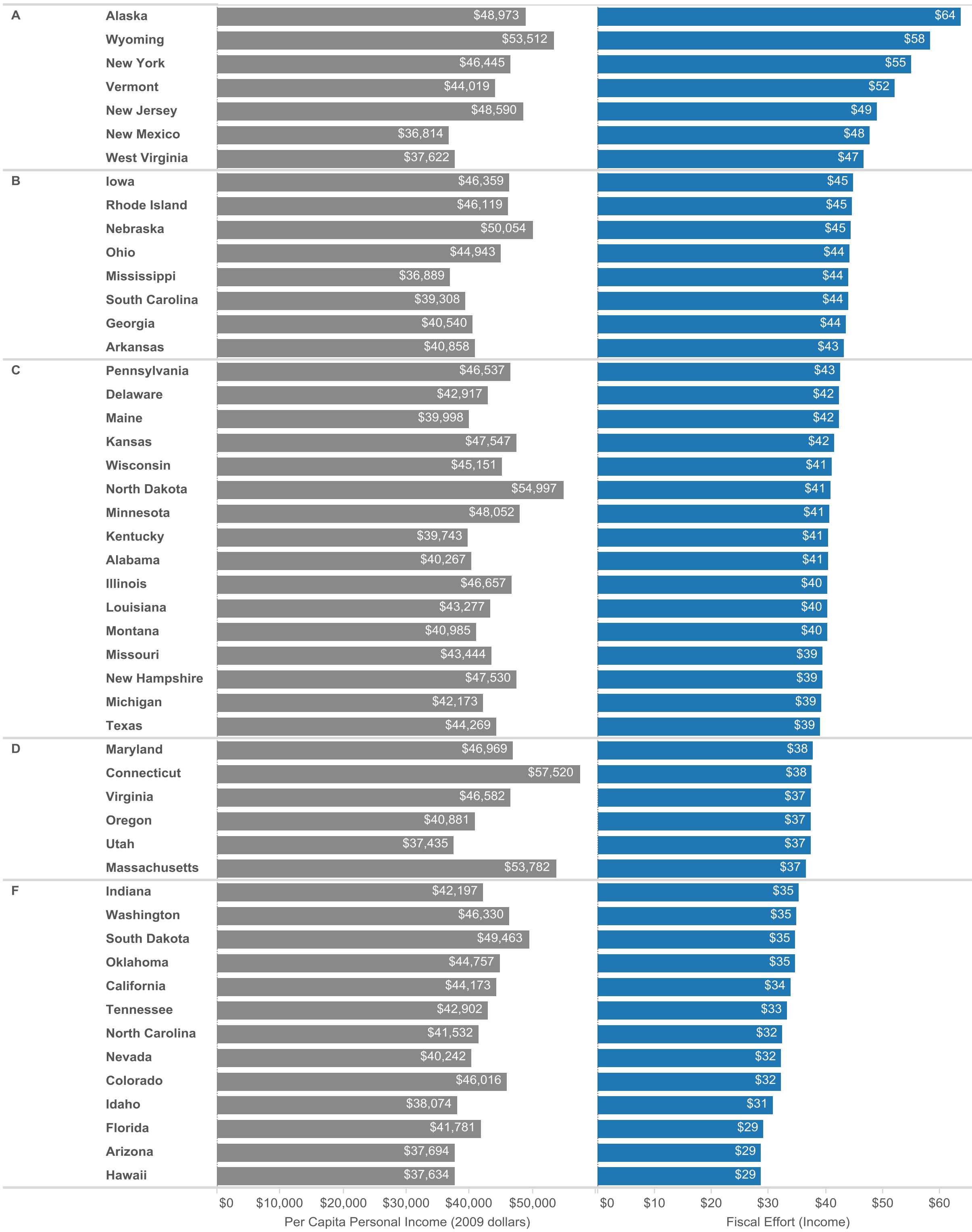


Figure 6. Fiscal Effort – Personal Income, 2015

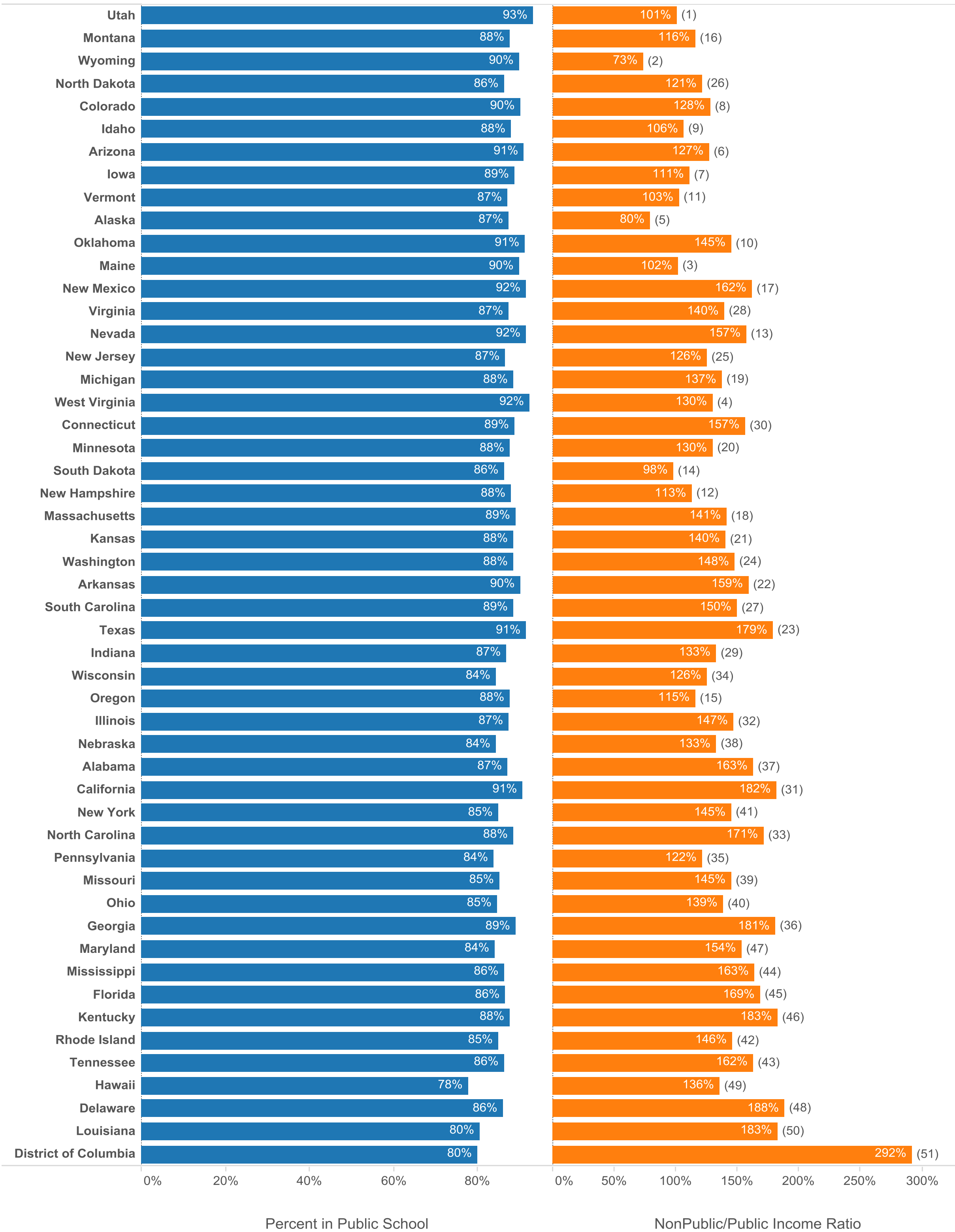


Fairness Measure #4: Coverage

The coverage indicator measures the share of school-aged children enrolled in public schools and the degree of economic disparity between households in the public and nonpublic education systems. The coverage indicator is a gauge of several important issues. The proportion of students enrolled in public schools affects the level of financial support necessary for public education. There are also two important consequences when wealthier households opt out of public education: a further concentration of poverty in the public schools and an increase in the need for resources in those schools. Finally, when wealthier families no longer use the public education system, it affects the public and political will necessary to generate sufficient revenues for a fair school funding system.

The percentage of school-aged children enrolled in public school ranges from 78% in Hawaii to a high of 93% in Utah. In several states, there are wide disparities in the incomes of families with children in public and nonpublic schools. States such as Utah, Wyoming and Maine have comparatively few students who opt out of public schools, and those who do are not very economically different from their public school peers. On the other hand, the District of Columbia, Louisiana and Hawaii have a large percentage of students, whose families are significantly wealthier, who do not attend public schools.

Figure 7. Coverage



Note: States ranked by the average of their standardized scores for percent in public school and the public/nonpublic household income ratio.

The Four Fairness Measures

Table 1 presents each state's scores on the four fairness indicators. The table provides a scorecard on the strengths and weaknesses of a particular state's finance systems and how a state's performance compares to other states in the region and across the country.

A few major findings stand out:

- New Jersey and Wyoming are the only states positioned relatively well on all four fairness indicators.
- South Carolina, Vermont, and West Virginia score well on Funding Level, Fiscal Effort and Coverage, but score poorly on the important Funding Distribution measure. This means that even though these states are funded relatively well, with above average funding levels and fiscal effort, the distribution of those funds disadvantages high poverty districts.
- Arizona, Nevada, South Dakota, and Texas score poorly on all measures except Coverage.
- Colorado, North Carolina, and Utah have somewhat progressive funding systems, but low funding levels. Without a sufficient base level of funding, even a progressive system cannot be fair. These states also score poorly on Fiscal Effort, indicating that they have the capacity to increase the base funding level.
- California, Florida, Louisiana, and Tennessee score poorly on all measures with low funding levels, low fiscal effort, and flat or regressive distribution of funds.

Table 1. National Report Card, 2015

	Funding Distribution	Fiscal Effort GSP	Fiscal Effort Income	Funding Level	Coverage
Alabama	F	B	C	39	37
Alaska		A	A	2	5
Arizona	F	F	F	48	6
Arkansas	B	A	B	36	22
California	C	F	F	32	31
Colorado	B	F	F	35	8
Connecticut	C	C	D	6	30
Delaware	A	F	A	10	48
District of Columbia					51
Florida	C	F	F	41	45
Georgia	B	C	B	37	36
Hawaii		F	F		49
Idaho	C	F	F	49	9
Illinois	F	C	C	16	32
Indiana	C	F	F	20	29
Iowa	D	C	B	18	7
Kansas	C	C	C	25	21
Kentucky	C	C	C	34	46
Louisiana	C	D	C	28	50
Maine	F	A	C	14	3
Maryland	D	C	C	12	47
Massachusetts	A	D	D	7	18
Michigan	C	C	C	24	19
Minnesota	A	C	C	13	20
Mississippi	C	A	B	44	44
Missouri	F	C	C	31	39
Montana	D	B	C	30	16
Nebraska	C	C	B	21	38
Nevada	F	F	F	42	13

Table 1. The National Report Card (cont.)

	Funding Distribution	Fiscal Effort GSP	Fiscal Effort Income	Funding Level	Coverage
New Hampshire	D	B	C	11	12
New Jersey	A	A	A	5	25
New Mexico	D	C	A	33	17
New York	C	A	A	1	41
North Carolina	B	F	F	47	33
North Dakota	F	F	F	19	26
Ohio	A	C	B	15	40
Oklahoma	C	F	F	45	10
Oregon	C	F	D	27	15
Pennsylvania	C	B	C	8	35
Rhode Island	D	A	A	9	42
South Carolina	C	A	A	26	27
South Dakota	F	F	F	40	14
Tennessee	C	F	F	43	43
Texas	D	F	D	38	23
Utah	A	F	C	46	1
Vermont	C	A	A	3	11
Virginia	F	C	C	29	28
Washington	C	F	F	23	24
West Virginia	C	A	A	22	4
Wisconsin	B	C	C	17	34
Wyoming	A	A	A	4	2

Note: Funding Level and Coverage rankings are colored by quartiles: Q1, Q2, Q3, Q4.

Fair School Funding and Resource Allocation

This section explores the impact of funding fairness, or lack thereof, on schools and students through three resource allocation indicators. These indicators are examples of how a state's funding priorities affect the quality and breadth of educational opportunities available for students. Information on methodology and data sources can be found in Appendix A. Detailed, longitudinal data tables for these indicators can be found in Appendix C.

Early Childhood Education

Access to early childhood education is a critical component of a fair and equitable education system. Research shows that low-income children often come to school lagging behind their peers academically. High quality preschool programs can help reduce those gaps.[16] States vary in the degree to which early education programs are available to young children across the socioeconomic spectrum. States that recognize the need for early interventions in children's educational careers can promote and support early education programs that focus on providing opportunities for low-income families.

Not surprisingly, there is great variation in the extent to which young children are enrolled in early childhood programs in the states. Total enrollment of 3- and 4-year-olds ranges from a high of 77% in the District of Columbia to a low of 27% in Idaho. Enrollment of low-income children ranges from 72% in the District of Columbia to only 22% in North Dakota.

Though the importance of early childhood education for low-income children is well documented, in most states these children are still less likely to be enrolled than their peers. Only a handful of states enroll proportionally more low-income students in early childhood programs. In South Dakota, Wyoming, Vermont, and Montana, low-income children are more likely than their peers to be enrolled in early education, as depicted by the enrollment ratio. In the vast majority of states, low-income children are considerably less likely to be enrolled than their peers. In states such as West Virginia, North Dakota, Alaska, and Maine, enrollment rates in general are very low, with about a third of children enrolled in early education. But participation is much lower among low-income students, with only about one in five enrolled in a program.

Wage Competitiveness

A state's ability to attract and retain high quality teachers is a fundamental component of a strong and equitable school system. Because teachers' salaries and benefits make up the bulk of school budgets, a fair school funding system is required to maintain an equitable distribution of high quality teachers in all districts. One of the most important ways that states can ensure that teaching jobs remain desirable in the job market is to provide competitive wages.

[16] For a review, see W.S. Barnett. 2011. "Effectiveness of early educational intervention." *Science,* 333, 975-978.

We have constructed a measure of wage competiveness that compares teachers' salaries to the salaries of other professionals in the same labor market and of similar age, degree level and hours worked. Results are reported for 25-year-olds.

Most states' average teachers' salaries are far below the salaries of their non-teacher counterparts. On average, teachers beginning their careers at age 25 earn about 82% of what non-teachers earn. Only three states have average teacher wages that are comparable to similar workers: Wyoming, Alaska, and Iowa. Wages are least competitive in Colorado, New Hampshire, Virginia, Utah, and Washington, where teachers earn about 30% less than their counterparts.

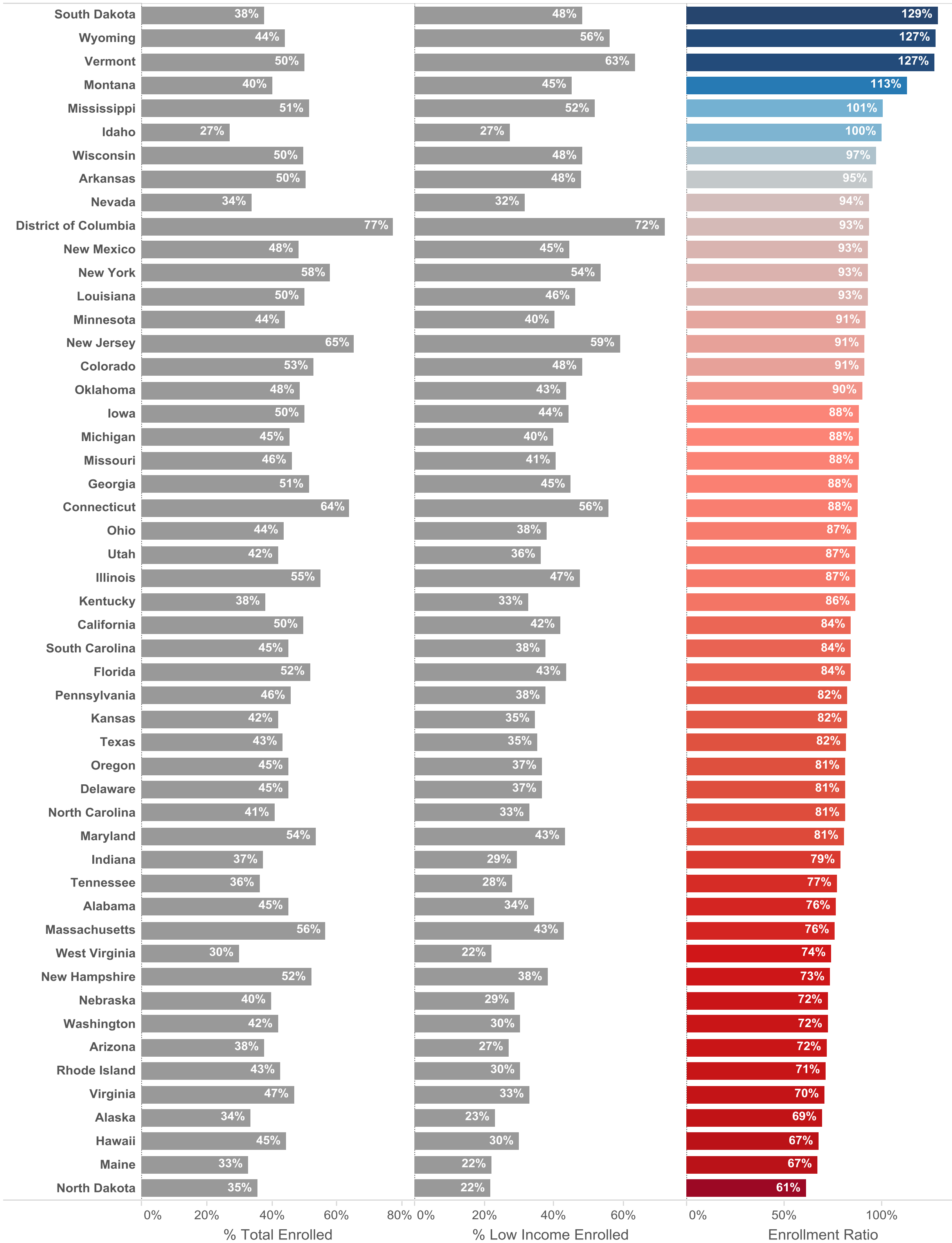
Teacher-to-Student Ratios

The fundamental premise of fair school funding is that additional resources are required to address the needs of students in poverty. High poverty schools require more staff to address the challenges of serving low-income students, since these students benefit from smaller class sizes, literacy and math specialists, instructional coaches, and social services such as counselors and nurses. Our measure of staffing fairness compares the number of teachers per 100 students in high and low poverty districts.

The staffing fairness measure ranges from a progressive 154% in North Dakota to a regressive 75% in Florida. In other words, high poverty districts in North Dakota have, on average, 40% more teachers per 100 students than low poverty districts, potentially resulting in smaller class sizes, while in Florida, the poorest districts have about 25% fewer teachers per 100 students than low poverty districts. Predicted staff to student ratios, at 20% poverty, range from a high of 9.2 teachers per 100 students in North Dakota to a low of 4.4 in California.

Nineteen states have a progressive distribution of teachers, i.e., at least 5% more teachers per student in high poverty districts. Ten states are regressive and have fewer teachers per student in high poverty districts. The remaining nineteen states have essentially no difference in staffing ratios between low and high poverty districts. This means the majority of states are failing to systematically provide an equitable distribution of teachers so that high poverty schools have smaller teacher-to-student ratios than low poverty schools.

Figure 8. Early Childhood Education



State	% Total Enrolled	% Low Income Enrolled	Enrollment Ratio
South Dakota	38%	48%	129%
Wyoming	44%	56%	127%
Vermont	50%	63%	127%
Montana	40%	45%	113%
Mississippi	51%	52%	101%
Idaho	27%	27%	100%
Wisconsin	50%	48%	97%
Arkansas	50%	48%	95%
Nevada	34%	32%	94%
District of Columbia	77%	72%	93%
New Mexico	48%	45%	93%
New York	58%	54%	93%
Louisiana	50%	46%	93%
Minnesota	44%	40%	91%
New Jersey	65%	59%	91%
Colorado	53%	48%	91%
Oklahoma	48%	43%	90%
Iowa	50%	44%	88%
Michigan	45%	40%	88%
Missouri	46%	41%	88%
Georgia	51%	45%	88%
Connecticut	64%	56%	88%
Ohio	44%	38%	87%
Utah	42%	36%	87%
Illinois	55%	47%	87%
Kentucky	38%	33%	86%
California	50%	42%	84%
South Carolina	45%	38%	84%
Florida	52%	43%	84%
Pennsylvania	46%	38%	82%
Kansas	42%	35%	82%
Texas	43%	35%	82%
Oregon	45%	37%	81%
Delaware	45%	37%	81%
North Carolina	41%	33%	81%
Maryland	54%	43%	81%
Indiana	37%	29%	79%
Tennessee	36%	28%	77%
Alabama	45%	34%	76%
Massachusetts	56%	43%	76%
West Virginia	30%	22%	74%
New Hampshire	52%	38%	73%
Nebraska	40%	29%	72%
Washington	42%	30%	72%
Arizona	38%	27%	72%
Rhode Island	43%	30%	71%
Virginia	47%	33%	70%
Alaska	34%	23%	69%
Hawaii	45%	30%	67%
Maine	33%	22%	67%
North Dakota	35%	22%	61%

Figure 9. Wage Competitiveness

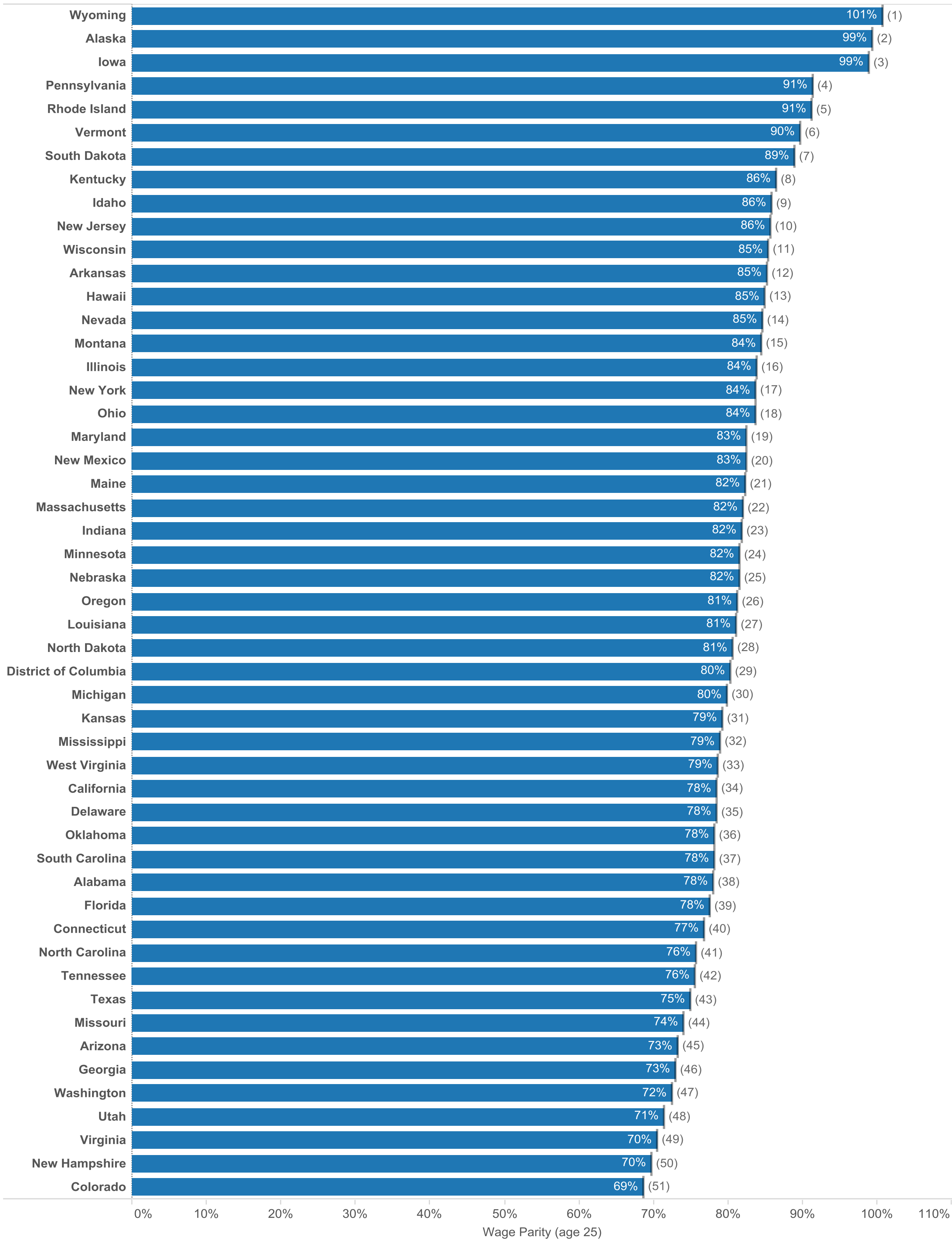
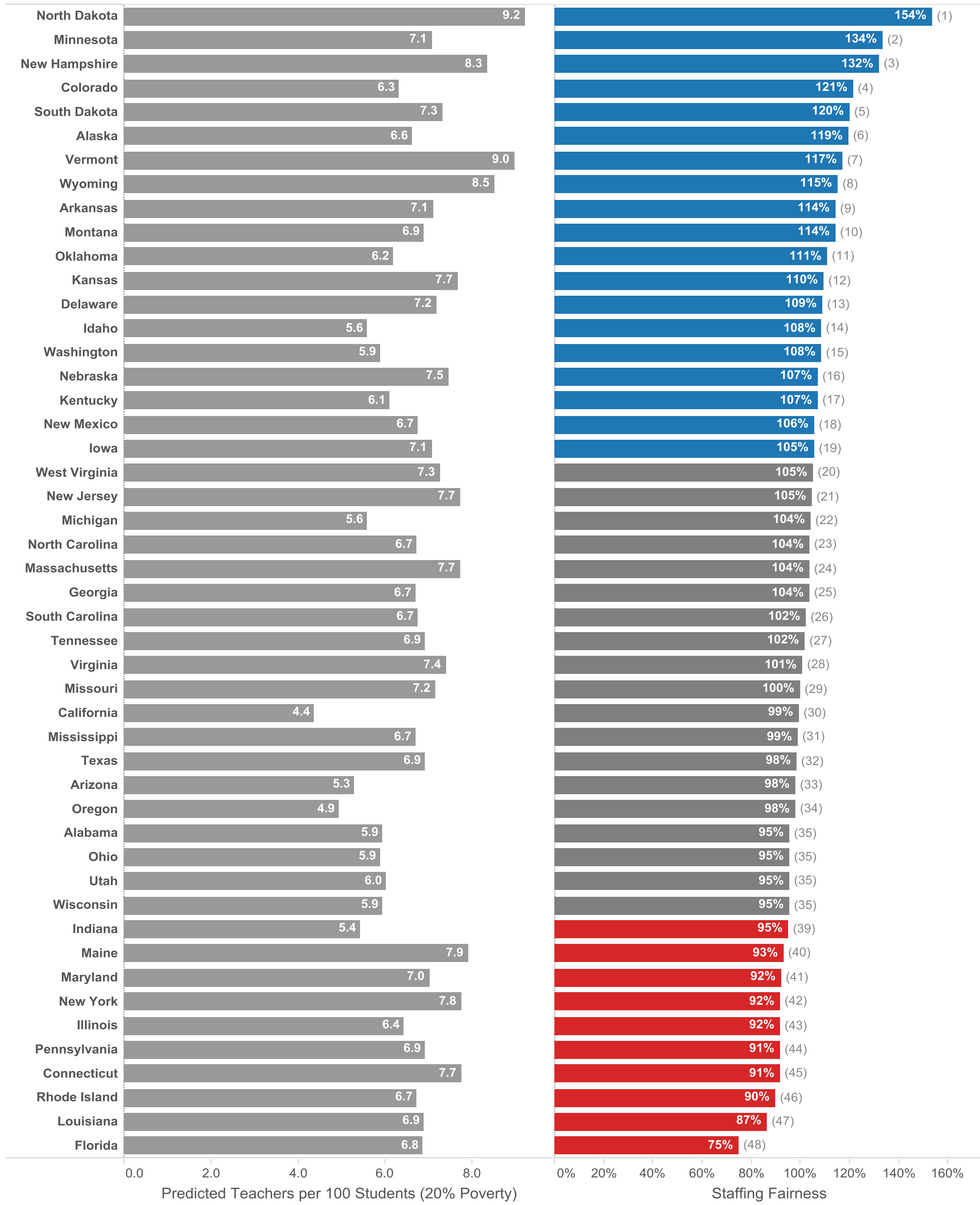


Figure 10. Teacher to Student Fairness Ratio



Note: Nevada is excluded from the teacher fairness analysis because six of the seventeen school districts were missing data in 2015.

Progressive Flat Regressive

How Much is Enough?

The National Report Card shows wide disparities in education funding among states, with the lowest funded states providing less than a third of what the highest funded states provide their schools. Most states' finance systems also fail to increase funding to address higher levels of student poverty in districts.

For policymakers, the key question is: how much should a state spend to meet the goal of student academic proficiency as measured by state standards? To date, this analysis has not been possible at the national level. Because each state sets its own academic standards and faces unique economic conditions, no national study has been able to identify each state's ability to achieve common academic outcomes nor assess the cost of reaching that goal.

The *National Education Cost Model* (NECM) fills this gap in existing research. The model uses newly available, district-level estimates of school expenditures, student population characteristics, economic conditions, and assessments of reading and math that are comparable across states to determine how much each district and state must spend to achieve national average outcomes.

The report, *The Real Shame of the Nation: The Causes and Consequences of Interstate Inequity in Public School Investments,* provides a deeper and sobering analysis of the condition of the 50 state finance systems.[17] The report shows egregiously uneven investment in public schooling across states and equally egregious differences in the ability of state public education systems to achieve even modest student outcomes. In fact, most states do not provide enough funding for their highest poverty children to achieve average outcomes. In some states, the funding disparity for the most vulnerable students exceeds $10,000 per pupil. The handful of states that are successfully targeting resources to higher poverty districts have student outcomes to match.

The NECM and the *Shame of the Nation* report have important policy implications: school finance reform and increased investment is essential to improve student outcomes in those states and districts that are presently most deprived of resources. Further, to reduce achievement gaps both within and among states, an effective federal policy is needed to boost investments in states to reduce interstate inequality while encouraging states with unrealized capacity to do more to address their own shortfalls.

The National Report Card, the NECM, and the *Shame of the Nation* report offer irrefutable evidence of the failure of finance systems in most states to provide all children with the opportunity for educational success. Together these reports are a resounding and urgent call to action for state school finance reform.

[17] Report is authored by Bruce D. Baker, Mark Weber, Ajay Srikanth, Robert Kim and Michael Atzbi.

Appendix A: Data and Methodology

Fairness Measures

Funding Level: A regression model predicts an average per-pupil funding level for each state, while holding other factors constant. This eliminates the variation in funding associated with characteristics that vary between districts and across states, and determines average funding at the state level under a hypothetical, yet meaningful, set of conditions. State and local funding levels are predicted with the following variables: student poverty, regional wage variation, economies of scale, population density, and the interaction between economies of scale and density. Reported funding levels are predicted using national averages for all independent variables and a poverty rate of 20%.

The regression equation includes a panel of 25 years of data and presents estimates for the most recent five years. Models used in previous editions only included 3-year panels, with estimates reported for the most recent year. Due to this change in modeling, there will be slight differences between the results of this edition and previously published editions.

Funding Distribution: Using the above regression model, the relationship between student poverty and school funding is estimated for each state. Funding levels are predicted for poverty levels at 10% intervals from 0% to 30% under the average conditions within each state. The fairness ratio is calculated by dividing state and local funding at 30% poverty by funding at 0% poverty. A higher ratio indicates greater fairness.

Fiscal Effort: The two Fiscal Effort indices are calculated by dividing the total direct expense for elementary and secondary education by: 1) state gross domestic product, and 2) aggregate personal income. The indices are expressed as education spending per $1,000 of GSP or personal income.

Coverage: The Coverage indicator includes two measures. First is the proportion of school-aged children attending the state's public schools, as opposed to private schools, homeschooling, or not attending school at all. The second is the ratio of median household income of students who are enrolled in public schools to those who are not. The Coverage rankings are computed by calculating a standardized score (z-score) for each measure and then taking the average.

Table A-1. Data Sources

Indicator	Data Element	Data Source	
Funding Level & Funding Distribution	Local and state revenues per pupil	U.S. Census F-33 Public Elementary-Secondary Education Finance Survey	http://www.census.gov/govs/school/
	Student poverty rates	U.S. Census Small Area Income and Poverty Estimates	http://www.census.gov/did/www/saipe/data/index.html
	Regional wage variation	Taylor's Extended NCES Comparable Wage Index	http://bush.tamu.edu/research/faculty/Taylor_CWI
	Economies of Scale/District Size	NCES Common Core of Data – Local Education Agency Universe Survey	http://nces.ed.gov/ccd/
	Population Density	U.S. Census Population Estimates	https://www.census.gov/popest/index.html
Effort	Gross State Product	Bureau of Economic Analysis	http://bea.gov/itable/
	Personal Income	Bureau of Economic Analysis	http://bea.gov/itable/
	Total direct expense for elementary and secondary education	The Urban Institute-Brookings Institution Tax Policy Center Data Query System (SLF-DQS)	http://slfdqs.taxpolicycenter.org
Coverage	% 6-16 year olds enrolled in school	U.S. Census American Community Survey	Integrated Public Use Micro Data System www.ipums.org (3-Year Sample)
	Median household income by school enrollment	U.S. Census American Community Survey	Integrated Public Use Micro Data System www.ipums.org (3-Year Sample)
Early Childhood Education	School enrollment of 3- and 4-year-olds by household income	U.S. Census American Community Survey	Integrated Public Use Micro Data System www.ipums.org (3-Year Sample)
Teacher-to-Student Fairness	District teachers per 100 students	NCES Common Core of Data – Local Education Agency Universe Survey	http://nces.ed.gov/ccd/
Wage Competitiveness	Teacher and non-teacher wages	U.S. Census American Community Survey	Integrated Public Use Micro Data System www.ipums.org (3-Year Sample)

Resource Allocation Indicators

Early Childhood: The early childhood indicator compares school enrollment rates for 3- and 4-year-olds by income level. Low-income is defined as family income below 185% of the federal poverty level. This is the threshold at which students qualify for free or reduced price lunch. School enrollment is not limited to public school, and there are no restrictions on the number of days per week or hours per day the student attends. The ratio is calculated as the percentage of enrolled low-income students over the percentage of enrolled not low-income students. States are ranked on this ratio.

Wage Competitiveness: This indicator uses a regression model predicting average wages for teachers and non-teachers while controlling for age, education, and hours/weeks worked. The ratio of wages between teachers and non-teachers is computed at age 25 and indicates whether teachers, on average, are paid more or less than non-teachers.

Teacher-to-Student Ratios: The teacher-to-student ratio fairness measure is calculated by generating a regression model to establish the relationship between district teacher-to-student ratios (teachers per 100 students) and student poverty. Similar to the funding fairness analysis, the model controls for size, sparsity, and poverty and then estimates teacher-to-student ratios at various poverty levels for each state. The fairness ratio is calculated by dividing the predicted teacher-to-student ratio at 30% poverty by the predicted ratio at 0% poverty.

Appendix B: Fairness Measures

Table B-1. Funding Level

	2011		2012		2013		2014		2015	
	Funding Level	Rank	Funding Level	Rank	Funding Level	Rank	Funding Level	Rank	Funding Level	Rank
Alabama	$7,830	37	$7,882	37	$7,870	37	$8,155	37	$8,259	39
Alaska	$14,527	3	$15,326	3	$17,719	1	$16,770	3	$18,586	2
Arizona	$6,618	46	$6,370	47	$6,499	47	$6,778	47	$6,522	48
Arkansas	$8,245	30	$8,536	31	$8,418	32	$8,711	32	$8,672	36
California	$7,730	38	$7,612	39	$7,734	38	$8,363	36	$8,961	32
Colorado	$8,024	35	$7,978	36	$8,226	35	$8,453	35	$8,752	35
Connecticut	$13,984	5	$15,237	4	$15,802	4	$16,549	4	$16,930	6
Delaware	$11,444	12	$12,462	10	$13,563	8	$13,608	10	$13,598	10
Florida	$7,396	41	$7,051	42	$7,196	42	$7,618	41	$7,684	41
Georgia	$8,208	31	$8,144	35	$7,990	36	$8,112	38	$8,343	37
Idaho	$6,145	48	$5,764	49	$5,831	49	$5,872	49	$6,277	49
Illinois	$10,389	16	$10,651	16	$10,788	15	$11,192	15	$11,343	16
Indiana	$9,860	19	$10,165	20	$10,192	19	$10,376	20	$10,316	20
Iowa	$9,942	18	$10,244	19	$10,312	18	$10,582	18	$10,854	18
Kansas	$9,148	22	$9,546	22	$9,559	22	$9,780	23	$9,806	25
Kentucky	$8,110	34	$8,310	32	$8,449	31	$8,521	34	$8,807	34
Louisiana	$8,616	26	$9,017	25	$8,995	28	$9,177	28	$9,462	28
Maine	$11,234	13	$10,876	15	$11,532	13	$12,191	13	$12,242	14
Maryland	$11,879	10	$12,315	11	$12,391	12	$12,706	12	$12,672	12
Massachusetts	$13,349	6	$13,847	6	$14,277	6	$14,988	5	$15,074	7
Michigan	$9,121	23	$9,205	24	$9,403	23	$9,640	25	$9,869	24
Minnesota	$11,215	14	$11,190	14	$11,409	14	$11,734	14	$12,320	13
Mississippi	$6,633	45	$6,827	44	$6,924	44	$7,071	45	$7,213	44
Missouri	$8,202	32	$8,698	29	$8,779	30	$8,900	31	$8,970	31
Montana	$8,358	29	$8,582	30	$8,800	29	$9,007	30	$9,319	30
Nebraska	$9,502	20	$9,610	21	$9,919	21	$10,284	22	$10,249	21
Nevada	$7,329	43	$7,399	41	$7,345	41	$7,436	42	$7,485	42
New Hampshire	$11,561	11	$12,150	12	$12,614	11	$13,100	11	$13,276	11
New Jersey	$14,270	4	$16,397	2	$16,516	3	$17,046	2	$17,008	5
New Mexico	$8,121	33	$8,204	33	$8,252	34	$8,611	33	$8,956	33
New York	$16,190	1	$17,019	1	$17,508	2	$18,190	1	$18,719	1
North Carolina	$7,646	40	$6,617	46	$6,697	46	$7,383	44	$6,967	47
North Dakota	$9,026	24	$9,309	23	$9,369	24	$10,550	19	$10,579	19
Ohio	$10,301	17	$10,285	18	$10,421	17	$10,988	16	$11,547	15
Oklahoma	$6,596	47	$6,747	45	$6,807	45	$7,059	46	$7,086	45
Oregon	$7,868	36	$8,191	34	$8,273	33	$9,021	29	$9,474	27
Pennsylvania	$11,985	9	$12,498	9	$13,047	10	$13,813	8	$14,273	8
Rhode Island	$12,414	8	$12,643	8	$13,241	9	$13,674	9	$13,875	9
South Carolina	$8,609	27	$8,785	27	$9,312	25	$9,431	26	$9,560	26
South Dakota	$7,366	42	$7,543	40	$7,685	39	$7,872	40	$7,965	40
Tennessee	$6,694	44	$6,880	43	$6,950	43	$7,393	43	$7,454	43
Texas	$7,706	39	$7,666	38	$7,627	40	$8,018	39	$8,264	38
Utah	$6,040	49	$6,182	48	$6,310	48	$6,551	48	$7,070	46
Vermont	$12,919	7	$13,363	7	$13,780	7	$14,734	6	$18,188	3
Virginia	$8,633	25	$8,747	28	$9,104	26	$9,231	27	$9,335	29
Washington	$8,544	28	$8,813	26	$9,039	27	$9,694	24	$9,887	23
West Virginia	$9,348	21	$11,434	13	$10,006	20	$10,296	21	$9,932	22
Wisconsin	$11,005	15	$10,515	17	$10,569	16	$10,807	17	$11,066	17
Wyoming	$14,646	2	$14,237	5	$14,614	5	$14,587	7	$17,939	4

Appendix D: Student Poverty Measures

State	Census SAIPE Poverty	Free/Reduced Lunch Eligible (NCES)
Alabama	25%	52%
Alaska	13%	43%
Arizona	23%	
Arkansas	24%	62%
California	20%	59%
Colorado	13%	42%
Connecticut	13%	38%
Delaware	18%	37%
District of Columbia	29%	92%
Florida	22%	58%
Georgia	23%	62%
Hawaii	13%	50%
Idaho	15%	49%
Illinois	18%	54%
Indiana	18%	49%
Iowa	13%	41%
Kansas	15%	50%
Kentucky	23%	57%
Louisiana	26%	64%
Maine	15%	47%
Maryland	13%	45%
Massachusetts	14%	40%
Michigan	20%	47%
Minnesota	12%	38%
Mississippi	30%	74%
Missouri	18%	51%
Montana	16%	44%
Nebraska	14%	44%
Nevada	20%	52%
New Hampshire	10%	29%
New Jersey	14%	37%
New Mexico	25%	63%
New York	21%	51%
North Carolina	22%	57%
North Dakota	10%	30%
Ohio	19%	45%
Oklahoma	20%	60%
Oregon	18%	51%
Pennsylvania	17%	46%
Rhode Island	19%	47%
South Carolina	23%	56%
South Dakota	15%	40%
Tennessee	22%	56%
Texas	22%	59%
Utah	11%	37%
Vermont	12%	39%
Virginia	14%	40%
Washington	14%	46%
West Virginia	22%	46%
Wisconsin	15%	41%
Wyoming	11%	38%

Note: Census student poverty is the number of children age 5-17 below the poverty threshold. FRL is the number of public school students eligible for free or reduced-price lunch (below 185% of the poverty threshold). Arizona's FRL data did not meet NCES data quality standards.

Source: U.S. Census, Small Area Income Population Estimates, School District Estimates; National Center for Education Statistics, Elementary - Secondary Information System.

3

Economics of Education Review 29 (2010) 283–300

Contents lists available at ScienceDirect

Economics of Education Review

journal homepage: www.elsevier.com/locate/econedurev

Exploring weighted student formulas as a policy for improving equity for distributing resources to schools: A case study of two California school districts

Jay G. Chambers*, Jesse D. Levin, Larisa Shambaugh[1]

American Institutes for Research, 1070 Arastradero Road, Suite 200, Palo Alto, CA 94304, United States

ARTICLE INFO

Article history:
Received 22 September 2009
Accepted 23 September 2009

JEL classification:
I22

Keywords:
Weighted student formula
Resource allocation
Educational equity

ABSTRACT

This paper presents a case study of two California school districts, San Francisco and Oakland, each of which have implemented their own versions of what is popularly known as a weighted student formula (WSF). One primary goal of the WSF policy is to increase the equity with which resources are distributed to schools. With respect to equity, the findings suggest that for particular schooling levels per-pupil spending became more responsive to student poverty and that the increase in responsiveness appears to have coincided with implementation of the WSF in the two districts. Moreover, each district relies on a different mechanism for driving resources to the schools: San Francisco relying to a greater degree on the unrestricted funds, while Oakland relies more heavily on restricted sources which, as directed by law, drive dollars to special need populations. Interestingly, neither district exhibited any significant change in the distribution of teacher experience after implementation of their SBF models; schools serving the highest proportion of students from low-income families continued to employ teachers with the least experience after implementation of the SBF models. While an additional goal of WSF was to drive more resources down to the school level to be spent, our analysis found little substantial change in the proportion of resources expended at the school versus the district level.

1. Introduction

Schools and districts are increasingly focused on how to get the most out of every dollar they receive to improve student outcomes and to ensure an equitable distribution of resources to meet the diversity of student needs. Indeed, to meet these goals, a number of districts in the United States have adopted what is referred to in the literature as a weighted student formula (WSF) policy that includes two key components: namely, (a) the distribution of dollars within districts to schools based on student needs and (b) an increase in autonomy at the school level over how those dollars are to be used. Proponents of WSF suggest the policy improves vertical equity by distributing dollars based on student needs (e.g., on student poverty, status as English learners, or disability). In addition, by providing schools with greater autonomy the WSF policy builds on the notion that principals, other school professionals, and parents at the school site are in a better position than centralized decision makers to understand the needs of the students being served and, thereby, are better able to match

* Corresponding author.
E-mail address: jchambers@air.org (J.G. Chambers).

[1] We thank the William and Flora Hewlett Foundation for its generous support of this project. We also acknowledge the following individuals for their contributions and thoughtful reviews of and contributions to our project along the way: Tom Parrish, Joseph Olchefske, Jennifer O'Day, and an anonymous referee. Lastly, we express our gratitude to the district administrators, principals, teachers, parents, and community members who took time out of their already busy schedules to share their thoughts and opinions with us on their district planning and budgeting processes.

0272-7757/$ – see front matter
doi:10.1016/j.econedurev.2009.09.005

the utilization of dollars with the instructional program needs of the students.[2]

The present paper focuses on the equity component of the WSF policy. More formally, we touch on the following research questions:

(1) What is the theory of action behind WSF policies?
(2) What are common features of a WSF?
(3) Can WSF increase the equity with which resources are allocated across schools within a district?

The analysis takes the form of a case study of two California districts, San Francisco and Oakland Unified School Districts (SFUSD and OUSD), to examine how each attempted to achieve an improvement in the vertical equity through the implementation of a WSF-type policy and to what extent each accomplished this objective.

During the early part of this decade, San Francisco (SFUSD) implemented its WSF policy, beginning in 2002–03, and Oakland (OUSD) implemented "results based budgeting" (RBB), its version of the WSF policy, in 2004–05. Each of these names emphasizes a different component of the policy: WSF emphasizes the distributional equity, while RBB emphasizes the increased in school autonomy directed at results for students. And yet, each policy within its implementation embeds both elements to some degree. For the purpose of minimizing confusion in our terminology, we will use the term "Student-Based Funding" or the abbreviation SBF for the remainder of this paper as a general reference to WSF-types of policies. From here on out, we will use WSF to refer *only* to the specific policy implemented in SFUSD, and RBB to refer to the policy implemented in OUSD.

The remainder of the article is organized as follows: Section 2 touches on the theory of action used to motivate the use of the SBF policy; Section 3 provides a brief overview of the methodology we employed to conduct this study; Section 4 describes the specific form each policy took in SFUSD and OUSD, respectively; Section 5 gives an overview of the analysis and presents our main results; and Section 6 provides a brief summary of the main findings.

2. SBF theory of action and review of literature

The literature suggests that school districts have chosen to implement SBF policies for a number of reasons: to improve student achievement, promote accountability for school-level decisions, increase transparency in how resources are allocated, and increase equity in their districts (Childress & Peterkin, 2004; Hill, 2008). The Edmonton school district in Alberta, Canada, has the longest-running SBF policy, having initially implemented a site-based management and student-based funding reform (named the "Weighted Student Formula") in the 1970s (Archer, 2005). Starting in the late 1990s, several urban school districts in the United States followed suit implementing student-based funding policies: Cincinnati, Hartford, Hawaii (a one-district state), Houston, Milwaukee, New York City, Seattle, and Washington, DC (Cooper, DeRoche, Ouchi, Segal, & Brown, 2006; Ucelli, Foley, & Emdon, 2002).

It is important to note that SBF policies have gained widespread appeal from both the liberal and conservative ends of the political spectrum. As Baker (2009) points out, from the liberal perspective these policies offer a way to dismantle the inequitable allocation of resources within districts that have often emerged under more traditional allocation schemes, whereas conservatives find comfort in the potential for efficiency gains (via greater school autonomy) and increase in school choice offered by these policies.

SBF policies replace the traditional district budgeting model in which the central office retains control over both the allocation of staff and instructional materials across school sites and hence, to a large degree, how dollars are used. Under the traditional budgeting model, the central office district calculates the staffing required based on the total number of students enrolled at the school, using the desired student-staffing ratio for various job titles (for an example of the traditional staffing model used in SFUSD prior to WSF, see Chambers, Shambaugh, Levin, Muraki, & Poland, 2008a).

In contrast to this traditional allocation process, SBF districts provide funding to schools on the basis of the composition of students enrolled in each school. Students are "weighted" according to educational need as measured by the incidence of students who are from low-income families, are English learners, or have disabilities. Under SBF, schools are given increased autonomy in developing their academic plans and in determining how to utilize their budgets to implement those plans.

An SBF policy may encompass several different goals and the driving force behind the implementation of these policies appears to vary by district. Some have implemented an SBF policy to decentralize control to the schools and hold schools accountable for student outcomes, whereas others did so to create intra-district resource equity and make the funding system more transparent (Cooper et al., 2006; Ucelli et al., 2002). Changing the funding stream to match dollars at the school site with specific needs of the students at the school is intended to create a more equitable distribution of resources and provide greater resources to those students most in need (see, for example, the Hawley & Roza, 2006; Roza & Hill, 2003; Thomas B. Fordham Foundation, 2006).

In addition, changing the locus of decision making from the central office to the school site is intended to create a more efficient use of resources because those who work closest to the students might best understand these students' needs (see, for example, National Association of State Boards of Education, 2003; Ouchi, 2003; Psacharopoulos, 2006). The theory behind decentralized decision making draws from research in the business world that links active participation in the company with overall organizational effectiveness (Mohrman, Lawler, & Mohrman, 1992).

[2] Moreover, WSF policies, more often than not, also incorporate an element of school choice which offers the potential for a better match between family and student preferences and school programs, which WSF proponents feel interjects an element of competition between schools that may motivate school leaders to offer high quality programs to attract students and their families.

Although this decentralization component may have the benefit of increasing transparency of governance (Roza, Swartz, & Miller, 2005), increasing involvement of various stakeholders (Designs for Change, 2002), and providing more accountability to schools in exchange for more flexibility, it is important to remember that the ultimate goal is to improve outcomes for students (Hansen & Roza, 2005).

Despite the well-intended goals of SBF policies, they do have their critics. First, some believe that a focus on SBF policies draws attention away from the true problem of inadequate funding in education (Ackerman et al., 2006; Petko, 2005). That is, even if an SBF policy distributes the available funding to schools in a more equitable manner, because the overall pot of money is not big enough to provide an adequate education, it will be difficult to achieve the ultimate goal of improving student outcomes. Others have argued that the formulas developed to distribute the funds to students under an SBF policy are not well researched and therefore may not ultimately create a more equitable distribution of resources (Baker, 2009).

Other critics are concerned that by decentralizing decision making and placing local school leaders and community members, who may lack the capacity to make effective planning and budgeting decisions, in charge of the schools, the policy is setting up these local leaders to fail. Under a decentralized model, local school communities could be blamed for the failure of the system, when they did not have the ability or the power to change the district's systemic failures (Lewis & Nakagawa, 1995). Others argue that because of this lack of school-level capacity around resource allocation strategies typically led by district-level staff, SBF policies could result in the ineffective use of funds at specific schools, further contributing to inequities in the district (League of Women Voters of Charlotte-Mecklenburg, 2007).

3. Methodology

To address these research questions, we used a mixed-methods approach, collecting and examining qualitative and quantitative data from both districts. To obtain perspectives from various stakeholders in the district, we conducted interviews and focus groups with a diverse sample of respondents in San Francisco and Oakland including district and school-level personnel, reviewed relevant district documents, and observed district-led trainings. All of these interviews were conducted during the 2007–08 school year.[3]

To provide a better understanding of whether resource allocations changed with the implementation of the SBF policies in San Francisco and Oakland, we collected and analyzed district-provided expenditure files and publicly available data from the California Department of Education (CDE). A major focus of the quantitative analyses—investigating whether resource allocations were more equitable under the SBF policies—was to determine whether greater resources for students at high- versus low-need schools existed and whether this changed after the district implemented their respective policies. The quantitative data were collected for the years 2000–01 through 2006–07 which spanned the period before and after implementation of both the WSF and RBB models in SFUSD and OUSD. We focus most of our attention in this paper on the quantitative analysis that investigates changes in resource equity across schools within the two districts.

4. Overview of SBF implementation in SFUSD and OUSD

Our interviews in SFUSD and OUSD indicated that the primary goals of their WSF and RBB models—promoting equity, school autonomy and accountability—were very similar. However, while the motivation behind the design and implementation of SBF policies in both districts closely followed the theory of action found in the existing literature, it is important to note that the two districts developed their respective reforms under very different circumstances. Most notably, the speed and level of urgency with which the policies were developed and implemented clearly distinguishes their experiences with SBF.

San Francisco began implementing its WSF policy in the 2001–02 school year after the new superintendent who started in 2000 created a number of committees to focus on improving equity, including convening the Weighted Student Formula Committee to provide a forum to discuss the possible design and implementation of their WSF policy. In accordance with a suggestion from the WSF Committee, the district began a pilot of the WSF policy with 27 schools in the district in 2001–02. Concurrently, the district engaged in a five-year plan, "Excellence for All," which had three main goals: to improve academic achievement for all students, increase the equitable allocation of district resources, and establish accountability for student outcomes (San Francisco, Excellence for All, 2001). After receiving feedback from the pilot schools, the district rolled out the WSF policy district-wide in 2002–03.

Oakland began to discuss district-wide reform efforts in 2000 in response to declining enrollment, growing community awareness of poor conditions in schools, and resource inequities throughout the district (FCMAT, 2000; Hill, 2008). Much of the controversy centered on the inequities between "Hill" schools which serve predominately affluent families and the "Flatland" schools which serve substantially less affluent families (Hill, 2008). In general, the Hill schools had access to more resources and exhibited higher student achievement than the Flatland schools. By 2001–02, Oakland began experimenting with site-based management by creating a handful of "small autonomous schools" (Honig, 2003). After the district went into state receivership in June, 2003, the newly appointed state administrator focused on quickly expanding the site-based budgeting policies to a larger section of the district, which resulted in the framework for Oakland's policy. In a three-month period, the leadership created the framework for the new results based budgeting (RBB) policy by developing new funding formulas and initial budgets for all schools. OUSD implemented the formal RBB policy

[3] For more information on the qualitative components of this work, the reader is referred to Chambers, Shambaugh, Levin, Muraki, and Poland (2008a).

district-wide, as part of a larger set of reforms titled "Expect Success" in 2004–05.

Administrators in both districts mentioned increasing equity and enhancing school autonomy as the two main goals of their SBF policies. In addition, Oakland emphasized increased accountability for schools as a third reason for the policy. However, it is interesting to note that the basic academic planning and budgeting processes—the timeline, the general goals, and the players involved—does not vary greatly between the two districts.

4.1. The mechanics of the WSF and RBB funding models

Although both Oakland's RBB policy and San Francisco's WSF policy contain funding allocations based on each school's student population, the two districts' funding mechanisms differ significantly. In what follows, we briefly outline the funding mechanisms and highlight their differences.

4.1.1. Accounting for enrollment

Each of the two districts uses a different metric for counting students when calculating budget allocations to its schools: San Francisco uses total enrollment, while Oakland weights the total enrollment by the school's average daily attendance (ADA).[4] By linking the amount of funding a school receives to its ADA, Oakland intended to create an incentive for schools to improve their attendance rates.[5]

4.1.2. Weighting funding according to student needs

San Francisco and Oakland also use different approaches to distributing funding according to student need. San Francisco weights the allocations of unrestricted general purpose (GP) funds on the basis of grade level (kindergarten, grades 1–3, 4–5, 6–8, and 9–12), student's family income, English learner status (e.g., beginning or advanced), or category of special education service a student receives (e.g., resource specialist, special day class non-severe or severe).[6] The WSF allocation of GP funds is supplemented by restricted use (categorical) funding, resources to ensure each school has a minimum level of funding (floor plan), and, upon eligibility, additional resources under the Students and Teachers Achieving Results (STAR) and DREAM Schools initiatives.

Total school allocation	=WSF allocation + categorical funding + floor plan + STAR school resources + DREAM school resources
WSF funding	=Sum of need-specific per-pupil allocations from general funds (weighted according to specific students) × projected enrollment of students

In contrast, Oakland effectively weights students only by the grade level of the school (i.e., elementary, middle, or high school) with larger GP allocations going to the upper grade levels.

Total school allocation	=General purpose (GP) allocation + categorical funding + small school subsidy (for enrollments less than 360) + veteran teacher subsidy
GP allocation	=School-level specific per-pupil allocation (different for elementary, middle, and high schools) × projected enrollment of students × average daily attendance (ADA)

While some news articles and literature have previously cited Oakland's policy as an implementation of a weighted student formula, in fact Oakland does not include the traditional student need factors (i.e., poverty, EL status, or disability) as weights for distributing the unrestricted (discretionary) GP funds. Oakland chose to rely primarily on the distribution of federal and state categorical funds to the schools to address student need. District officials argued that the large amount of categorical revenues that Oakland receives are used to ensure school budgets reflect the needs of the students. It was further argued that the use of actual versus average salaries to calculate teacher costs help address these equity issues (see discussion below under *Use of Average versus Actual Teachers' Salaries*).

In fact, as required by federal and state laws, both districts allocate categorical program funds to schools based on counts of students from, for example, low-income families (e.g., such as under the Title I) or classified as English learners (e.g., such as under Title III). Thus, while Oakland relies solely on the categorical program funds to funnel additional dollars to students with special needs, San Francisco uses both GP and categorical funds to support these students.

4.1.3. Minimum funding amounts

Both San Francisco and Oakland try to ensure some minimum level of funding a school needs to function. San Francisco costed-out a basic, minimum level of staffing it felt was necessary for a school at each grade level to operate effectively (Shambaugh, Chambers, & DeLancey, 2008). This per-pupil amount became the funding floor or the so-called "floor plan." If the combined WSF allocation and categorical program funds was less than the *floor plan* (i.e., the minimum per-pupil amount), the district would provide enough additional GP funding to make up the difference.

Oakland did not establish an official minimum amount but rather created a basic per-student allotment for each school based on the grade level (i.e., elementary, middle, or high school) and reviews this allotment each year to ensure that all schools can cover their basic operating costs. To come up with per-pupil allocations that covered the basic costs of the schools, in the first year of the RBB policy the district estimated a per-pupil cost for elementary, middle, and high schools, then tested a few different schools using the current year's staffing to see whether they would be able to cover their costs. Since then, the district has taken the per-pupil cost and adjusted it across all schools, for example, by adding a cost of living adjustment.

[4] Districts are funded in California based on average daily attendance (ADA), which reflects the average number of children who actually attend school on a daily basis.

[5] Unfortunately, we observed no real changes in attendance that could be linked to the implementation of RBB in Oakland. See Chambers et al. (2008a).

[6] See Appendix A of this paper for a more detailed description of the weights used in SFUSD.

4.1.4. Additional subsidies to specific schools

In both districts, certain schools receive additional funding on top of their general purpose and categorical program funds. San Francisco provides additional resources to the lowest-performing schools, and these funds are not included in the school's discretionary budget.[7] Oakland provides additional resources to their small schools.[8] In addition to the small school subsidy, Oakland created another temporary subsidy for schools with greater numbers of veteran teachers (generally the lowest poverty schools) to offset the cost of their higher salaries. This subsidy is described further in the following section.

4.1.5. Use of average versus actual teachers' salaries for school budgets

The San Francisco and Oakland school districts use different approaches to charging teacher compensation against school budgets under their respective SBF models, and their different approaches have potentially important implications for equity. In San Francisco, the cost of a teacher to a school is determined by the *district-wide average teacher compensation* (i.e., salary and benefits), while in Oakland, the cost of a teacher is determined by the *actual compensation* for that teacher. Thus, in their budgeting processes, every school in San Francisco faces the same, identical teacher cost.

On the surface, this arrangement in San Francisco sounds equitable. However, the reality is not quite that simple. Under the WSF policy in San Francisco, every school faces the same cost per teacher deducted from their budgets, regardless of the actual salary paid out to each teacher by the district, which is determined by levels of experience and educational preparation. The data for San Francisco and the research evidence more generally tend to show that the more experienced veteran teachers who are paid higher salaries tend to gravitate toward schools with fewer low-income students (Chambers et al., 2008a; Education Trust West, 2005; Roza & Hill, 2003). Thus, on average, schools serving the highest poverty student populations tend to exhibit the lowest actual teacher salaries, and vice versa. Put another way, schools with the greatest needs have the least highly paid teachers (i.e., teachers at lower points on the salary schedule). The inequity results from the fact that what appear to be the same school budgets purchase differential inputs (i.e., teacher experience levels) favoring the schools serving fewer low-income students.

In 2005–06, San Francisco did try to supply additional funds to the schools with the highest number of new teachers to combat this inequity (Shambaugh et al., 2008). Moreover, in June 2008, voters passed a parcel tax to combat some of the inequities in teacher distribution, with measures to attract and retain quality teachers and staff by increasing salaries and to provide teachers with additional compensation when serving in "hard to staff" schools. Therefore, although not pursuing actual salaries, San Francisco has tried alternative methods to encourage teachers to work in higher-need schools.

In contrast, in 2004–05 as part of the RBB policy, Oakland began charging each school the *actual salary and benefits* of the teachers it employed. Oakland was the only district in the country implementing an SBF model that had chosen to charge school budgets based on the actual rather than average compensation levels of teachers. Oakland's rationale for using actual salaries in the formula was that schools serving the higher poverty students with less-experienced teachers would have lower teacher-related charges against their budgets than schools serving lower poverty students. With lower actual costs of teachers combined with the comparable levels of funding, the notion was that the relatively higher poverty schools would have more resources that would permit them to provide smaller class sizes and offer increased professional development opportunities. These preferred working conditions would in turn eventually support and encourage retention of more senior teachers.

The use of actual salaries forced Oakland to face political tensions and questions about how the schools serving lower proportions of low-income students would be able to cover their higher actual teacher costs in their budgets. To address this, Oakland provided subsidies, during the first three years of implementing RBB, to schools with above-average proportions of veteran teachers in order to support them during the transition from average to actual compensation policy. Average subsidies amounted to about \$500–\$600 per-pupil in the first year and declined to less than \$100 per-pupil in the third year.

Using quantitative data, we investigated whether there had been any changes associated with the implementation of SBF policies in the distribution of teacher experience between schools with high and low proportions of students from low-income families. In both districts, we observed that, for the most part, low-poverty schools employed more experienced teachers than their high-poverty counterparts both before and after implementation of their respective SBF policies, with much smaller experience gaps in elementary and middle schools (detailed results can be found in Chambers et al., 2008a). Surprisingly, despite Oakland's additional incentive to retain newer teachers at higher poverty schools and therefore begin to change the distribution of teachers over time, San Francisco showed progress toward closing the experience gap, whereas Oakland did not. It is interesting to note that our qualitative findings show several district staff mentioning that collective bargaining agreements inhibited any substantial shift in teachers' experience levels. These respondents argued that while these agreements protected veteran teachers from being transferred to a school against their wishes, they also prevented a transition to a more equitably distributed teacher workforce.

[7] In San Francisco, the district allocates additional resources under the STAR (Students and Teachers Achieving Results) and Dream Schools programs, which provide targeted assistance to the district's lowest performing schools by providing additional school staff and funds to support instructional improvements.

[8] The small schools subsidy is supplementary funding provided on a sliding scale, which is capped at an enrollment level of 360 students. It is relatively small funding source (only \$5.3 million distributed across 83 schools in 2006–07) with a majority (67.9 percent) going to elementary schools and considerably smaller shares to middle and high schools (14.6 percent and 17.5 percent, respectively).

5. Analysis and main results

5.1. Discretion and the proportion of funding at the school site

One primary goal of an SBF policy is to increase school-level discretion over budgeting and planning. Research suggests that previous efforts to decentralize decision-making have not been successful, in part, because they did not fully embrace giving budgeting and planning discretion to schools, and therefore did not produce changes in the institutional structures (Hansen & Roza, 2005; Wohlstetter & Van Kirk, 1995). Exactly how much discretion schools retain is affected by many decisions made at the central office. These decisions focus on both budgeting discretion (i.e., the proportion of funds sent to the schools versus retained at the central office) and planning discretion (i.e., how much control over staffing and programmatic offerings to give to schools).

Unfortunately, the best we can do in the present study is to offer different measures of how much of the total funding districts receive is actually spent at the school site versus the central office. The actual levels of discretion are significantly more difficult to ascertain because true discretion would require measuring how much control school leaders have over not only how many of each kind of staff they employ, but also which specific staff they employ. While this may be a subtle distinction, the reality is that specific individuals embody certain qualifications such as experience, and, to some extent, the employees themselves because of seniority retain some discretion over school assignments.

SBF policies are often designed so that the district pushes more money out to schools and offers them discretion over how the funds are used. One measure of the degree of discretion might simply be the proportion of the budget spent at the school level. However, measuring the amount of money spent at the school level can be difficult, especially given that school budgets do not include many centrally reported resources that benefit the schools (Miller, Roza, & Swartz, 2005).

To analyze the portion of funds spent at the school site versus retained at the central office, we used several years of district-level fiscal data from before and after SBF implementation, and coded expenditures into two groups: those funds linked to the schools through the SBF policy and those linked to the central district office.[9]

In neither district did the proportion of total expenditures spent at the school site increase as a result of implementing an SBF policy. Table 1 reveals the share of total spending attributable to school- and district-level expenditures in each district (SFUSD and OUSD), respectively. The pattern for San Francisco is relatively stable, with about 60 percent of expenditures at the school level virtually every year after 2001–02. In Oakland prior to the RBB policy in 2002–03, 66 percent of total per-pupil spending was from school-level expenditures, while this has declined to about 60 percent in the years after the implementation of RBB.[10]

5.2. Equity analysis: targeting funds towards student needs under SBF

Both San Francisco and Oakland identified equity as an important goal in implementing their respective SBF policies. Here we interpret their desire to achieve equity as the provision that students with greater educational need should be given access to relatively more resources if they are to be offered an equal opportunity to achieve. As a proxy for student need the analysis makes use of the percentage of students at a school who are eligible for a free or reduced-price lunch.

To explore the extent to which the goal of equity was achieved, we investigated whether the relationship between school spending per-pupil and student need became stronger in each district after SBF was implemented. This was done using three measures of per-pupil spending: total spending per-pupil and separate per-pupil spending supported by unrestricted versus restricted sources of revenue. In this way, it was possible to ascertain not only whether the overall spending versus need relationship became stronger, but also which of the two funding components, restricted versus unrestricted revenues, were responsible for driving the overall patterns of spending.

5.2.1. Restricted versus unrestricted funding and teacher salary subsidies

Under its WSF policy, San Francisco established specific student weights (see Appendix A) to distribute unrestricted funding to schools on the basis of student need. The district then ensured that each school's allocations provided a minimum operating budget based on a set of standardized staffing ratios (the "floor plan", described previously). Restricted funds continued to be distributed as they were prior to the implementation of the WSF, according to the regulations of each categorical funding program.

Oakland's RBB policy did not assign explicit weights based on student needs to distribute unrestricted funding. Instead, the district distributed its unrestricted funds according to a school's share of total district enrollment weighted by average daily attendance (ADA): that is, schools with higher attendance rates received more funding per-pupil. However, elementary, middle, and high schools did receive differential per-pupil funding based on assumptions about the relative cost of serving students at these grade levels. Also, Oakland distributed restricted

[9] We focused on dollars linked to traditional public elementary, middle, and high schools that received their funding through the SBF policy (excluding charter schools, adult education, early childhood education centers, etc.).

[10] The results presented above do not capture the true district-wide expenditures that occur at schools given that several services, such as special education and professional development, are managed at the central office but delivered to school sites. Therefore, we also analyzed the estimated proportion of funds spent *by* the schools and spent *on* the schools through district-provided services. While the proportion of funds spent at the school level were higher (typically above 80 percent), neither district showed large increases in the level of resources spent at the school level after the implementation of an SBF policy.

Table 1
Shares of SFUSD and OUSD expenditures by central district office versus school site, 2000–01 to 2006–07.*

SFUSD	Pre-WSF		Post-WSF			
	2000–01	2001–02	2002–03	2004–05	2005–06	2006–07
District-level expenditures	34%	40%	40%	40%	40%	39%
School-level expenditures	66%	60%	60%	60%	60%	61%
OUSD	Pre-RBB			Post-RBB		
	2000–01	2001–02	2002–03	2004–05	2005–06	2006–07
District-level expenditures	–	–	34%	35%	39%	38%
School-level expenditures	–	–	66%	65%	61%	62%

Source: District provided standardized account code structure (SACS) fiscal data, 2000–01 through 2006–07 for SFUSD and 2002–03 and 2004–05 through 2006–07 for OUSD (OUSD data for 2003–04 were found to be unreliable and were therefore excluded from the analysis).
* Expenditure does not include the following object categories: capital outlay, other financing uses or other outgoing expenditures.

funding to schools according to their enrollment of eligible students in relation to the district as a whole (e.g., Title I funding is distributed based on free or reduced-price lunch counts of children and Title III is distributed based on counts of English learner students).

As previously described, another important difference between the SBF policies that were implemented is in the way each district treated personnel costs in school budgets. Under the WSF program in San Francisco, the cost of a full-time teacher for any school corresponded to the average compensation level for teachers in the district. In Oakland under the RBB policy, the cost of a full-time teacher corresponded to the actual compensation for that teacher. However, Oakland introduced this component of the RBB model gradually from 2003–04 to 2006–07, over which time those schools with high proportions of veteran (or more expensive) teachers could apply for subsidies to cover their higher costs.

Although using compensation subsidies in Oakland was necessary to ease the transition for schools with high salary costs resulting from large proportions of veteran teachers, one might expect that these subsidies may have diluted the original intention of using actual, as opposed to average, salaries to charge against school budgets. That is, the original intent of this provision was to increase resource equity by having schools base their staffing decisions on the true cost of the staff they employ. Schools with large numbers of veteran teachers, no longer able to support their staffing costs once faced with paying the actual price for these staff, were expected to employ a more balanced cadre of instructors with respect to experience, which would result in a stronger relationship between per-pupil spending and student needs. However, to the extent that schools with large numbers of veteran teachers tend to serve less impoverished student populations, the subsidies to support these schools would inhibit the change in composition of teachers across schools and, hence, the full expected increase in equity. We investigated the impact of the teacher subsidies on the relationship between per-pupil spending and poverty in the post-RBB years by creating an additional measure of spending: school-level per-pupil spending *excluding* the subsidies for veteran teachers. Comparison of these two profiles permits us to evaluate the impact of the teacher subsidies on the relationship between spending and poverty.

5.2.2. *Estimating the relationship between school spending and student need*

To facilitate this investigation multivariate regression analysis was used to measure how the relationship among actual per-pupil spending and student need and school size changed over the periods before and after implementation of the SBF policies in San Francisco and Oakland, respectively. Specifically, spending profiles by poverty level and school size were estimated for each district in the years before and after implementation of the policy using school-level per-pupil expenditures stemming from total, restricted, and unrestricted funds.

The regressions allowed us to estimate implicit weight profiles for student need and school size, which show how school-level per-pupil expenditures varied with respect to levels of student poverty (i.e., the percent of students eligible for the free or reduced-price lunch program) and total school enrollment in each year. School size was included as an explanatory factor in this analysis to see to what extent economies of scale played a role in ensuring equitable access to resources in schools. If the funding distribution formula does not account for school size, pupil need may not necessarily be appropriately addressed. The spending profiles that we have estimated for this analysis simply reflect the extent to which district funding distributions and, more specifically, actual per-pupil spending by the schools account for diseconomies of small-scale operations.[11]

Evaluation of the generated spending profiles show whether the relationship among student need, school size, and expenditures became stronger with the advent of the SBF policies. We use the magnitude of the estimated per-pupil spending versus student need relationship as a gauge to answer the question of whether the policies implemented achieved the desired increase in equity that both districts identified as a goal of their respective SBF policies. Under the assumption that higher poverty students have greater needs for educational resources, we hypoth-

[11] It is important to note that we used actual spending for each school as the dependent variable rather than the budget allocation, which in San Francisco would have been based on average compensation levels for teachers. Our data analyzed spending based on actual teacher compensation levels.

esize that spending should be positively associated with student poverty. The following analysis investigated this expected relationship and how they may have changed with the implementation of the SBF policies in Oakland and San Francisco.

Simple regression analysis of the following general form was used to identify if there were any systematic patterns in school-level per-pupil expenditure that could be explained by student need or enrollment, and whether the expenditure/need and expenditure/enrollment relationships experienced significant changes over time.

$$\textit{per-pupil expenditure} = f(\textit{student need}, \textit{enrollment})$$

Separate regressions were estimated for elementary versus middle and high schools, where the formal specifications of the models were as follows[12]:

Elementary school equation

$$\begin{aligned}\ln(PPEXP)_{s,t} &= \alpha + \beta_1 \ln(1 + FRL_{s,t}) + \beta_2 ENR_{s,t} + \beta_3 ENR^2_{s,t} \\ &\quad + \sum_{t=1}^{T} \delta_t YEAR_t + \sum_{t=1}^{T} \phi_t \ln(1 + FRL_{s,t}) YEAR_t \\ &\quad + \sum_{t=1}^{T} \varphi_t ENR_{s,t} YEAR_t + \sum_{t=1}^{T} \gamma_t ENR^2_{s,t} YEAR_t \\ &\quad + \varepsilon_{s,t}\end{aligned}$$

Middle/high school equation

$$\begin{aligned}\ln(PPEXP)_{s,t} &= \alpha + \beta_1 \ln(1 + FRL_{s,t}) + \beta_2 ENR_{s,t} + \beta_3 ENR^2_{s,t} \\ &\quad + \beta_4 HIGH_{s,t} + \sum_{t=1}^{T} \delta_t YEAR_t \\ &\quad + \sum_{t=1}^{T} \phi_t \ln(1 + FRL_{s,t}) YEAR_t \\ &\quad + \sum_{t=1}^{T} \varphi_t ENR_{s,t} YEAR_t + \sum_{t=1}^{T} \gamma_t ENR^2_{s,t} YEAR_t \\ &\quad \times \sum_{t=1}^{T} \pi_t HIGH_{s,t} YEAR_t + \varepsilon_{s,t}\end{aligned}$$

where, *PPEXP* represents per-pupil expenditure; the subscripts *s* and *t* denote school and year, respectively; FRL is the percent of pupils eligible for or receiving free/reduced-price lunch; *ENR* is school enrollment; *YEAR* denotes a year-specific dummy indicator equal to 1 for year *t* and 0, otherwise; *HIGH* is a dummy indicator used in the middle/high school equations equal to 1 for high schools and 0, otherwise; and $\varepsilon_{s,t}$ is a school-level random error term.[13] The omitted year-specific dummy denoting the reference group in each regression corresponds to the year just preceding implementation of the respective SBF policies, which was 2001-02 in San Francisco and 2002-03 in Oakland.

The regressions estimated year-specific coefficients for student need and scale, which represent how school-level per-pupil expenditure varied on average with respect to levels of student poverty and total school enrollment. We subsequently refer to these coefficients on need and scale as *implicit weights*. Separate regressions were run on unrestricted, restricted, and total (both unrestricted and restricted) per-pupil expenditure.

Moreover, for Oakland the regressions using total and unrestricted expenditure were run both with and without veteran teacher subsidies. The formal regression specifications were estimated separately for elementary schools and for middle and high schools combined. A dichotomous indicator was included in the middle/high school regressions to distinguish differences between middle and high schools. The samples of middle and high schools were simply not sufficient to support separate models for these two grade levels.

Although poverty is arguably the strongest indicator of student need, we also experimented with estimating implicit weights for other student-need variables commonly thought to be related to costs or expenditures, including percent special education and English learners. However it was not feasible to include additional measures of student need in the analyses presented in this study for two reasons. First, in both districts, a bulk of the spending for the special education population could not be linked to individual schools because many of these services are provided by instructional and related service staff working out of the central district office. Second, the other measure of student need mentioned—English learner (EL) status of a student—is highly correlated with poverty, making it impossible to accommodate both in the regressions.[14]

[12] The decision to estimate separate elementary and middle/school models was driven by concerns that: (1) educational production at the elementary level is quite different than at the upper two levels (e.g., elementary classrooms are mostly self-contained, while middle and high school classes are generally departmentalized); (2) the distribution of free/reduced price lunch differs greatly across the three schooling levels, with high school rates being notoriously low (e.g., the average poverty rate across the seven years of data for SFUSD elementary schools was 58% versus 45% for high schools); and (3) there were two few middle and high schools in each district to generate independent regression. That being said, we did use a model that included all three schooling levels to explore whether there was resource reallocation *across* schooling levels (i.e., strengthening over time in the expenditure/poverty relationship for one schooling level being met by weakening in the relationship at another schooling level). However, in both districts the results showed little evidence that cross-schooling level reallocation occurred.

[13] The error terms are assumed to be independent across schools, but not within schools across years. Standard errors that do not adjust for clustered error terms tend to overstate the precision with which parameters are estimated. To this end, robust standard errors have been calculated for all of the regressions that take into account this form of group-clustered heteroskedasticity, where the group is an individual school.

[14] That is, including the percentage of EL students along with the percentage of students eligible for free or reduced-price lunch in the regression model resulted in multicollinearity, severely affecting our ability to isolate the separate impacts of poverty and EL status. Variance inflation-factor diagnostics confirmed that the inclusion of both poverty and EL in virtually all the regressions was not warranted.

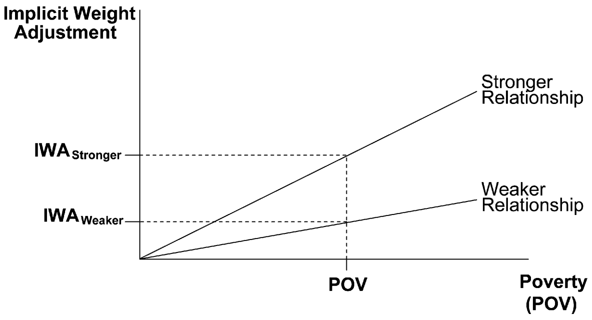


Fig. 1. Example of implicit poverty weight.

5.2.3. Interpreting the results

Below, we present our results using graphical representations of the "responsiveness" of school-level per-pupil spending to student poverty (i.e., the percentage of pupils eligible for free or reduced-price lunch), controlling for school size. The Implicit Weight Adjustment on the *y*-axis is an index value denoting the proportionate difference in the average per-pupil spending at a school with a given percentage of students in poverty *relative* to an identically sized school with zero poverty. For example, Fig. 1 provides two hypothetical implicit poverty weight profiles portraying relatively stronger and weaker relationships between per-pupil spending and student poverty. The slope of the relationship is the implicit weight that represents variation in school-level per-pupil spending with respect to poverty. Clearly, as the lines become steeper (that is, as the lines show higher corresponding increases in the level of school spending and poverty at a school) so does the "responsiveness" of expenditures to poverty. For instance, at any given poverty level the difference in per-pupil spending relative to an identically sized school with zero poverty (termed the implicit weight adjustment or IWA) is larger on steeper profiles.

We offer two words of caution regarding the interpretation of the implicit weight profiles. First, the analyses represent spending profiles and *not* cost profiles. These estimates merely show how spending varied with respect to poverty and whether this relationship changed after the implementation of an SBF policy. Because we have not conditioned on outcomes, the analysis provides no information about the amount of expenditures necessary for schools serving various levels of student poverty to achieve at some pre-specified level.

Second, the results presented below in no way imply that the respective SBF policies were solely responsible for changes in the observed relationship between expenditures and poverty. That is, they do *not* imply a causal link between the SBF policies and resource allocation, but rather only a correlational relationship. A myriad of other policies and factors occurred over the same period under study that may have affected resource allocation and school spending decisions, which are difficult if not impossible to take into account. However, this does not preclude the usefulness of the results, which shed light on how spending patterns changed after the implementation of the RBB and the WSF.

5.2.4. Analysis of school spending: results

The following pages present graphically the results of our analysis of the relationship between school spending and pupil need and the scale of school operations in San Francisco and Oakland.[15] The analysis of spending and poverty is presented first for each district separately and within each district for middle/high schools first and then for elementary schools.

5.2.4.1. San Francisco. In San Francisco, we had two years of data from before the implementation of the WSF policy (2000–01 and 2001–02). We decided to use 2001–02, the year just prior to WSF implementation, as the reference year against which we tested other year-specific profiles for significant changes.

5.2.4.2. San Francisco Middle and High Schools. Focusing on the overall per-pupil spending, we found that San Francisco increased the level of total school-level resources spent at high-poverty relative to low-poverty middle and high schools. Fig. 4a, 4b, and 4c illustrate the total, unrestricted, and restricted implicit weight profiles for the combined group of San Francisco middle and high schools. The implicit weight profiles of total per-pupil expenditure for middle/high schools displayed in Fig. 4a suggest that the estimated relationship between per-pupil spending and poverty became stronger over time. From the pre-WSF reference year (2001–02) onward, the profiles become much steeper until 2005–06 and experience a modest decline in 2006–07. As an example, let us consider the level of expected per-pupil funding received by the average middle/high school with 50 percent poverty before and after WSF was implemented. The results imply that in the year before San Francisco implemented the WSF policy (2001–02), the average middle/high school with 50 percent poverty had a per-pupil expenditure that was merely 2 percent greater than an identically sized school with zero percent poverty (the implicit weight adjustment was equal to 1.02). By 2006–07, this poverty premium jumped to an estimated 44 percent (implicit weight adjustment increased to 1.44). Note that the implicit weights for the most recent three years (2004–05, 2005–06, and 2006–07) are all statistically significantly differ from zero. In addition, those from the most recent two years proved to be significantly different from the pre-WSF reference year. It seems that San Francisco middle and high schools have experienced a noteworthy increase in the slope of the expenditure/poverty relationship since the implementation of WSF (Fig. 2).

Fig. 4b and 4c explore whether the increase in the link between spending and poverty among San Francisco middle/high schools was driven by the allocation of unrestricted or restricted funding. The results of this analysis clearly show that the increased slope of the expenditure/poverty relationship was driven by changes in the way in which *unrestricted* funds were distributed across schools.

[15] The graphics were developed from the regression analysis described above. All regression output is available in Chambers, Shambaugh, Levin, Muraki, and Poland (2008b).

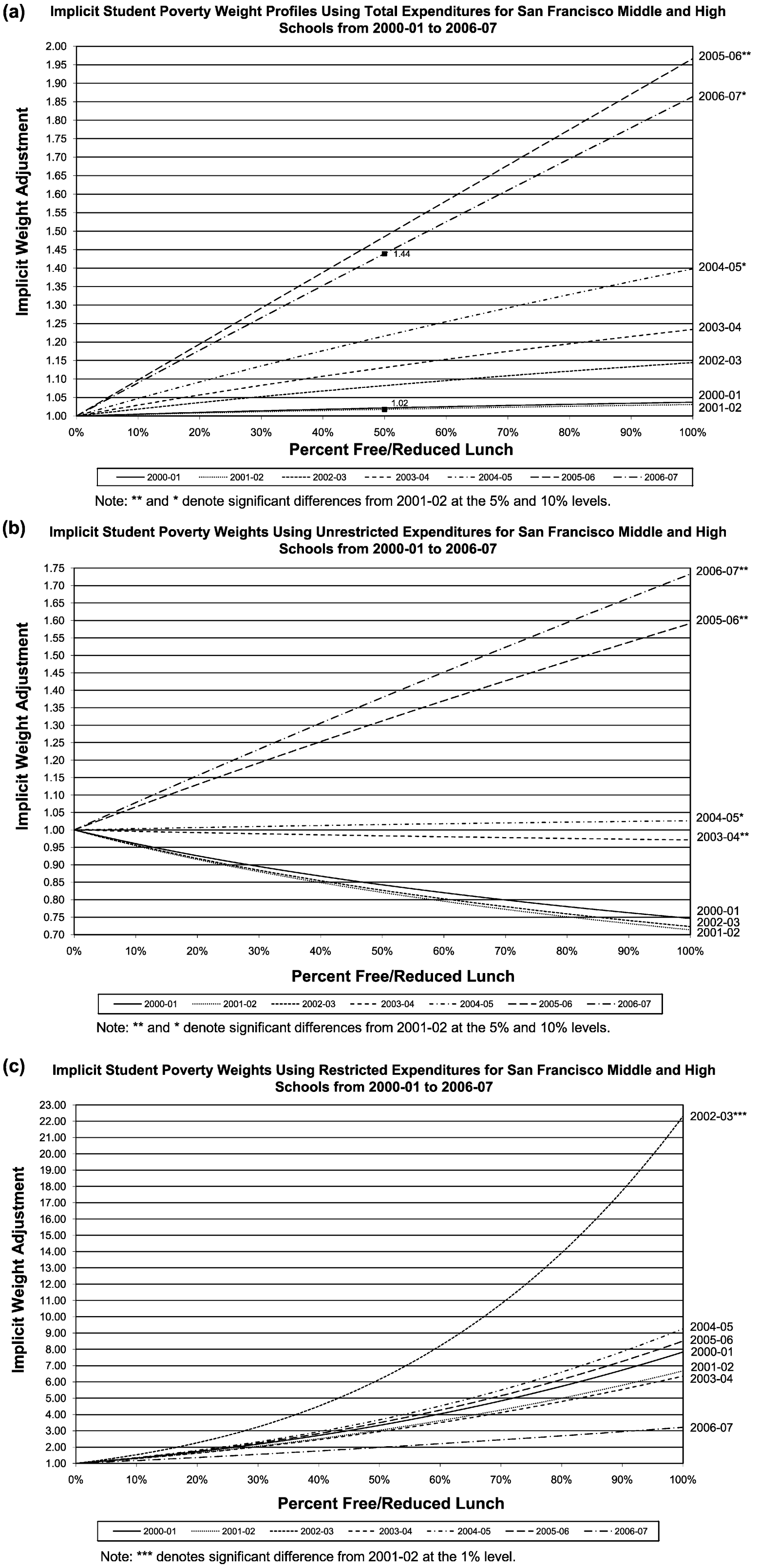


Fig. 2. (a) Implicit student poverty weight profiles using total expenditures for San Francisco middle and high schools from 2000–01 to 2006–07. (b) Implicit student poverty weights using unrestricted expenditures for San Francisco middle and high schools from 2000–01 to 2006–07. (c) Implicit student poverty weights using restricted expenditures for San Francisco middle and high schools from 2000–01 to 2006–07.

Fig. 4b shows the strong post-WSF trend in the profiles to be clear; every year after WSF was implemented except for 2002–03, the profile gradients became steeper. The year-specific profiles can be grouped into the following three phases:

- Pre/Early-WSF (2000–01 to 2002–03) – negative expenditure/poverty relationship
- Mid-WSF (2003–04 to 2004–05) – negligible expenditure/poverty relationship
- Late-WSF (2005–06 to 2006–07) – positive expenditure/poverty relationship

In three of the five post-WSF profiles (all in the mid- and late-WSF phases), the implicit weight estimates significantly differed from that of the pre-WSF reference year. However, imprecision of these estimates shows that they did not individually differ from zero. This finding is consistent with the WSF policy which created explicit student weights to apply to unrestricted funding in an effort to target more funds to high need students.

With the exception of one year (2002–03), the relationship between per-pupil spending out of restricted funding in San Francisco middle and high schools did not appear to change with the implementation of WSF (Fig. 4c). Tracking the profiles over time shows little or no consistent pattern to their movement. Perhaps the most striking result is the incredibly large, but short-lived, jump in the profile gradient for the year directly following WSF implementation (2002–03). Indeed, this is the only year for which the implicit weight was statistically significantly different from the pre-WSF reference year. Of additional interest is that only during the first three years did the estimated implicit weights prove to be statistically different from zero. Therefore, the results did not show there to be a systematic relationship between restricted expenditures and student poverty in the years after implementation.

5.2.4.3. San Francisco elementary schools. Our analysis shows that San Francisco provided more total resources (restricted and unrestricted combined) on a per-pupil basis to high-poverty than to low-poverty elementary schools across all years for which we have data—both before and after WSF implementation (see Fig. 5a). Thus, while the district provided more resources to high need schools, the implementation of the WSF policy did not appear to be associated with any change in the slope of the gradient between per-pupil spending and poverty in elementary schools. While the implicit weights used to generate the individual spending-poverty profiles were all statistically significantly different from zero (at the 1 percent level), none of the post-WSF weights differed significantly from the pre-WSF reference year (2001–02). Therefore, there is nothing to suggest that this observed relationship between elementary per-pupil spending and student poverty is attributable to the implementation of WSF. For example, the results suggested that a San Francisco elementary school with a poverty rate of 50 percent was consistently expected to spend between 20 percent and 25 percent more per-pupil than a similar size school with zero percent poverty over the period 2000–01 to 2006–07 (Fig. 3).

Focusing on variations in expenditures out of unrestricted funds, we observe a moderately positive slope in the spending-poverty gradient emerging in the post-WSF years in San Francisco elementary schools (see Fig. 5b). Nevertheless, we see there is only limited statistical evidence to suggest that the implementation of the WSF policy resulted in a consistent systematic positive relationship between unrestricted per-pupil spending and student poverty for San Francisco elementary schools. Most notably, the slope of the spending-poverty gradient increased from 2002–03 through 2005–06 and then receded in the final year (2006–07). The 2005–06 school year was the only one for which the estimated slope of the gradient proved to be significantly different from both the pre-WSF reference year (2001–02) and from zero at conventional levels (i.e., 5 percent or better).

Variations in school spending out of restricted revenues reveal a positive relationship with student poverty (see Fig. 5c). For example, at a poverty level of 50 percent, per-pupil spending out of restricted funds ranged roughly between just under two to more than four times higher in the high need schools over the sample years for which we have data. However, there was no difference in this positive relationship before and after the implementation of the WSF policy. Although none of the post-WSF weights is statistically different from those in the reference year, individually all of them prove to be significantly different from zero. These findings suggest that while there was a positive relationship between overall per-pupil expenditures and student poverty among San Francisco elementary schools, this was driven at least in part by the distribution of restricted (categorical) funding and did not change appreciably over the years in our sample, including the period of WSF implementation.

5.2.4.4. Oakland schools. We now turn to the patterns of variation in per-pupil spending across schools with respect to student poverty before and after the implementation of the RBB policy in Oakland schools. Our spending profiles for the Oakland schools include estimates with and without the salary subsides provided to those schools with large proportions of veteran (high cost) teachers. The lined gradients include the subsidies, while the gradients with the symbols (*, ●, and +) exclude the subsidies. This analysis allows us to show the equity implications of the salary subsidies, if any.

5.2.4.5. Oakland middle and high schools. While the per-pupil spending-poverty gradients for Oakland middle/high schools show a positive gradient, none of the estimated poverty profiles for Oakland middle and high schools for the post-RBB year proved to be statistically significantly different from that of the pre-RBB year 2002–03 (Fig. 4). The post-RBB poverty profiles for Oakland middle/high schools never become steeper than that of the pre-RBB year. Therefore, the data at hand cannot identify any pre/post difference in the relationship between middle/high school per-pupil expenditures and poverty.

In 2004–05, the profile based on per-pupil spending that excluded teacher subsidies becomes flatter than its with-subsidy counterpart. This implies that the teacher subsidies

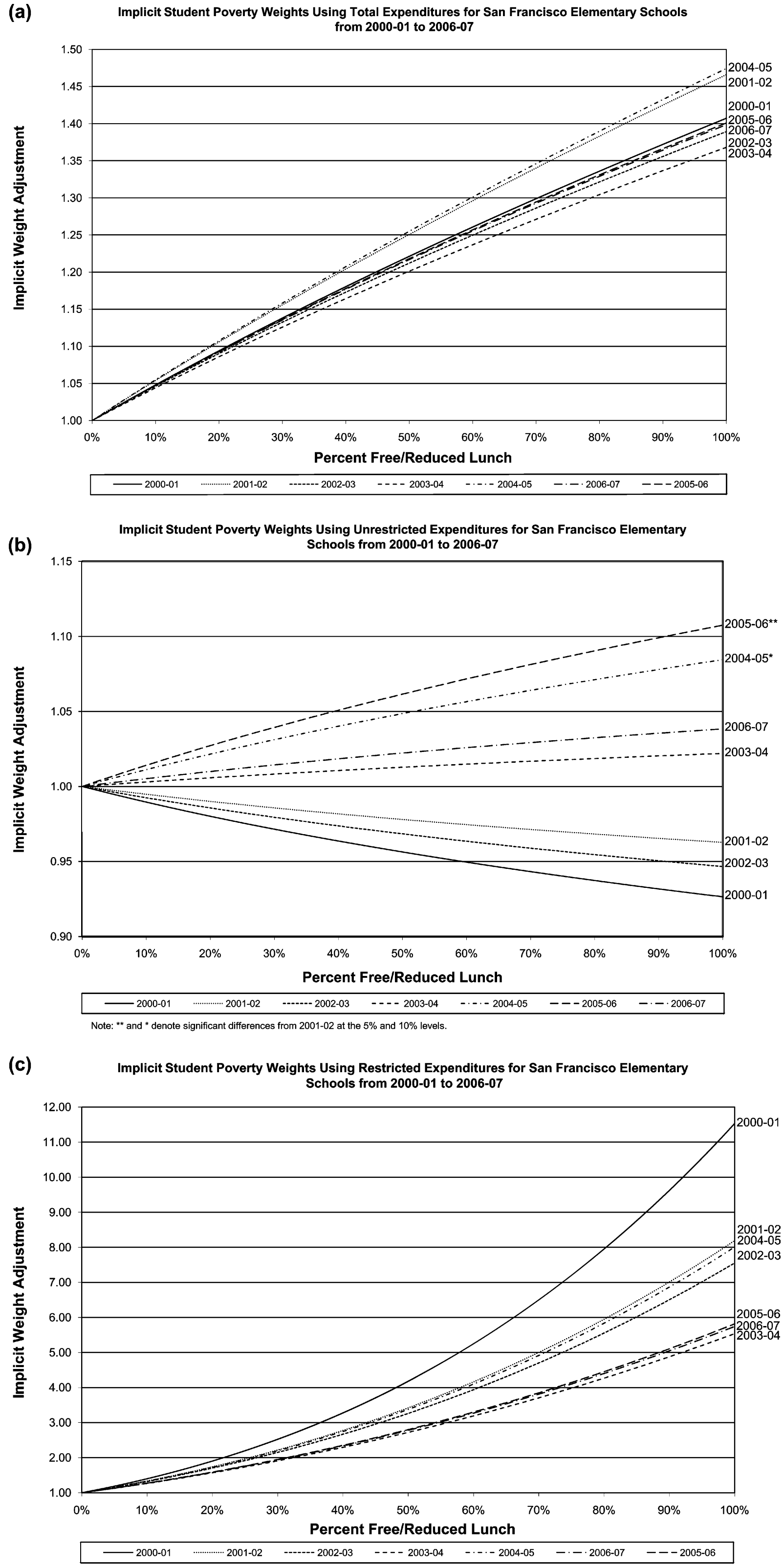


Fig. 3. (a) Implicit student poverty weights using total expenditures for San Francisco elementary schools from 2000–01 to 2006–07. (b) Implicit student poverty weights using unrestricted expenditures for San Francisco elementary schools from 2000–01 to 2006–07. (c) Implicit student poverty weights using restricted expenditures for San Francisco elementary schools from 2000–01 to 2006–07.

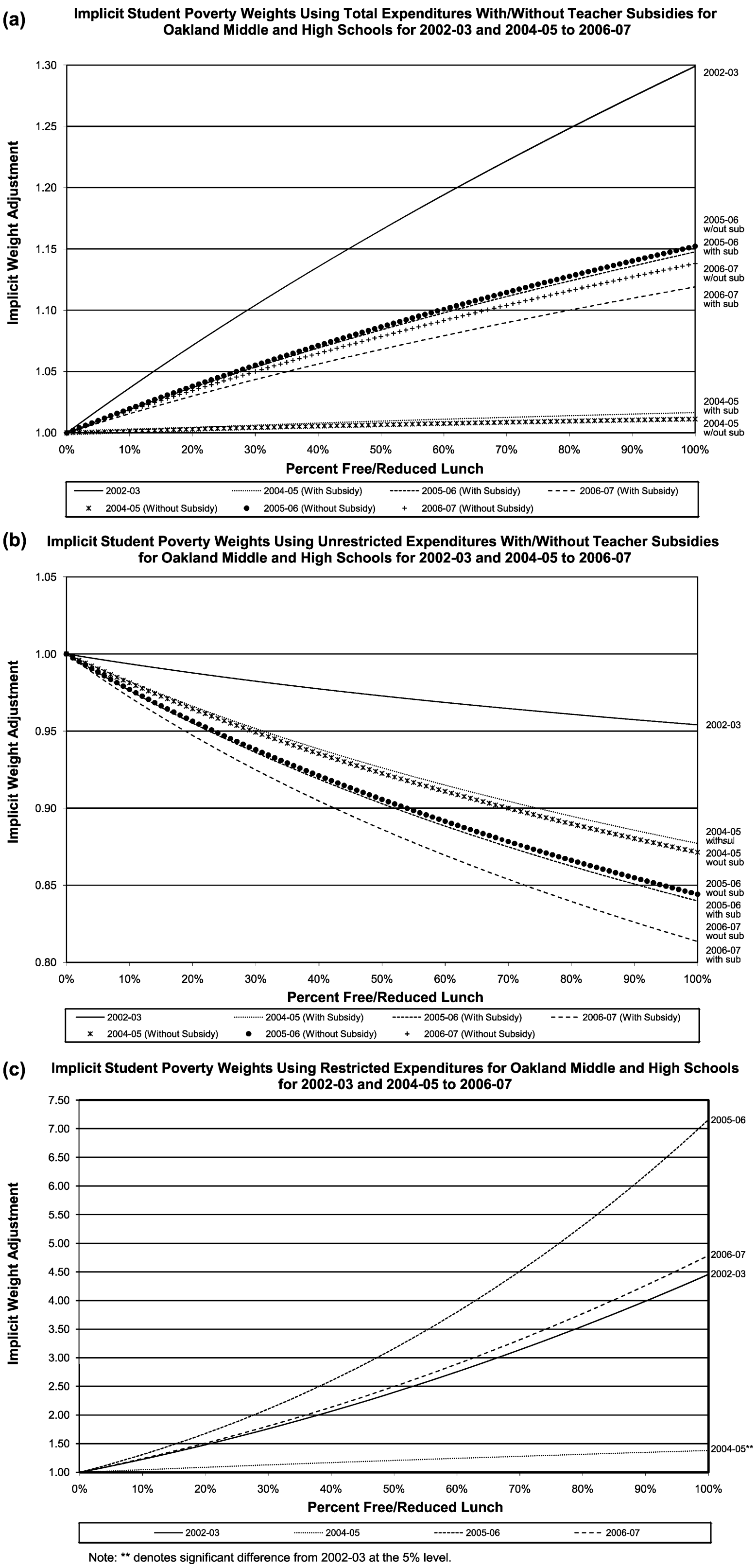


Fig. 4. (a) Implicit student poverty weights using total expenditures with/without teacher subsidies for Oakland middle and high schools for 2002–03 and 2004–05 to 2006–07. (b) Implicit student poverty weights using unrestricted expenditures with/without teacher subsidies for Oakland middle and high schools for 2002–03 and 2004–05 to 2006–07. (c) Implicit student poverty weights using restricted expenditures for oakland middle and high schools for 2002–03 and 2004–05 to 2006–07.

distributed in 2004–05 tended to go toward middle/high schools with higher than average poverty. That is the high-poverty middle/high schools tended to have more veteran teachers on average and were provided a subsidy to cover these additional costs in the short run (during the first three years of the RBB policy) and provide the opportunity to adjust the composition of their teaching staffs. We observe just the opposite pattern in 2005–06 and 2006–07 in which provision of the subsidies for more veteran, high cost teachers tended to reduce the slope of the spending-poverty gradient implying that the subsidies were directed more toward the schools serving low-poverty students.

Turning to expenditure supported by unrestricted funds, we observe that high-poverty Oakland middle/high schools appear to have spent less on a per-pupil basis compared to their lower poverty counterparts (see Fig. 4b). That is, there was a *negative* relationship between unrestricted per-pupil spending and student poverty among Oakland middle/high schools. The results also suggest a decreasing pattern in the post-RBB unrestricted expenditures profile gradients over successive years, although none differing statistically from that of the pre-RBB year. Nevertheless, the implicit weight used to generate the profiles for 2005–06 and 2006–07 proved to be statistically significant different from zero at the 5 percent and 10 percent levels, respectively. While the distribution mechanism for unrestricted funds was intended to be neutral with respect to student need, this analysis suggests that the spending patterns among middle/high schools in the more recent years was regressive (i.e., there was a negative relationship between per-pupil spending out of unrestricted funds and poverty). However, it must be noted that Oakland relied on the distribution of restricted funding to achieve the goals of the RBB policy, for which restricted resources are distributed according to student need.

Focusing on spending out of restricted funding, we observed that high-poverty Oakland middle/high schools spent greater amounts of restricted funding than their low-poverty counterparts, both before and after the implementation of RBB (see Fig. 4c). The shift in profiles was quite sporadic, declining in 2004–05, increasing strongly in 2005–06, and finally settling back to just above the pre-RBB level in 2006–07. Although none of the post-RBB profiles differed statistically from that of the pre-RBB year, two of the three post-RBB profiles were statistically significant from zero at the 1 percent level. These results imply a statistically significant and positive relationship between restricted per-pupil spending and student poverty both before and after the implementation of RBB.

When taken together with the other implicit weight profile results, it seems that the spending levels out of restricted funding by middle/high schools could not compensate for the lack of equity found in the spending patterns stemming from unrestricted funding.

5.2.4.6. Oakland Elementary Schools. Fig. 5a shows the implicit weight profiles for Oakland elementary schools, using total spending (restricted and unrestricted combined) for each of the four years in our study sample (2002–03 and 2004–05 to 2006–07). The more steeply sloped poverty gradients in the more recent years suggest that higher poverty elementary schools in Oakland exhibited relatively higher per-pupil spending after implementation of the RBB policy. The only year prior to RBB implementation is 2002–03,[16] which corresponds to a relatively flat implicit weight adjustment profile suggesting that an elementary school with 50 percent poverty spent approximately 4.6 percent more per-pupil than a school with identical enrollment and zero percent poverty. Although the slope of the poverty gradient declined between 2002–03 and the first year of RBB implementation (2004–05), this decline was not statistically significant (i.e., the slopes for all intents and purposes were not different from one another). The poverty gradients for 2005–06 and 2006–07 show dramatic and statistically significant increases in their slopes, which suggests that high-poverty elementary schools in Oakland had more dollars to spend relative to low-poverty schools in these two years than in the year preceding RBB implementation. The 2005–06 profile shows that an elementary school with 50 percent poverty in that year was expected to spend approximately 15 percent more per-pupil compared with a school of similar size but with no students in poverty. The increasing trend in the poverty gradient continued in 2006–07, when an elementary school with 50 percent poverty was expected to spend approximately 20 percent more on average than a zero poverty school. Unlike the previous result, this was statistically significant from the pre-RBB year (2002–03) at the conventional 5 percent level (Fig. 5).

The analysis in Fig. 5a also shows that Oakland's salary subsidies may have temporarily inhibited the RBB policy's strengthening of the relationship between elementary school spending and poverty. Here we see that in each year following RBB implementation (2004–05, 2005–06, and 2006–07) the estimated relationship between per-pupil spending and poverty was stronger in each corresponding year when the teacher subsidies were not taken into account. This result makes intuitive sense, because we would expect the schools receiving subsidies (i.e., those with a large share of veteran teachers) to be lower poverty, on average. We can best see this result by comparing the with- and without-subsidy profiles for 2004–05. Clearly, the 2004–05 profile without the subsidy is much steeper than both the with-subsidy profile for the same year and the Pre-RBB profile for 2002–03. Turning to our familiar example we find that in 2004–05, when veteran teacher subsidies were at their highest, the average Oakland elementary school with 50 percent poverty was expected to spend only 1.6 percent more per-pupil than similarly sized school with zero poverty. However, had the subsidies not been put into place this year, we would expect schools at the same 50 percent poverty level to have spent 5.5 percent more on average. The same qualitative story is told for the other two years, although the difference between the with- and without-subsidy profiles diminished in each successive year as the amount of subsidies provided steadily declined. Nevertheless, the findings suggest that veteran

[16] Although we tried to obtain more than one year of data prior to RBB for this analysis, Oakland officials were not able to provide accurate fiscal data for the 2003–04 school year.

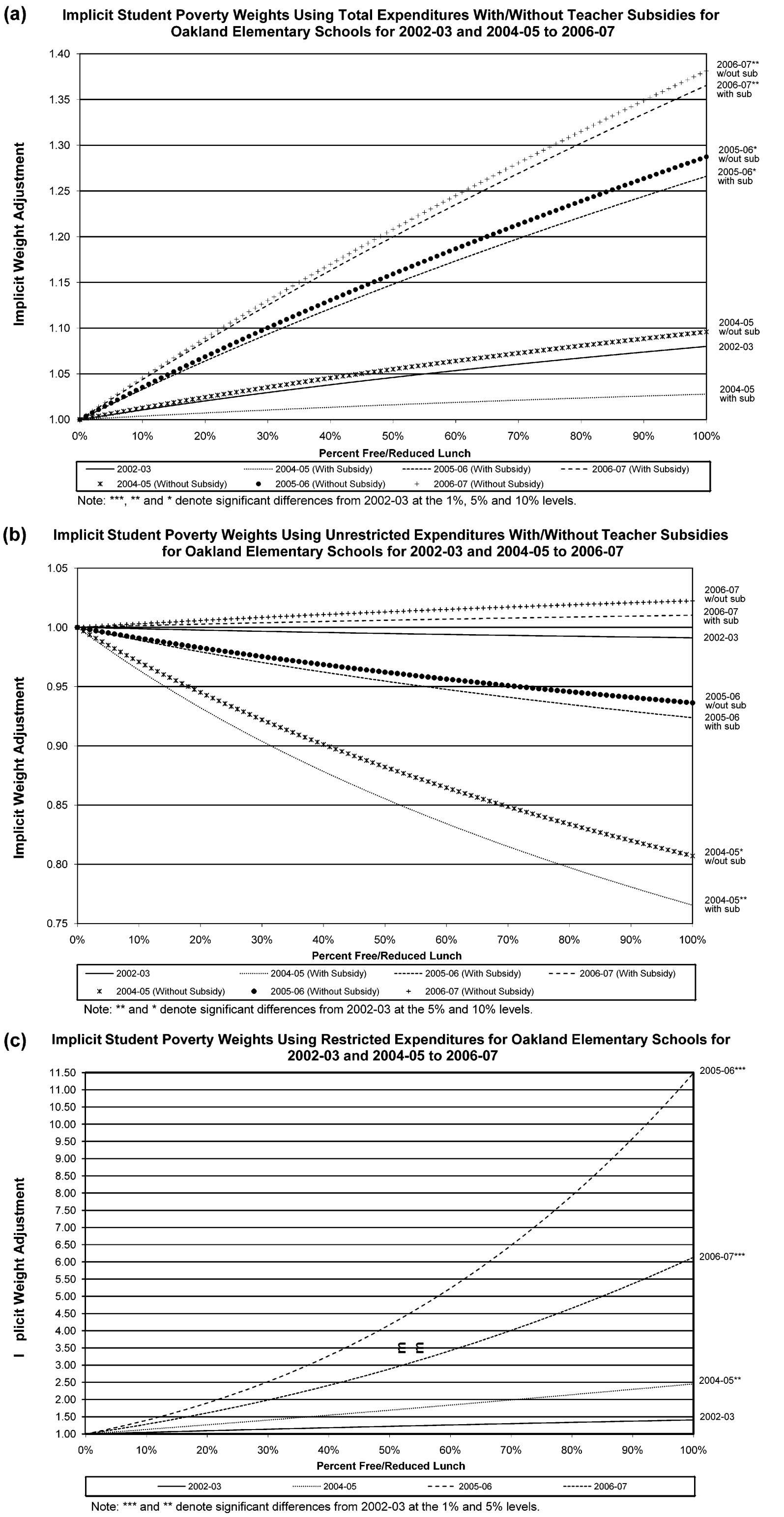


Fig. 5. (a) Implicit student poverty weights using total expenditures with/without teacher subsidies for Oakland Elementary Schools for 2002–03 and 2004–05 to 2006–07. (b) Implicit student poverty weights using unrestricted expenditures with/without teacher subsidies for Oakland Elementary Schools for 2002–03 and 2004–05 to 2006–07. (c) Implicit student poverty weights using restricted expenditures for oakland elementary schools for 2002–03 and 2004–05 to 2006–07.

teacher subsidies inhibited the effectiveness of the RBB policy in directing resources to higher poverty elementary schools. However, we should note that district leadership envisioned these subsidies as a necessary, if temporary, provision because without the subsidies, schools would not have been able to afford the staff currently in their school and not been able to adhere to collective bargaining agreement commitments.

Focusing on the expenditures made with unrestricted funds we find, with the exception of 2004–05, Oakland elementary schools exhibited a more or less flat profile between per-pupil spending and student poverty (see Fig. 5b). That is, with the exception of the 2004–05 gradient, which showed a *negative* relationship between school spending and poverty, none of the poverty relationships were statistically different from the flat profile found for the pre-RBB year. Also, only the 2004–05 implicit weight estimate differed statistically from zero at the conventional 5 percent significance level. This suggests that the mechanism by which Oakland distributed unrestricted funding to elementary schools was not systematically related to student poverty. This should be no surprise if we consider that the RBB policy distributes unrestricted funding only with regard to enrollment weighted by ADA and not poverty. District leadership was somewhat surprised by the negative relationship between spending and poverty in 2004–05, but suggested that this might have resulted from schools not actually being able to spend all of the funds made available to them through unrestricted funding. As with the analysis of total spending, the poverty gradients that excluded the teacher subsidies showed a higher slope than the analysis with the teacher subsidies.

In contrast to the results pertaining to unrestricted funding, the move to an RBB policy appeared to be associated with a significant increase in the extent to which Oakland directed its restricted funds to elementary schools serving higher poverty students (see Fig. 5c). In 2002–03 (the year before RBB implementation), the very flat poverty profile suggested that there was essentially no systematic relationship between student poverty and per-pupil spending out of restricted funding. However, with the move to RBB, the poverty gradients for Oakland elementary schools appeared to increase the responsiveness of restricted per-pupil expenditures to student poverty. Moreover, the estimated implicit weights used to generate the profiles for all three post-RBB years were statistically significantly different from 2002–03 at the 5 percent level or better. Whereas the profiles show that in 2004–05 a school with 50 percent student poverty spent about 175 percent more (close to three times as much) in restricted funding compared with a school with zero poverty, in 2006–07 this expected measure went up to 300 percent (about four times as much).[17]

In summary, the implicit weight analysis for Oakland elementary schools shows that overall, the district appeared to direct significantly more resources to high-poverty elementary schools starting in 2005–06. It is important to note that the district drove the increases in equity through the way it distributed restricted as opposed to unrestricted funding to schools. In addition, the veteran teacher subsidies had a negative impact on the extent to which these resources were directed to the higher poverty schools.

6. Summary and concluding remarks

School districts leaders are searching to find ways of reorganizing the finance and governance of schools that will lead to improved student learning opportunities. This paper presents a case study of two California school districts, San Francisco and Oakland, each of which have implemented their own versions of a “student-based funding” (SBF) model, more popularly known as a weighted student formula. All SBF reforms incorporate two primary elements: (1) distribution mechanisms that that allocate resources to schools based on student needs and (2) increased school autonomy over how funds are used. To assess whether such a model could actually improve student learning is beyond the scope of the present paper. Instead, the objective of the paper was a much more modest one: simply to assess whether we could observe improvement in the equity with which resources were distributed to schools and whether there was any evidence of change in the level of discretion over how funds were spent at the school site within these two districts.

With respect to equity, the findings suggest that for particular schooling levels per-pupil spending became more responsive to student need and that the increase in responsiveness appears to have coincided with implementation of SBF in the two districts. Specifically, a strengthening in the relationship between per-pupil spending and poverty for San Francisco middle and high schools occurred after the district implemented its WSF policy. Moreover, the results suggest that this increase in vertical equity was achieved through the change in how unrestricted funding was distributed to schools under the new policy. In a similar manner, the strength of the relationship between per-pupil spending and student poverty increased among Oakland elementary schools in the post-RBB years. However, the findings show that in this case the increase in progressivity was driven by the allocation of restricted (i.e., categorical) rather than unrestricted (i.e., discretionary) funding.

While both of these districts have implemented models that represents a significant departure from the more traditional staffing model for allocating resources to schools, the results we have presented do not reveal consistent impacts on equity at all schooling levels. Moreover, each district relies on a different mechanism for driving resources to the schools: San Francisco relying to a greater degree on the unrestricted funds, while Oakland relies more heavily on restricted sources of revenues which, as

[17] Although the implicit weight adjustment values here look inordinately high and profiles surprisingly steep, we remind the reader that the average restricted per-pupil expenditures estimated in conjunction with each weight was far lower than those generated for those weights above corresponding to total and unrestricted expenditures. For instance, the estimated average restricted per-pupil expenditure for 2006–07 was $621, whereas the estimated average unrestricted per-pupil expenditure (inclusive of teacher subsidies) for the same year was $6,214.

Table A1
San Francisco's weights for general purpose funds, 2006–07.[a].

Grade level	Base weight	English learners			Special education			
		Long-term non-redesignated	Beginning/ intermediate (based on CELDT)[b]	Advanced/ transition (based on CELDT)[b]	Low-income[c]	Resource specialist program	Special day class non-severe	Special day class severe
K	1.33	–	0.0781	0.0605	0.09	0.0097	0.0179	0.0315
1–3	1.33	–	0.0781	0.0605	0.09	0.0097	0.0179	0.0315
4–5	1.00	–	0.0781	0.0605	0.09	0.0097	0.0179	0.0315
6–8	1.14	0.937	0.0937	0.0605	0.09	0.0097	0.0189	0.0315
9–12	1.19	0.937	0.2070	0.0605	0.09	0.0097	0.0189	0.0315

"Allocating resources for equitable site-managed schools using the weighted student formula" (SFUSD powerpoint presentation).

[a] These weights, for the most part, have remained untouched in San Francisco since their inception in 2001, even though the district has seen significant changes in its population (Shambaugh et al., 2008).

[b] CELDT stands for the comprehensive English language development test taken by English learners and serves as the assessment that determines whether a student is considered English proficient.

[c] Low income is defined by eligibility for the free or reduced-price lunch program.

directed by law, drive dollars to special need populations by formulas.

Interestingly, neither district exhibited any significant change in the distribution of teacher experience before and after implementation of their SBF models. Schools serving the highest proportion of students from low-income families continued to employ teachers with the least experience after implementation of the SBF models.

While we presented data suggesting that the proportion of resources spent at the school site versus the central office did not change with implementation of the SBF reforms in the two districts, we pointed out that measuring the degree of change in the level of school-level discretion was significantly more complex. Measuring discretion requires assessing the extent to which school leaders could control both which as well as how many staff they would employ, with the determination of "which" likely being limited by collective bargaining agreements and seniority rules over staff assignments.

With regard to dollars spent at the school site versus the central office, our analysis found little substantial change associated with the implementation of the SBF reforms. Both districts place about 60 percent of their resources within the discretion of school-level decision makers and this share has not changed appreciably from before to after implementation of the SBF policies.

What is apparent from this work in San Francisco and Oakland is that there is a great deal of leeway in the way SBF reforms can be implemented that has significant impact on the outcomes. Districts can press for driving more resources from the central office to schools. They can develop funding schemes that find ways of integrating categorical programs into a single pupil-weighted formula. They can use more continuous versus discrete approaches to account for the effects of school size on dollar allocations. They can encompass alternative compensation schemes that offer schools wider discretion over not only who they employ, but the rates of compensation provided to employees. Our study has been a modest effort to capture the net effects of a collection of choices by each of the districts in an effort to improve the equity with which resources are distributed to schools.

Future work in this arena should focus more attention on the impact of SBF on changes in the types of instructional programs, the nature of the innovative patterns of resource allocation, and the impact of both of these on student outcomes. Expansion of work around SBF policies should involve larger scale experiments that might offer broader opportunities for exploring the impact of increasing meaningful discretion at the school site, driving more resources from the central office to the school site, implementing programs (e.g., alternative compensation programs) that would create incentives for redistribution of teacher qualifications toward high-need schools, and creating incentives for improving the willingness of school leadership to invest time and effort into more innovative programs that would improve student learning.

Appendix A. Weights used in SFUSD WSF policy

Table A1 lists the current weights for the different populations in San Francisco's general purpose (GP) revenue formula.[18] To show how this works, a first grade student from a low-income family who is also an "advanced" English language learner would have a weight of 1.4805 [equal to 1.33 (grade-specific weight) + 0.09 (low-income weight) + 0.0605 (advanced CELDT weight)]. This student would generate GP revenues that are 48.05 percent higher than the basic fourth- or fifth-grade student.

The district set higher weights for grades $K-3$ than grades 4 and 5 to account for the cost of implementing California's class size reduction program. According to district officials, the larger weights for beginning or intermediate English learners at higher grades were set because there is less time left for the student to achieve English proficiency and it becomes more difficult to attain English in the higher grades. San Francisco budgets centrally for the special education program so the special education weights presented

[18] The district's WSF Committee developed and approved the weights for the district's high-need student populations, based largely on one district administrator's knowledge of how such weights were created in Seattle and Washington, DC (Shambaugh et al., 2008).

above are just intended for small additional expenses for instructional supplies and professional development activities.

References

Ackerman, A., Brown, C., Paige, R., Podesta, J., Rebell, M. (Presenters), & Merrow, J. (Producer) (2006). *The weighted student formula debate (Podcast 52)*. Learning Matters, Inc. http://www.pbs.org/merrow/podcast/transcripts/52WeightedStudentDebate.pdf. Retrieved 28.09.07.

Archer, J. (2005). An Edmonton Journey. *Education Week*. http://resources.topschooljobs.org/tsj/articles/2005/01/26/20edmonton.h24.html. Retrieved 30.07.08.

Baker, B. D. (2009). Within-district resource allocation and the marginal costs of providing equal educational opportunity: Evidence from Texas and Ohio. *Education Policy Analysis Archives*, *17*(3). http://epaa.asu.edu/epaa/v17n3/. Retrieved 6.04.09

Chambers, J., Shambaugh, L., Levin, J., Muraki, M., & Poland, L. (2008a). *A tale of two districts: A comparative study of student-based funding and school-based decision making in San Francisco and Oakland Unified School Districts*. Palo Alto, CA: American Institutes for Research.

Chambers, J., Shambaugh, L., Levin, J., Muraki, M., & Poland, L. (2008b). *A tale of two districts: A comparative study of student-based funding and school-based decision making in San Francisco and Oakland Unified School Districts—Report appendices*. Palo Alto, CA: American Institutes for Research.

Childress, S., & Peterkin, R. (2004). *Pursuing educational equity at San Francisco Unified School District*. Public Education Leadership Project at Harvard University. http://harvardbusinessonline.hbsp.harvard.edu/b02/en/common/item_detail.jhtml;jsessionid=PX2DYPFBZ0PAKAKR-GWCB5VQBKE0YOISW?id=PEL005&referral=2341. Retrieved 28.09.07.

Cooper, B., DeRoche, T., Ouchi, W., Segal, L., & Brown, C. (2006). *The weighted student formula: putting funds where they count in education reform*. Education Working Paper Archive. http://www.uark.edu/ua/der/EWPA/Research/School_Finance/1781.html. Retrieved 28.09.07.

Designs for Change. (2002). *Chicago's Local School Councils: What the Research Says*. http://www.designsforchange.org/pdfs/LSC_rpt_final.pdf. Retrieved 25.05.08.

Education Trust West. (2005). *California's hidden teacher spending gap: How state and district budgeting practices shortchange poor and minority students and their schools*. http://www.hiddengap.org/resources/report031105.pdf. Retrieved 9.07.08.

Fiscal Crisis and Management Assistance Team. (2007). *Assessment and Recovery Plan: Fifth Progress Report*. http://www.static.kern.org/gems/fcmat/Oakland07.pdf. Retrieved 30.03.08.

Hansen, J., & Roza, M. (2005). *Decentralized decisionmaking for Schools: New promise for an old idea?* http://www.rand.org/pubs/occasional_papers/2005/RAND_OP153.pdf. Retrieved 1.08.08.

Hawley, M. K., & Roza, M. (2006). Understanding student-weighted allocation as a means to greater school resource equity. *Peabody Journal of Education*, *81*(3), 39–62. http://www.leaonline.com/doi/abs/10.1207/s15327930pje8103_2. Retrieved 28.09.07

Honig, M., (2003). *The view from the edge: Oakland's progress in the implementation of site-based decision-making and new small autonomous schools*. Document OP-03-1. Center for Educational Policy and Leadership, University of Maryland. http://www.education.umd.edu/EDPA/CEPAL/pdf/oc-papers/CEPAL-OP-02-Homig-Oakland2.pdf. Retrieved 27.09.07.

Hill, M. (2008). Funding schools equitably: Results-based budgeting in the Oakland Unified School District. *In Ensuring equal opportunity in public education: How local school district policies hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. http://www.americanprogress.org/issues/2008/06/comparability_part4.html. Retrieved 15.07.08.

League of Women Voters of Charlotte-Mecklenburg. (2007). Weighted student funding report. http://goleaguego.org/files/weightstfureport.pdf. Retrieved 28.09.07.

Lewis, D. A., & Nakagawa, K. (1995). *Race and educational reform in the American Metropolis: A study of school decentralization*. Albany, NY: State University of New York Press.

Miller, L. J., Roza, M., & Swartz, C. (2005). A cost allocation model for shared district resources: A means for comparing spending across schools. In W. J. Fowler Jr. (Ed.), *Developments in school finance: 2004. Fiscal proceedings from the annual state data conference of July 2004 (NCES: 2005-865)* U.S. Department of Education, National Center for Education Statistics,. Washington, DC: Government Printing Office.

Mohrman, S. A., Lawler, E. E., & Mohrman, A. M. (1992). Applying employee involvement in schools. *Education Evaluation and Policy Analysis*, *14*, 347–360.

National Association of State Boards of Education. (2003). School-based financing. *Policy Update* 11(7). http://www.nasbe.org/new_resources_section/policy_updates/PU_Schoolbased_Financing_05.03.pdf. Retrieved 28.09.07.

Ouchi, W. G. (2003). *Making schools work: A revolutionary plan to get your children the education they need*. New York: Simon & Schuster.

Psacharopoulos, G. (2006). The value of investment in education: theory, evidence, and policy. *Journal of Education Finance*, *32*(2), 113–135.

Petko, M. (2005). *Weighted student formula: What is it and how does it impact educational programs in large urban districts*? National Education Association. http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/c4/8b.pdf. Retrieved 28.09.07.

Roza, M., Swartz, C., & Miller, L. (2005). *Lessons on assessing the costs of small high schools: Evidence from Seattle and Denver*. Center on Reinventing Public Education, Daniel J. Evans School of Public Affairs, University of Washington. http://www.crpe.org/hot/PDF/CostofSmSchool_brief.pdf. Retrieved 28.09.07.

Roza, M., & Hill, P. (2003). How within-district spending inequities help some schools fail. Prepared for Brookings Institute conference. The Teachers We Need, Washington, DC. http://www.pdkintl.org/kappan/k0310mil.htm. Retrieved 24.07.08.

Shambaugh, L. S., Chambers, J. G., & DeLancey, D. (2008). *Implementation of the weighted student formula policy in San Francisco: a descriptive study of an equity-driven student-based planning and budgeting policy (Issues & Answers Report, REL 2008–No. 061)*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. http://ies.ed.gov/ncee/edlabs

Thomas B. Fordham Institute. (2006). *Fund the child: tackling inequity and antiquity in school finance*. Thomas B. Fordham Institute. http://www.100percentsolution.org/fundthechild/FundtheChild062706.pdf. Retrieved 28.09.07.

Ucelli, M., Foley, E., & Emdon, T. (2002). *First steps to a level playing field: An introduction to student based budgeting*. Annenberg Institute of School Reform at Brown University. http://schoolcommunities.org/Archive/images/SBB.pdf. Retrieved 28.09.07.

Wohlstetter, P., & Van Kirk, A. (1995). *School-based budgeting: organizing for performance*. Los Angeles, CA: Center on Educational Governance, University of Southern California.

4

Exceptional Children, Vol. 59, No. 5, pp. 433-443.

"Flat" Versus "Weighted" Reimbursement Formulas: A Longitudinal Analysis of Statewide Special Education Funding Practices

SAMUEL DEMPSEY
DOUGLAS FUCHS
George Peabody College of Vanderbilt University

Abstract: Tennessee data were analyzed longitudinally from 1979-80 to 1987-88 in terms of numbers of children placed in a variety of service options. In 1983-84, the Tennessee funding formula was changed from a "flat" rate to a "weighted" formula. The weighted formula was associated with a statistically significant decrease in less restrictive placements and a reliable increase in more restrictive placements. A statewide survey of district special education directors suggested that service needs may have been more likely than monetary incentives to explain the observed changes.

□ Since passage of Public Law 94-142, special education funding has increased dramatically, reaching $16 billion in 1985-86 (Decision Resources Corporation, 1988). By 1984-85 the federal share of average per-pupil cost was 8.2%. In contrast, the local and state shares were 35.1% and 56.7%, respectively (National Association of State Directors of Special Education [NASDSE], 1989). This large responsibility of states to fund special education services, coupled with increased emphasis on equity issues and caps on state and local tax revenues, has generated important questions about effects of funding patterns in special education.

For more than a decade, there has been speculation that reimbursement strategies exert different effects on special education service delivery (Weintraub & Higgins, 1980). Federal funding of special education always has been disbursed in accordance with a flat, student-based formula; that is, each child served in special education triggers an equal number of dollars from Washington, regardless of type, cost, or duration of service. In response to the continued shortfall in federal allocations, the states have developed alternative reimbursement patterns. Nevertheless, there has been infrequent empirical analysis of the effects of these different reimbursement strategies on statewide placement patterns or on decision making in special education at the local level.

REIMBURSEMENT FORMULAS

Several types of allocation formulas have been used at the state level to distribute special education funds to local education agencies (LEAs). These include (a) flat grants, (b) resource-based disbursements, (c) weighted-pupil versions, and (d) cost-based calculations (NASDSE, 1989). Fiscal and programmatic considerations are associated with each type. That is, just as they vary in how they are calculated, it has been suggested that these formulas also differ in terms of their impact on classification, placement, and distribution of services for students with disabilities (e.g., Bernstein, Hartman, Kirst, & Marshall, 1976; Jordan & McKeown, 1980; Hartman & Harber, 1981; McCarthy & Sage, 1982; Moore, Walker, & Holland, 1982; NASDSE, 1989).

Flat grants provide a fixed amount of funds per child, teacher, or classroom unit. They are relatively simple to administer and do not require labeling of students by type of disability (Moore, Walker, & Holland, 1982). However, because funds increase in direct proportion to the number of students served, there is an inherent incentive to overclassify students and leave them in low-cost placements (Hartman, 1980). According to Thomas (1973), flat funding encourages identification of children with mild disabilities because (a) each child generates the same amount of money and (b) children with mild disabilities generally are less expensive to serve.

Resource-based formulas support a percentage of personnel salaries or weighted costs of specific program types or units. Funds for a certain number of resource classes (or teachers) oblige the school system to fill those slots (Hartman, 1980). Mainstreaming typically is not encouraged because failure to fill special classes can result in the loss of funded units (Moore et al., 1982). Because classrooms (or teachers) are counted instead of children, classes tend to be filled to capacity, and children's needs are defined by existing program types. Insufficient numbers of "low incidence" students may result in the failure to generate reimbursement necessary to establish special units. Resource-based formulas cause little incentive for overclassification because the start-up of given programmatic units is based on expected state averages and may be limited by a funding or population cap (NASDSE, 1989).

Weighted-pupil calculations are based on types of specific children multiplied by an average per-pupil cost, or based on a type of weighted formula tied to the type of service or degree of disability. The range of weights can encourage a purposeful misclassification of students into more restrictive categories, which in turn, generally triggers higher reimbursements (Hartman, 1980; Moore et al., 1982). Weighted formulas often are not responsive to wide variations in program costs, but encourage identification of students with more severe disabilities by providing higher allocations for more intensive service (Thomas, 1973).

Cost-based formulas fund a portion of the overall cost of services provided by a district. They reimburse a partial percentage or the actual cost of providing special education. It is believed that this type of formula encourages more reasonable identification of children because local cost is minimized or eliminated (Hartman, 1980); however, cost containment becomes an issue for the state (Moore et al., 1982). Under a cost-based arrangement, mainstreaming should be encouraged because reimbursement would be tied to actual services provided (Hartman, 1980).

EFFECTS ON LOCAL DECISION MAKING

As mentioned, in theory, alteration of state funding mechanisms results in important changes in how and where children with disabilities are served (e.g., Hartman, 1980; Fuhrman, 1979; McCarthy, 1980). Such speculation has received some empirical support by Singer and Raphael (1988), who found that, when keyed to funding categories, placement was a critical factor in children's performance at the local level. However, most state funding studies of special education have addressed other concerns, such as equity issues through examination of expenditures, resource allocations, and type of label assigned identified children (e.g. Bruininks & Lewis, 1986; Decision Resources Corporation, 1988; Kakalik, Furry, Thomas, & Carney, 1981; Singer & Raphael, 1988).

In practice, then, there have been few empirical analyses of statewide strategies to fund special education. Virtually no empirical research has been conducted to test the validity of hypothesized effects of various funding formulas on statewide placement and service provision (Albright, 1988; Gaughan, 1976; Guarino, 1971). The lack of such research is all the more surprising and important because 13 states have switched funding formulas between 1982 and 1989 (see Table 1). In the same period, an additional 26 states (and the District of Columbia) either modified or contemplated changes in their current reimbursement strategies. Only 11 states during the past decade took no action in this regard (NASDSE, 1989).

The purpose of our research was to explore possible changes from one type of student-based formula to another within the state of Tennessee. Relations between the two funding formulas and student placement were investigated across *all*

TABLE 1
States' Changed (and Unchanged) Reimbursement Formulas Over Time[a]

	1982				1989			
State	*Flat* (n = *19*)	*Weighted* (n = *12*)	*Resource* (n = *9*)	*Cost* (n = *11*)	*Flat* (n = *10*)	*Weighted* (n = *17*)	*Resource* (n = *9*)	*Cost* (n = *15*)
Alabama	X				X			
California	X				X			
Delaware	X				X			
Georgia	X					•		
Idaho	X						•	
Illinois	X				X			
Kansas	X				X			
Kentucky	X				X			
Louisiana	X						•	
Missouri	X				X			
Mississippi	X				X			
North Carolina	X							•
North Dakota	X				X			
New Hampshire	X					•		
Nevada	X				X			
Rhode Island	X							•
Tennessee	X					•		
Texas	X					•		
Virginia	X						•	
Alaska		X				X		
Arizona		X				X		
Florida		X				X		
Iowa		X				X		
Indiana		X				X		
Massachusetts		X				X		
New Jersey		X				X		
New Mexico		X				X		

(Continued)

TABLE 1
(Continued)

State	1982				1989			
	Flat (n = *19*)	*Weighted* (n = *12*)	*Resource* (n = *9*)	*Cost* (n = *11*)	*Flat* (n = *10*)	*Weighted* (n = *17*)	*Resource* (n = *9*)	*Cost* (n = *15*)
New York		X				X		
Oklahoma		X				X		
South Carolina		X				X		
Utah		X				X		
Colorado			X					●
Montana			X				X	
Ohio			X				X	
Hawaii			X				X	
Vermont			X					●
Washington			X				X	
Wisconsin			X				X	
West Virginia			X				X	
Wyoming			X					●
Arkansas				X		●		
Connecticut				X				X
Maine				X				X
Maryland				X				X
Michigan				X				X
Montana				X				X
Nebraska				X				X
Oregon				X				X
Pennsylvania				X				X
South Dakota				X				X
District of Columbia				X				X

Note: All placements based on interpretation of published descriptions of state finance mechanisms reported by Project FORUM (1982) and in State Special Education Finance Systems (NASDSE, 1989).
[a]● Denotes a changed reimbursement formula.

LEAs in the state for a period of 9 consecutive years. More specifically, we asked three questions concerning Tennessee's change in reimbursement formulas:

1. Was there a difference in numbers of children placed in special education?
2. Was there a difference in numbers of children placed in more restrictive environments?
3. What was the perceived rationale for decision making at the local level?

METHOD

Archival Data

In collaboration with the Tennessee State Office of Special Education, we examined relations between reimbursement formulas and student placement during a 9-year period. Archival data were collected from annual state summaries and reports submitted to the Office of Special Education Programs in the U.S. Department of Education, which display numbers of children placed in consultation, partial resource, comprehensive resource, and self-contained programs from 1979-80 to 1987-88, inclusive. During this period, Tennessee changed how it funded special education, moving from a *flat* student-based formula to a *weighted* one. These reimbursement formulas require additional explanation.

Flat Versus Weighted Formulas. As with many states, Tennessee's education funding pivots on a base rate for each school-age child, determined year-to-year by the legislature. Special education funding rests on a "multiple constant" of the base rate, which is also negotiated annually. For example, in 1982-83 the base rate was $439 per child. Special education's multiple constant for 1982-83 was 1.0, which meant the state earmarked an equal amount of money for children with and without disabilities. From 1979-80 to 1982-83, the multiple constant changed yearly; but in each year, it was the same for all special needs children, regardless of type of disability or amount of service provided—hence, the term *flat-rate reimbursement.* In 1983-84, however, the state began to fund special education in a manner proportionate to the type of services provided. It did so by assigning *different* multiple constants to various options of service; service options were "weighted" to reflect intensity of effort and cost.

Service Options. By state regulation, Tennessee defines 10 special education service options in terms of the number of hours provided. For purposes of analysis, we eliminated 2 options: homebound and the provision of special materials in the regular classroom. This resulted in the loss of fewer than 1,500 children statewide. The remaining 8 options were regrouped into 4: *consultation*, 3 hr or less of service per week (Option I); *partial resource*, or more than 3 to 21 hr (Option II); *comprehensive resource*, more than 21 to 27 hr, (Option III); and *self-contained*, more than 27 hr, or full time, self-contained programs in the public school, including special transportation and at least two other related services (Option IV). This regrouping permitted more straightforward comparisons between less and more restrictive placements, and represented options that also parallel the types of service reported in the First through Tenth Annual Reports to Congress on the Implementation of P.L. 94-142.

Flat Versus Weighted Reimbursements and Service Options. From 1979-80 through 1982-83, LEAs' flat-rate reimbursement per student with a disability averaged $512.38 ($SD$ = $15.19). From 1983-84 to 1987-88, multiple constants for Option I through Option IV were 0.57, 1.03, 4.61, and 6.35, respectively. Tennessee LEAs received the following mean reimbursements per special needs child: for Option I, $333.80 ($SD$ = $32.63); for Option II, $600.60 ($SD$ = $52.58); for Option III, $2,693.40 ($SD$ = $235.65); and for Option IV, $3,714.80 ($SD$ = $324.53).

Numbers of Children. In our analysis, we included all special education students receiving K-12 public instruction in Tennessee. Special education enrollment decreased from 123,900 in 1979-80 to 113,671 in 1987-88. In the same period, 10 states in addition to Tennessee experienced declining special education enrollments or an annual growth rate of less than 1% (U.S. Department of Education, 1990).

Each of the 140 Tennessee school districts reports the number of students with disabilities four times annually by amount of service received. Our figures were obtained from February census counts, the legal tabulation used to calculate state funds received by the districts for the following year. Total numbers of actual children and type of special education service provided per child were collected.

TABLE 2
Survey Completed by Tennessee Special Education Directors

Survey Questions[a]

1. In your opinion was the *statewide* increase in Option III the result of:
   Reason 1[b] ____ Reason 2[c] ____
   Another Reason ____
   If you checked Another Reason, please explain.
2. In terms of *your district*, would you say there was a similar increase in Option III?
   ____ Yes ____ No
3. If yes, was it the result of:
   Reason 1 ____ Reason 2 ____
   Another Reason ____
   If you checked Another Reason, please explain.
4. If you answered "no," please describe briefly how the switch from flat to weighted payment affected the numbers of children in Option III in relation to the other options in your district.

[a]Background information accompanying this survey: "Figure 1 shows change over the years in numbers of actual children in relation to numbers of weighted children served in Tennessee from 1980 to 1988. There has been a drop in the number of actual children, but an *increase* in weighted children since 1982. In 1983-84, we shifted from paying an essentially flat rate per child to weighted payment by type of service option provided. Numbers of actual children decreased for Options I, II, and IV under weighted payment. However, Figure 2 shows that the number of actual children in Option III greatly increased at the same time. This suggests that, over time, children were moved into Option III from other options." [b]Reason 1 reflects efforts to provide more appropriate service; that is, districts provided additional services because they had children who needed more restrictive placements. [c]Reason 2 reflects efforts to generate additional funds; that is, districts saw an opportunity to retain or place children in options that generate a greater amount of service dollars.

Survey of Special Education Directors

Survey Instrument. Data on statewide changes in special education placement from 1979-80 to 1987-88 were presented to an annual gathering of 30 Tennessee special education directors. Afterward, they completed a questionnaire. Their written and extemporaneous comments were used to help formulate questions for a statewide survey. When mailed, it included a cover letter, two figures, a response form, and a return envelope. The response form postulated two contrasting reasons for the statewide changes in special education placement and contained four questions (see Table 2).

Sample. A total of 100 of 140 special education directors in the state in charge or with direct knowledge of LEA programs during the 1979-80 to 1987-88 period were surveyed. That is, 40 were eliminated from the survey because they were judged unknowledgeable about the period in question. We promised anonymity to those targeted to receive the survey and gave them figures showing statewide shifts to more restrictive placements concurrent with a change in reimbursement formula. Next, they were asked to explain from their perspective what occurred statewide and in their own districts. Our initial selection of the 100 directors were verified independently by both current and former state department administrators and officers of the state association of special education directors. Districts of the directors selected were representative of the geographic regions, wealth, and population density of the state as a whole.

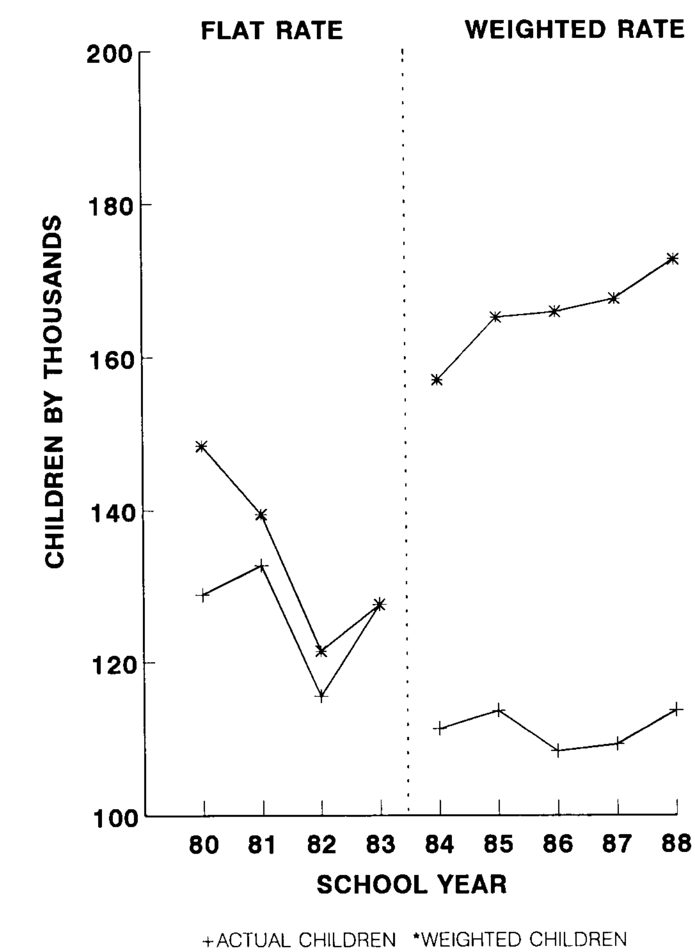
RESULTS

Archival Data

Figure 1 displays the relation between reimbursement formula and children counted. For both flat-rate and weighted-rate years, two types of child-count data are presented: "actual children" and "weighted children." "Actual children" refers to a straightforward unweighted count of students served in special education. As explained previously, the term *weighted children* in the flat-rate years refers to a multiple constant applied to each special needs child for reimbursement purposes. Whereas the value of this factor changed from year to year, under the flat reimbursement formula it was the same across all categories of service in a given year. By contrast, in the weighted-rate years, students with disabilities counted more or less, depending on their service option placement.

During the flat-rate years, actual and weighted child counts were similar and exhibited a downward trend (see Figure 1). In 1984-85, the first weighted-rate year, there was a dramatic jump in the number of *weighted* children, an increase that

FIGURE 1
Relations Between Types of Reimbursement Formulas and Numbers of Children in Special Education Statewide



Note: Each school year encompasses parts of two calendar years. Thus, "1980" signifies "1979-80" and so on.

continued in subsequent years. In contrast, the actual child count in 1984-85 dropped in relation to the preceding year and did not rebound in the next 4 years.

An important exception to this pattern occurred in 1982-83, when there was a marked increase in actual and weighted children. Two historical considerations appear to explain the anomaly. First, in 1981-82, the state eliminated a funding category for (nondisabled) students with learning problems, resulting in the reclassification of many as learning disabled. Second, with the impending change from flat to weighted formulas well known, the state delayed for 1 year its verification of children served in special education. Anecdotal information suggests this grace period encouraged at least some districts to retain speech-impaired children as a hedge against an anticipated loss of state monies.

Table 3 provides means and standard deviations of the proportions of *actual* children placed in Options I through IV under flat and weighted

TABLE 3
Proportion of Students with Disabilities by Service Option and Reimbursement Formula[a,b]

Formula	*Option I* M	*Option I* (SD)	*Option II* M	*Option II* (SD)	*Option III* M	*Option III* (SD)	*Option IV* M	*Option IV* (SD)
Flat	35.03	(0.81)	52.15	(1.91)	9.25	(1.05)	3.57	(.09)
Weighted	34.57	(1.14)	48.31	(0.80)	13.82	(1.62)	3.08	(.26)

[a]Option I refers to children in regular classrooms on consultation; Option II, children in partial resource placements (3 to 20 hr); Option III, children in comprehensive resource placements (21 to 27 hr); Option IV, children in self-contained programs (more than 27 hr). [b]Changes in mean *actual numbers* of children from flat-rate to weighted-rate formulas by service option: for Option I, 40, 989.75 (*SD* = 2,640.89) to 38,062.00 (*SD* = 1,666.15); for Option II, 61,108.25 (*SD* = 5,437.29) to 52,891.40 (*SD* = 1,281.81); for Option III, 10,807.75 (*SD* = 815.23) to 15,123.80 (*SD* = 1,744.51; for Option IV, 4,175.50 (*SD* = 264.41) to 3,374.80 (*SD* = 259.80).

reimbursement formulas. A two–between (Option I vs. II vs. III vs. IV and Flat vs. Weighted) analysis of variance (ANOVA) resulted in a significant main effect for service option, $F(3,28) = 3299.24, p < .001$, but not for reimbursement formula, $F(1,28) = .02$, *ns*.

There was a significant Service option by Reimbursement formula interaction, $F(3,28) = 21.45, p < .001$. Scheffe analysis indicated that the proportions of children per service option were significantly different from each other. Thus, the two reimbursement formulas within each service option were contrasted to identify possible shifts in population. Proportions of children in Option I did not vary significantly from one reimbursement formula to another, $t(7) = .67$, *ns*. However, numbers of students in Options II and IV decreased significantly under the weighted formula: Option II, $t(7) = 4.10, p < .01$; Option IV, $t(7) = 3.54, p < .01$. Conversely, numbers of students in Option III increased significantly under the weighted formula, $t(7) = -4.86$, $p < .01$. (Figure 2 illustrates this interaction.)

Survey of Special Education Directors

Surveys were mailed to 100 selected special education directors; 67% returned completed, usable forms. A second mailing resulted in an overall response of 90%. We compared the districts of the 90 survey respondents to the districts of the nonrespondents and failed to discern any difference on such dimensions as geographic region, wealth, population density, or tenure of the director.

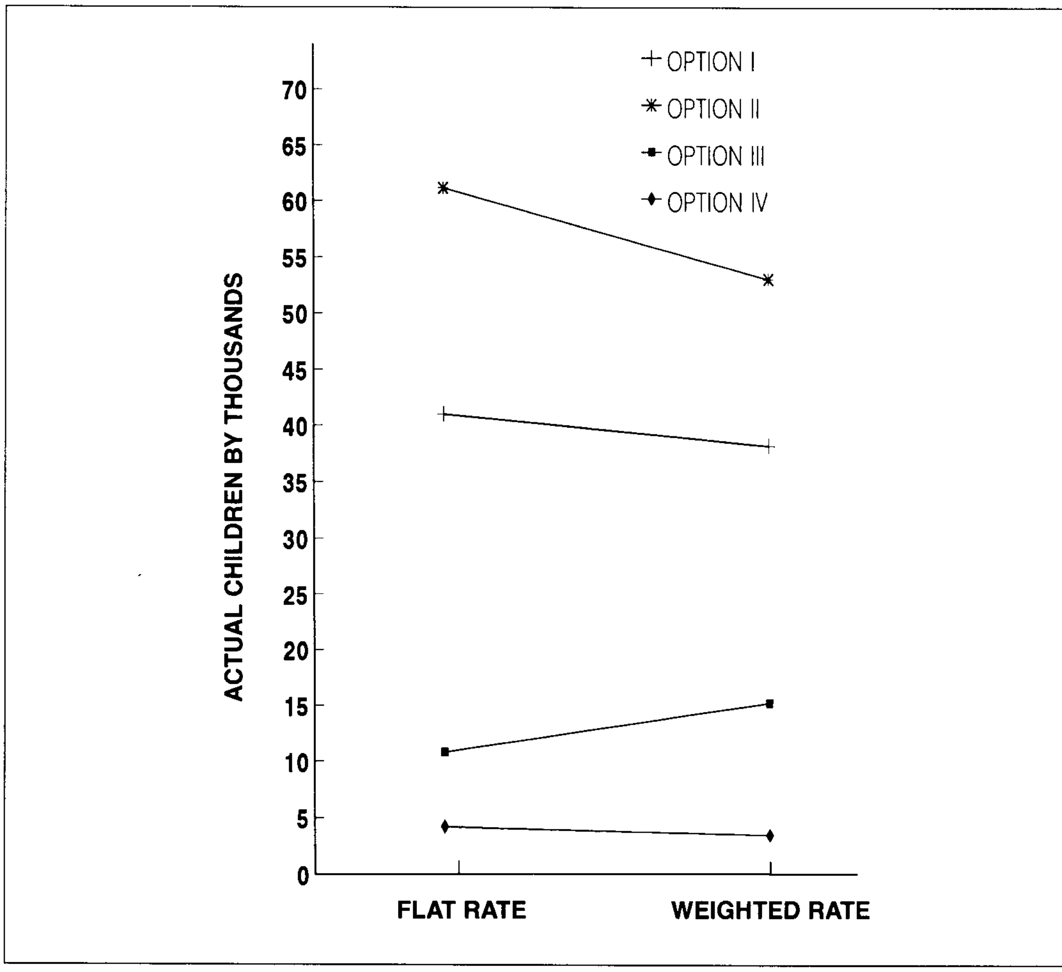
Directors were asked whether documented shifts in placement of children in Options II through IV (a) were a result of increased need for more restrictive service (Service), (b) were a response to monetary incentive (Money), or (c) were the result of another reason (AR). Eight responses in the last category, AR, were categorized as either "Service" or "Money" on the basis of written explanations. Four additional responses suggesting a combination of reasons (Service and Money) were interpreted as a "Money" response. This reflected the more conservative view that admitted recognition of financial incentive outweighed service needs in placement decisions.

Of 90 directors, 59 (65.55%) believed the changes observed statewide paralleled change in their own district. Forty-seven (79.66%) of this subgroup claimed the shift in use of service options in their districts reflected efforts to obtain genuinely needed services; 12 (20.33%) stated it was motivated by a desire to attract more dollars to their system. By contrast, 53 (58.88%) and 37 (41.11%) of the directors believed the statewide change in use of service options was due to service needs and monetary incentives, respectively.

DISCUSSION

This longitudinal study analyzed relations between how a state reimburses its LEAs and the types of service LEAs provide to students with disabilities. Overall, results indicate a shift in placement from lower funded (less expensive) to higher funded (more costly) service options concurrent with the change from a flat to weighted reimbursement formula. Proportions of children in partial resource (Option II) and self-contained

FIGURE 2
Mean Number of Actual Children Placed in Each Special Education Service Option Under Two Reimbursement Formulas



Note: Option I refers to children in regular classrooms on consultation; Option II, children in partial resource placements (3 to 20 hr); Option III, children in comprehensive resource placements (21 to 27 hr); Option IV, children in self-contained programs (more than 27 hr).

(Option IV) programs declined, whereas assignments to the consultation category (Option I) remained steady. Only in comprehensive resource (Option III) did a large increase of student placements occur (see Table 3).

Where did these additional comprehensive resource students come from? This question cannot readily be answered in terms of "newly found" children with disabilities because Tennessee experienced a *decrease* of 10,000 students from special education rosters between 1979-80 and 1987-88. In all likelihood, the answer is elsewhere.

There was a mean decline of 0.49%, or 800.70 students, in self-contained programs and some, or many, of these children may have moved into comprehensive resource. Even if this were true, however, such an explanation is insufficient to account for the average increase of 4.57%, or 4,316.05 placements in this option. A more important and likely explanation may involve partial resource. This placement option lost an average 3.84%, or 8,216.85 students, in the weighted-reimbursement years. Furthermore, it represents the category from which children most easily could be moved into comprehensive resource. For example, a student receiving special education instruction in three subjects daily, or 15 hr per week (partial resource), would require the addition of only 6 more special education hours to reach 21 hours and qualify for comprehensive resource. Such a placement change would generate an additional $2,092.80 per student for an LEA.

Therefore, as funding shifted from a flat to weighted rate, the data and the nature of the service options suggest that many students statewide moved from partial to comprehensive resource, or from less to more financially supportive, and more restrictive, school programs. If true, this finding would contribute to a growing literature on relations between reimbursement formulas and special education services. It would also corroborate a long-held belief that such formulas can have statewide impact on student placements (Weintraub & Higgins, 1980).

Despite the potential importance of this corroborative finding, one should also recognize at least three features of the database that place serious constraints on interpretations that might be made. First, we make deliberate use of the just-mentioned term *corroborate* to mean *parallel*, rather than to convey the notion that the data "confirm" or "verify" or "authenticate" any belief or hypothesis. This is because the database is correlational, not causative; at best it may be understood as *in accord* with prevailing ideas about the connection between funding and practice. Second, we did not track over time the educational placements of individual children with disabilities. Thus, when we suggest that many students moved from partial to comprehensive resource, we may only infer this movement. And third, because the archival data are highly aggregated, they may mask the existence of school districts for which the general pattern does not pertain. How many, which ones, and why are all questions that our archival database cannot answer.

These caveats notwithstanding, we attempted to understand possible motives behind the shift in use of service options. Specifically, we examined how change in reimbursement formulas was perceived by local decision makers. In this case, they were LEA special education directors who are obligated by law to report to their state education agency (SEA) which children they serve and how. This information is the basis for the state's allocation of special education monies. Thus, the typical LEA director is knowledgeable, if not expert, about budgetary matters including constraints and incentives within which service delivery systems function. It would seem that the directors' perceptions are potentially pivotal to understanding placement decisions at the local level.

Among the directors who believed changes observed statewide paralleled changes in their own districts, more than half (59.88%) indicated that the statewide changes resulted from legitimate service needs of children; 41.11% believed the shift represented a bid by their colleagues to attract more money to their respective systems. Yet, when explaining their own motives, nearly 80% believed local change in placement was based on legitimate service needs; only 20% stated that generating increased dollars was the primary motive. In other words, respondents perceived that *other* directors were more likely than themselves to place money ahead of service as factors in student placement decisions.

In a sense, it is encouraging that a majority of directors seem motivated by a desire to provide appropriate service, rather than by a desire to acquire funds. Yet, even the more uplifting explanation is troubling. The close temporal connection between (a) the change in Tennessee's reimbursement formula and (b) the special education directors' changes in student placements suggests that the directors' decision making was influenced by financial concerns. And financial concerns—the cost of programs and the availability of funds—have been deemed inappropriate considerations by landmark legislation and litigation. Rather, P.L. 94-142 and *Roncker v. Walter* (1983) require that a balance be struck between the service needs of a child and placement in the least restrictive environment. These are the only two factors determined by the federal government and the courts as pertinent to placement considerations.

Our correlational archival and survey data indicate, however tentatively, that placement decisions can depend on a state's policy for distributing special education monies. Underscoring the importance of this possibility is that the states, not the federal government, provide the majority of funds for special education at the local level. In light of the possibility that reimbursement policy may tilt placement decisions away from least restrictive settings and toward more financially rewarding and restrictive service options, we call for further analysis of the role that state reimbursement policy plays and for consideration of ways of making it more neutral with regard to special education placement decisions.

REFERENCES

Albright, L. E. (1988). Policy implications of funding: A comparison of two formulas for funding special education in New Hampshire. (Doctoral dissertation, Vanderbilt University). *Dissertation Abstracts International, 49*(10), 4401-B.

Bernstein, C., Hartman, W., Kirst, M., & Marshall, R. S. (1976). *Financing educational services for the handicapped: An analysis of current research and practices.* Reston, VA: The Council for Exceptional Children.

Bruininks, R., & Lewis, D. R. (1986). *Cost analysis for district level special education planning, budgeting and administration* (Report to the Office of Special Education and Rehabilitative Services, U.S. Department of Education, Grant No. G008400605). Minneapolis: University of Minnesota.

Decision Resources Corporation. (1988). *Patterns in special education service and cost* (Report to the U.S. Department of Education, Contract No. 300-84-0257). Washington, DC: Author.

Fuhrman, S. (1979). *State education politics: The case of school finance reform.* Denver, CO: Education Commission of the States.

Gaughan, J. P. (1976). An examination of financing special education services: A comparison of cost by handicap and educational services. (Doctoral dissertation, Syracuse University, 1975). *Dissertation Abstracts International, 36*(10), 6932-A. (University Microfilms No. 76-7401)

Guarino, R. L. (1971). The "Greenberg Law" (Section 4407) and the education of handicapped children in New York State. (Syracuse University, 1971). *Dissertation Abstracts International, 72*(32), 5638. (University Microfilms No. 72-11,839)

Hartman, W. T. (1980). Policy effects of special education. *Journal of Education Finance, 6*(2), 135-139.

Hartman, W. T., & Harber, T. R. (1981). *School finance reform and special education.* Palo Alto, CA: Institute for Research on Educational Finance and Governance, Stanford University.

Jordan, K. F., & McKeown, M. P. (1980). Equity in financing public elementary and secondary schools. In J. W. Guthrie (Ed.), *Finance policies and practices* (pp. 42-67). Cambridge, MA: Ballinger.

Kakalik, J. S., Furry, W. S., Thomas, M. A., & Carney, M. F. (1981). *The cost of special education.* Santa Monica, CA: Rand Corporation.

McCarthy, E. F. (1980). *Policy considerations for state special education funding systems.* New York: Syracuse University.

McCarthy, E. F., & Sage, D. (1982). State special education fiscal policy: The quest for equity. *Exceptional Children, 48,* 414-419.

Moore, M. T., Walker, L. J., & Holland, R. P. (1982). *Finetuning special education finance: A guide for state policymakers.* Princeton, NJ: Educational Testing Service.

National Association of State Directors of Special Education. (1989). *State special education finance systems, 1988-89* (Report to the U.S. Department of Education, Contract No. 300-85-0167). Washington, DC: Author.

Project FORUM. (1982). *A description of state funding procedures for special education in the public schools* (National Association of State Directors of Special Education). Washington, DC: Author.

Roncker v. Walter, 700 F. 2d 1058 (6th Cir. 1983), cert. denied, 104 S. Ct. 196 (1983).

Singer, J. D., & Raphael, E. S. (1988). *Per pupil expenditures for special education: To whom are limited resources provided?* (Report to the Office of Special Education, U.S. Department of Education, Grant No. G008630147). Cambridge, MA: Harvard University.

Thomas, M. A. (1973). Finance: Without which there is no special education. *Exceptional Children, 39,* 475-490.

U.S. Department of Education, Special Education Programs. (1990). *Twelfth annual report to Congress on the implementation of the Education of the Handicapped Act.* Washington, DC: Author.

Weintraub, F. J., & Higgins, S. (1980). *Local special education variables necessary for consideration in developing state special education fiscal policies.* Reston, VA: n.p.: 1980. (ERIC Document Reproduction Service No. ED 201-133)

ABOUT THE AUTHORS

SAMUEL DEMPSEY (CEC #185), doctoral student, DOUGLAS FUCHS (CEC #185), Professor, Department of Special Education, George Peabody College of Vanderbilt University, Nashville, Tennessee.

Preparation of this article was supported in part by the Office of Special Education Programs in the U.S. Department of Education (Grant H023F80005-89) and by the John F. Kennedy Center (NICHD Core Grant HD15052). The article does not necessarily reflect the position or policy of the funding agencies, and no official endorsement should be inferred.

We gratefully acknowledge the assistance of Marion Parr and Millie Davis of the Tennessee State Department of Education in collecting the data.

Manuscript received April 1991; revision accepted January 1992.

5

Lessons Learned: Weighted Student Funding

October 2020

Over the last two decades, some of the nation's largest districts, including those in New York City, Boston, Denver, Houston, and Chicago, have shifted to using a weighted student funding (WSF) formula to distribute some portion of their total budget. Instead of allocating resources based on instructional delivery models or doling out staff positions to schools based on staffing formulas, these districts use a *student-based formula* to allocate *dollars* in fixed increments based on the number and types of students in each school. In these models, each defined student type—such as students living in poverty or with limited English proficiency—generates additional dollars on top of a "base" fixed-dollar per-pupil sum for all students. Districts' cited goals for WSF include greater spending equity, transparency, flexibility, and school-level autonomy to focus on improving student outcomes.

Today, an estimated 10% of the nation's K-12 students are served in school systems using WSF. Notably, in 2018, the year following the start of our study, three big districts adopted WSF: Nevada's Clark County (including Las Vegas), Tennessee's Shelby County (including Memphis), and Atlanta. Yet little research has comprehensively mapped what the WSF systems look like and how effective they are in meeting their stated goals—until now.

Our three-year U.S. Department of Education-funded research study analyzes the use of WSF at the district and state level. In 19 districts using WSF in 2017-18, we document WSF designs and features (such as what student types districts weight and what share of their total dollars is distributed through the formula) and how WSF is implemented in those districts and their schools. Surveys of 639 principals in 14 of the study districts provide further implementation insights. We also study the links between WSF and greater resource equity by examining spending and staff allocations in 18 of the WSF districts and a comparison group of non-WSF peer districts. Additionally, we examine how outcomes in districts using WSF in 2009-2016 compared to overall outcomes in their respective states and whether achievement gaps narrowed in the WSF districts.[1]

Our study focuses on these key research questions:

- Why do districts adopt WSF?
- Is there a typical WSF model that districts are using?
- Do WSF districts spend more on at-risk students?
- Are principals taking a financial leadership role in WSF districts?
- What about outcomes? Are achievement gaps narrowing in WSF districts?

For current WSF district leaders and those considering it, this research can help them learn from what peer systems are doing as they seek how best to deploy their dollars to improve student outcomes.

Study Districts

Baltimore City School District
Boston Public Schools (P)
Chicago Public Schools
Cleveland Metropolitan School District (P)
Denver Public Schools (P)
Douglas County School District (P)
Hawaii Department of Education (P)
Houston Independent School District (P)
Indianapolis Public Schools
Jefferson County School District (P)
Metropolitan Nashville Public Schools (P)
Milwaukee Public Schools
New York City Department of Education (P)
Newark Public Schools
Norwalk Public Schools (P)
Orleans Parish School Board (P)
Prince George's County Public Schools (P)
San Francisco Unified School District (P)
Springfield Empowerment Zone* (P)

P=Included in principal survey

** Excluded from equity and outcomes analyses since it is a small set of autonomous schools within the district.*

1. Full research methodologies are forthcoming in journal articles in *Public Budgeting & Finance* and *Peabody Journal of Education*.

Examining more than 70 measures of formula features and implementation practices, we find variation is the norm. Homegrown formulas, non-formula allocations, and exemptions reflect local context and lead to substantial differences in how WSF is implemented across districts.

Why do districts adopt WSF?

Our study of school board and budget documents indicates that **nearly all districts identify equity (89%) and flexibility for school principals (79%) as a key rationale for WSF**, with nearly half also citing a goal of transparency (49%). Although much of the literature links WSF and "school choice" (whereby families choose their school), not one district in our 19-district study cited choice as a driving factor for using WSF.

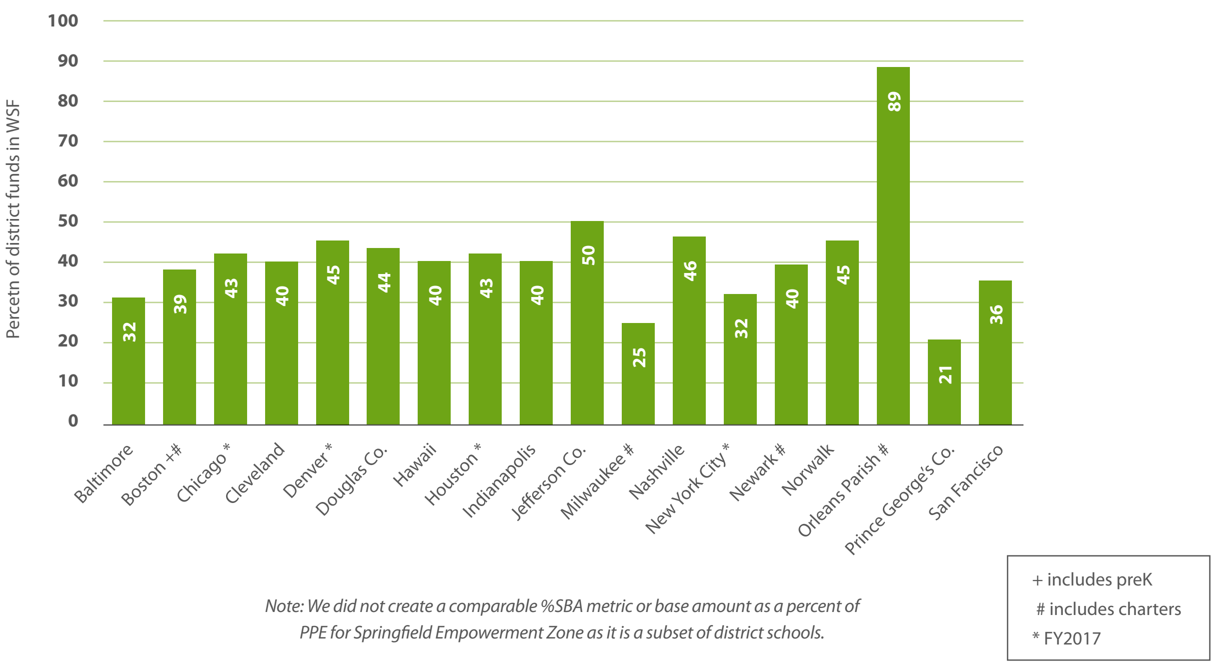
Is there a typical WSF model that districts are using?

Each district has developed a home-grown formula—and district-by-district differences are driven by local context. In examining both the formula amounts, weights, and formula exemptions, we find that many districts are layering their WSF formulas on top of longstanding allocations that reflect local context. In other words: **There's no such thing as the "typical" WSF model.**

Even the portion of the district's budget included in the formula differs. For example, on one end of the spectrum, Prince George's County deploys only 20% of its total budget via its WSF formula, while Orleans Parish deploys 89%.

Most districts use a hybrid approach, deploying some 30%–50% of their total funds via their WSF formula. Non-formula allocations tend to be made for central or shared functions, magnet or small school subsidies, or allocations to exempted schools or programs.

Figure 1: Just One District Allocates More Than 50 Percent of Total District Funds Via WSF



Note: We did not create a comparable %SBA metric or base amount as a percent of PPE for Springfield Empowerment Zone as it is a subset of district schools.

In addition to defining their "base" allocations differently (the fixed-dollar amount allocated for every student regardless of student characteristics) districts vary on what student characteristics they weight and the size of those weights. Grade level is the most commonly used student weight category across districts, but which level of schooling warrants the highest weight is not consistent. Seven districts give their highest grade-level weight to elementary students, four give it to middle-school students, and four give it to high schoolers.

Two-thirds of districts use weights for students identified as English Learners (ELs) and as having disabilities, while half use weights for poverty, such as free or reduced-priced lunch (FRL). Even the magnitude of the weights differs, with EL weights ranging from 10%–70%. We also find a range of unique, district-designed student weights to meet locally identified needs. Boston, for example, uses a weight for students with interrupted formal learning. Houston uses a weight for students who are refugees. Denver and Houston include students in foster care via the poverty weights listed in Figure 2. Note that no district included federal funds, such as Title I, in their weights, so these weights reflect only state and local resources.

Figure 2: WSF Formulas Vary Across Districts in Both the Types and Number of Weights Used

	Grade level	English language learner	Special education	Poverty	Low academic performance	Gifted	Vocational	Interrupted formal education	High academic performance	Homeless	Refugee
Baltimore			●		●				●		
Boston	●	●	●	●	●		●	●			
Chicago	●		●								
Cleveland	●	●	●		●			●	●		
Denver		●		●		●					
Douglas Co.	●			●	●	●					
Hawaii	●	●		●		●					
Houston	●	●	●	●		●	●			●	●
Indianapolis	●		●	●							
Jefferson Co.	●			●							
Milwaukee	●										
Nashville	●	●	●	●	●						
New York City	●	●	●	●	●		●	●			
Newark	●	●	●								
Norwalk	●										
Orleans Parish	●	●	●			●					
Prince George's Co.	●	●									
San Francisco	●	●	●	●							
Springfield Emp. Zn.	●	●	●	●			●				
Total Number of Districts Using	**17**	**12**	**12**	**11**	**6**	**5**	**4**	**3**	**2**	**1**	**1**
Percent of Districts Using	**89%**	**63%**	**63%**	**57%**	**32%**	**26%**	**21%**	**16%**	**11%**	**5%**	**5%**

Allocations to central or shared functions were typically not included in the weighted student formula. But while the weighted formula tended to be the primary driver of allocations to schools, some allocations weren't driven by student or student type. We find that **these other (non-WSF) allocations tended to reflect local context.** Extra allotments above the student-based formula included those for small school size, magnets, and foundation amounts. While some of these were driven by a formula, we didn't consider them as part of the student-driven formula since the allocations were made on the basis of *school* (versus *student*) characteristics. And some districts exempt some schools from the formula, grant weights for school types (versus student types), or fund select staff positions outside the formula. Clearly, it is difficult for most districts to deploy a strict formula without substantial redistribution. And these exemptions and adjustments effectively mitigate the formula's year-to-year financial effects on some schools.

We also find that **nearly all districts continue to use average salaries in school budgeting, likely limiting their goals for equity.** In this practice, schools are charged for their teaching staff based on district-wide average salaries, not the actual salaries of teachers in the building. This can financially penalize higher-need schools as research suggests that less experienced, lower-salary teachers tend to congregate in those schools. Districts in Boston and Denver have experimented with limited use of real salaries (allowing for roughly one-third of their schools to budget and account for spending based on actual salaries). Both the formula exceptions and continued reliance on average salaries may be limiting the extent to which WSF aids progress toward equitable distribution of resources.

Spending analyses indicate that WSF districts are living up to their equity promises to drive more dollars to low-income and low-performing schools.

Do WSF districts spend more on at-risk students?

Specifically, do WSF spend more at schools attended by low-income students and at the lowest-performing 5% of schools?

To explore whether districts were spending more on schools attended by low-income students, we compared the per-pupil allocations for each school attended by every low-income student to the per-pupil allocations for every non-low-income student. We averaged these allocations in each WSF district. **Nearly all WSF districts do spend more on average on schools attended by low-income students** than on schools attended by non-low-income students. **Schools attended by the average low-income student received more dollars in 16 of 18 (89%) WSF districts.** Similarly, an examination of teacher-student ratios indicated that **in WSF districts low-income students attend schools with more teachers** than do their non-low-income peers (see Figure 3).

In running the same analysis on 18 matched non-WSF districts, we found again that most, albeit a slightly smaller share, did spend more on schools attended by the average low-income student (15 of 18; 83%). While fewer of the non-WSF districts were spending more on low-income students' schools, where they did, the magnitude of that difference was higher (WSF districts were spending $293 more per-low-income pupil compared to $532 in comparison districts).

These patterns suggest that WSF districts do tend to live up to the promise of driving more dollars to higher-poverty schools (and yet, use of WSF is not a perfect guarantee of higher spending). Many of our match districts were also driving more dollars to higher-poverty schools.

Do WSF districts spend more on the lowest-performing 5% of schools? We compared district allocations for the 5% of lowest-performing elementary schools to the rest of the schools. Here we find that **the lowest-performing schools receive more dollars per pupil in 16 of 18 (89%) WSF districts and higher counts of teachers** (see Figure 3). A smaller majority of comparison districts (11 of 18; 61%) also spend more on their lowest-performing schools and have higher teacher-student ratios. Regarding the magnitude of additional dollars spent on low-performing schools, we find WSF districts spend $839 more per-pupil on their average low-performing schools compared to just $546 more in comparison districts (see Table 1).

Figure 3: At-risk students are more likely to have additional dollars and teachers in WSF districts than comparison districts

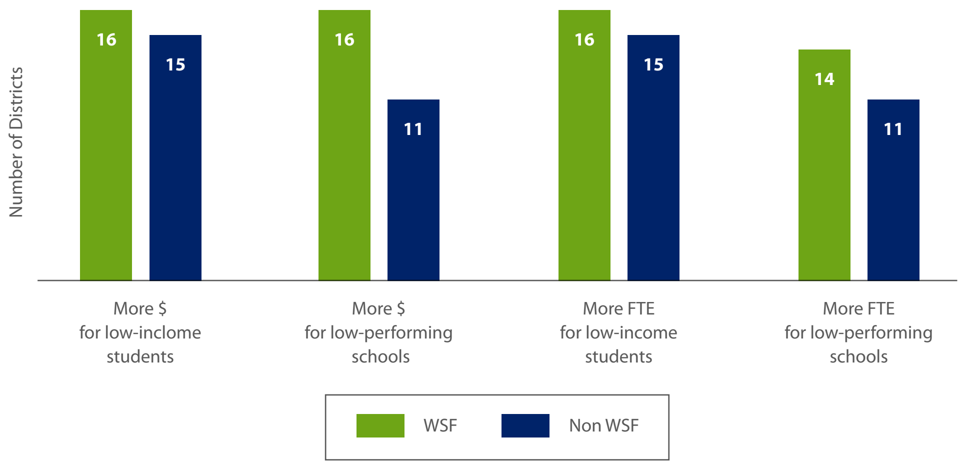


Table 1: The additional dollars and teachers for low-performing schools is greater in WSF than comparison districts; the opposite is true for low-income students

	WSF ($/FTE)	WSF (%)	Comparison ($/FTE)	Comparison (%)
More $ per pupil for low-income students	$293	2.50%	$532	4.07%
More $ per pupil for low-performing schools	$839	6.53%	$546	4.64%
More FTE for low-income students	0.24	3.78%	0.28	4.32%
More FTE for low-performing schools	0.51	7.81%	0.23	2.72%

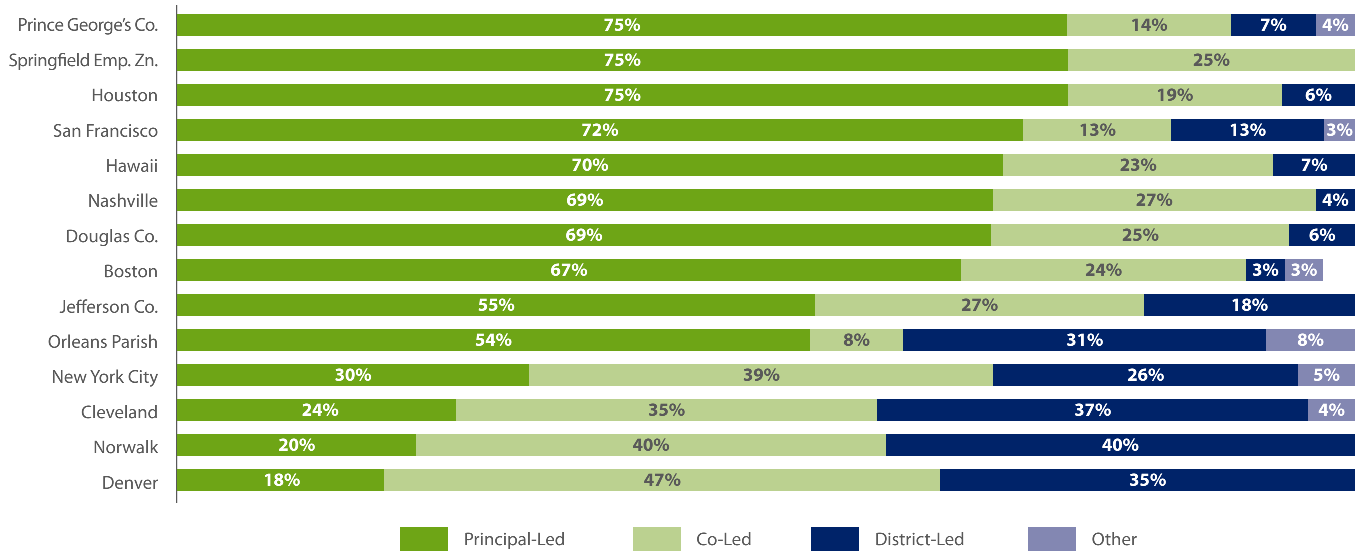
Anecdotally, we find that WSF districts become more equitable over time. And we found **the most equitable districts have used WSF for a decade or more.** Analyzing resource allocation patterns in a recent WSF adopter (1-3 years), a mid-range adopter (4-10 years), and a veteran WSF district (10+ years) showed those districts generally were growing more equitable over time. Anecdotal evidence suggests districts may be refining their formulas to better distribute resources in a way that aligns with their equity goals, but doing so in a way that minimizes any larger single-year redistributions. The only districts that did not allocate more dollars to low-income students were in their first and second years of WSF implementation.

Principals in WSF districts are active financial leaders.

Are principals taking a financial leadership role in WSF districts?

Most WSF principals are actively making budget decisions for their schools—and involving others who are typically left out of the budget process, like teachers and parents. In our survey, 79% of principals reported leading or co-leading the budget process; 87% involve teachers; and 71% include parents. Here again, WSF districts appear to be living up to their goals of increasing school-level autonomy, at least when it comes to involving school-level stakeholders in the budget decisions.

Figure 4: Majority of principals lead or co-lead budget development in WSF districts



**Boston does not add up to 100% because one respondent did not answer this question.*

Most principals understand the rationale for and workings of WSF. Across all responding principals, 40% cited equity/resources and 39% cited ownership/flexibility as the district's rationale for WSF implementation. As to understanding how WSF works, 61% of principals reported correctly that increasing enrollment was a strategy to increase funding at their schools. This finding indicates that these WSF principals understand that enrollment is the primary driver of funds for their schools. Recognizing the rationale for and workings of WSF is a necessary pre-condition if districts are to realize their goals for greater school-level budget autonomy.

Most principals are using their budget flexibilities and customizing spending to better meet their students' needs. Across all responding principals, 82% reported making the decision to apply flexible funds to increase the number of teachers in their schools; 76% reported increasing the number of support staff; and 62% reported changing the staff mix. In addition, 78% reported reallocating money across spending categories (such as shifting funding from staff positions to afterschool programming), suggesting that most principals are making budget tradeoffs between staff and other resources. These responses suggest that not only are principals making choices, they are using their budgetary flexibilities to make *different* choices depending on the school.

That said, survey comments suggest that while districts are granting schools new flexibilities in resource use, some principals reported bumping up against longstanding arrangements for things like base compensation, even in right-to-work states where such issues (at least theoretically) would be expected to be less fixed than in places where collectively bargained labor contracts are the norm. Further, district arrangements for centrally managed services limit the portion of dollars given to schools. **Ultimately, these conditions impact the net flexibility school leaders gain when switching to a WSF formula.**

While WSF principals are expected to be financial leaders, most aren't trained as such in their certification programs, forcing districts to pick up the slack. When asked about their participation in formal financial training opportunities for their role in financial decisionmaking, principals indicated that they are learning on the job. Some 63% said they received financial training (in WSF or budgeting generally) from their current district, while fewer than half said they received financial training in their certification program. In fact, one in ten principals cited their time as an assistant principal or other mentorship opportunities as their source of financial training. This means that most principals in WSF systems are not prepared to hit the ground running on finance leadership and are instead learning on the job.

Few opportunities exist for financial leadership training in principal preparation and certification programs. Our related research finds that although there are university programs that teach some education finance topics and credentialing standards around budget and resource allocation[2], there seems to be ample latitude for curricular components to satisfy those broad standards and yet leave practitioners without the hands-on finance skills they say they need in their jobs to make strategic financial decisions and tradeoffs on behalf of students.

For WSF districts, these findings suggest that, absent changes to principal preparation, districts may have to deliver training to build financial skills for principals to fully participate in WSF.

Table 2: Principals' training opportunities vary across WSF districts

District	Training from district in WSF	Training from district on budgeting	Training in Principal Certification	Other
Boston	79%	58%	52%	9%
Cleveland	65%	30%	31%	7%
Denver	78%	55%	59%	4%
Douglas Co.	73%	43%	45%	12%
Hawaii	77%	49%	70%	5%
Houston	71%	88%	58%	6%
Jefferson Co.	73%	64%	64%	18%
Nashville	78%	87%	17%	0%
New York City	45%	68%	44%	14%
Norwalk	80%	0%	20%	0%
Orleans Parish	23%	23%	54%	23%
Prince George's Co.	81%	35%	28%	9%
San Francisco	44%	53%	47%	19%
Springfield Emp. Zn.	63%	25%	0%	13%
All Responses, All Districts	**63%**	**56%**	**46%**	**10%**

2. Professional Standards for Educational Leaders (PSEL) and National Educational Leadership Preparation (NELP) Standards.

WSF implementation is associated with higher average student outcomes and improved outcomes in higher-poverty schools, but does not provide evidence that achievement gaps for Black/white or Hispanic/white students are narrowing.

What about outcomes? Are achievement gaps narrowing in WSF districts?

When exploring the links between WSF adoption and outcomes, the findings were tentatively positive. We compared the student performance trends from 2009 to 2016 for 18 districts that implemented WSF and districts in the same state that did not implement WSF. We find that **WSF implementation is related to positive test scores for the overall student population in those districts in both ELA and math** compared to non-WSF districts in the same state, even when controlling for student characteristics as well as anticipatory and phase-in effects.

But when drilling down to look at outcomes for a group of at-risk students[3], we do not find evidence of improved achievement for Black or Hispanic students. As such, **we find no narrowing of the Black/white or Hispanic/white achievement gaps that can be attributed to use of WSF.** In fact, we found some evidence of *widening* achievement gaps in districts that implemented WSF before 2011. The gap widened because student outcomes overall were improving but those of Black and Hispanic students were not.

When interpreting these outcomes, it is important to note that we find our study districts had substantial achievement gaps between white students and their Black and Hispanic peers before adopting WSF. This fact supports our earlier findings that districts typically adopt WSF in order to remedy longstanding inequities.

In our Colorado school-level analysis comparing schools in WSF districts to a propensity score matched sample of schools in non-WSF districts in the state, we find **schools overall in the WSF districts made small gains in ELA** compared to other Colorado districts overall. **The high-poverty schools in those WSF districts made larger ELA gains.** These high-poverty schools (where students qualifying for FRL make up more than 75% of total enrollment) are the very schools that tend to receive additional dollars from WSF formulas.

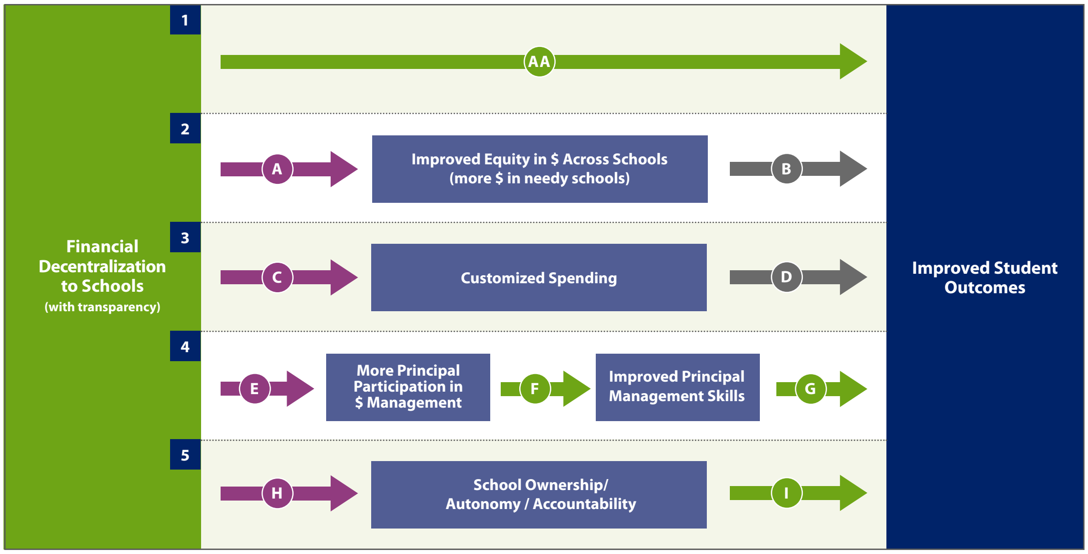
Despite efforts to create comparable groups, results should be interpreted with caution since WSF districts and their schools tend to be different than others in their state in both enrollment size and student composition. In addition, the effects of WSF cannot be isolated from the effects of other policies implemented around the same time.

Future research can further explore if and why WSF might drive improved student outcomes.

Most studies, including ours, have not been designed to validate a cause-and-effect relationship between WSF and improved student outcomes. But our research team analyzed existing literature and research to begin to identify if and *why* financial decentralization could contribute to improved outcomes. We found that many studies suggest that financial decentralization has led to effects that could conceivably contribute to improved student outcomes. In our analysis, we mapped the research landscape to uncover five possible theories on what mechanism is at play that would describe how a causal connection could exist (per the existing literature). These five theories are shown in Figure 6. The theories suggest that improved student outcomes may be caused by: a) increased spending (as a result of more equity across schools within districts);[I] more customized spending in schools;[II] greater principal participation in budgetary management;[III] improved principal management skills; [IV] and greater school autonomy, ownership, and responsibility for dollars spent. [V] This research landscape analysis (which documents the research for each causal mechanism) is summarized in our publication, "The Link Between Financial Decentralization and Improved Student Outcomes: What We Know and What We Need Future Research to Explore."[VI] For each causal path, we code the strength of evidence as it currently exists in the research literature.

3. The necessary data to disaggregate outcomes by other at-risk categories, such as low-income students, were not available.

Figure 6: Existing research on how financial decentralization drives improved student outcomes falls into five pathways with ten effects



Pathway	Effect	Evidence Base
1	AA	Promising
2	A	Strong
	B	Limited
3	C	Strong
	D	Limited
4	E	Strong
	F	Promising
	G	Promising
5	H	Strong
	I	Promising

Priority areas for future research

In April 2019, we hosted a researcher and practitioner roundtable to discuss our research landscape analysis and identify priorities for next-step investigation of the links between financial decentralization and improved student outcomes. Based on their own work and the landscape analysis, researchers and practitioners alike identified the mechanisms at play in the fourth and fifth pathways as potentially holding the most promise for yielding improved student outcomes. As such, participants viewed the effects on student outcomes from greater principal participation in budgetary management; improved principal management skills; and greater school autonomy, ownership, and responsibility for dollars spent as priority research areas going forward.

While the IES study has contributed greatly to our understanding of WSF, there remains much we do not know about the relationship between financial decentralization and improved student outcomes. While current research suggests that there may be a link, future research holds the promise of more definitively answering if—or under what conditions—financial decentralization can yield improved student outcomes.

Endnotes

I. Jay Chambers, Larisa Shambaugh, Jesse Levin, Mari Muraki, and Lindsay Poland, *A Tale of Two Districts: A Comparative Study of Student-Based Funding and School-Based Decision Making in San Francisco and Oakland Unified School Districts* (Washington, DC: American Institutes for Research, 2008); Jesse Levin, Jay Chambers, Diana Epstein, Nick Mills, Mahala Archer, Antonia Wang, and Kevin Lane, *Evaluation of Hawaii's Weighted Student Formula* (Washington, DC: American Institutes for Research, 2013); Karen Hawley Miles and Marguerite Roza, "Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity," *Peabody Journal of Education* 81, no. 3 (2006): 39-62.

II. Chambers et al., 2008; Ashley Jochim, Title TBD, from the multi-year study, *How Do School and District Spending Patterns Change with Weighted Student Funding (WSF) and What Is Happening to Equity and Achievement, Particularly for Low-Income and At-Risk Students* (Seattle, WA: Edunomics Lab at Georgetown University, forthcoming); Marguerite Roza, Tricia Davis, and Kacey Guin, "Spending Choices and School Autonomy: Lessons from Ohio Elementary Schools," School Finance Redesign Project, Working Paper 21 (Seattle, WA: Center on Reinventing Public Education, University of Washington, 2007).

III. Bruce S. Cooper, Timothy R. DeRoche, William G. Ouchi, Lydia G. Segal, and Carolyn Brown, "Weighted Student Formula: Putting Funds Where They Count in Education Reform," Education Working Paper Archive (Department of Education Reform, University of Arkansas, 2006); Chambers et al., 2008; Matthew Steinberg, "Does Greater Autonomy Improve School Performance? Evidence from a Regression Discontinuity Analysis in Chicago," *Education Finance and Policy* 9, no. 1 (2014): 1-35; Jesse Levin, Karen Manship, Steve Hurlburt, Drew Atchison, Ryoko Yamaguchi, Adam Hall, and Stephanie Stullich, *Districts' Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings from a National Study* (Office of Planning, Evaluation and Policy Development, US Department of Education, 2019).

IV. Nicholas Bloom, Renata Lemos, Raffaella Sadun, and John Van Reenen, "Does Management Matter in Schools?" NBER Working Paper No. 20667 (Cambridge, MA: National Bureau of Economic Research, 2014); Richard Rossmiller, "Achieving Equity and Effectiveness in Schooling," *Journal of Education Finance* 12, no. 4 (Spring 1987): 561-577.

V. Bloom et al., 2014; Levin et al., 2013; Steinberg, 2014.

VI. Edunomics Lab, "The Link Between Financial Decentralization and Improved Student Outcomes: What We Know and What We Need Future Research to Explore" (Seattle, WA: Edunomics Lab at Georgetown University, 2020).

Acknowledgments

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A170348 to Georgetown University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

The principal survey was done in partnership with the Center on Reinventing Public Education (CRPE) at the University of Washington. The outcomes portions of this study were conducted by CRPE.

Edunomics Lab is a university-based research center dedicated to exploring and modeling complex education fiscal decisions and growing the capacity of education leaders on the topic of education finance. The Edunomics Lab is affiliated with the McCourt School of Public Policy at Georgetown University.

6

The Dutch Experience with Weighted Student Funding
Author(s): Edward B. Fiske and Helen F. Ladd
Source: *The Phi Delta Kappan*, Vol. 92, No. 1 (SEPTEMBER 2010), pp. 49-53
Published by: Phi Delta Kappa International
Stable URL: http://www.jstor.org/stable/25753628
Accessed: 27-02-2018 17:33 UTC

The Dutch Experience with Weighted Student Funding

The Netherlands' centralized school funding, long-term stability of education policies, and extensive social services contribute to its success. Weighted student funding might not translate well into the U.S. system.

By Edward B. Fiske and Helen F. Ladd

Thinkstock/Hemera

Weighted student funding of individual schools is gaining attention in the United States. Several major cities have adopted variations of this policy, including Seattle, San Francisco, and Houston (Baker 2009). And when the Thomas B. Fordham Institute, a conservative think tank, released a proposal to implement weighted student funding on a far broader scale, a long list of policy makers and pundits, including three former U.S. Secretaries of Education, signed on (Thomas B. Fordham Institute 2006).

In the United States, weighted student funding, known as WSF, is a means of distributing money among primary and secondary schools to promote intradistrict equity. Under WSF, money follows students on a per pupil basis to the schools they attend, but the amounts differ according to the needs of the child. Schools then have the flexibility to use the money as they wish.

EDWARD B. FISKE is an education writer and consultant in Durham, N.C. **HELEN F. LADD** is a professor of public policy and economics in the Sanford School of Public Policy at Duke University, Durham, N.C.

WSF has appeal both to conservatives, who see it as a way to promote parental choice and school autonomy, and to progressives, who are attracted to it as a way of directing extra funds to disadvantaged students. But it's not a new idea. The Netherlands has been using WSF in its highly centralized system of financing primary schools for 25 years.

Weighted student funding in the Netherlands has clearly succeeded. Structural, political, and cultural differences may make it hard to establish such a system in the United States.

By most measures, the Netherlands does well by its children. The country ranks at the top of the UNICEF scale of children's well-being (UNICEF 2007). In addition, Dutch students outperform students in many other developed countries on such international tests as the Program for International Student Assessment (PISA) and the Trends in International Mathematics and Science Survey (TIMSS). Moreover, Dutch students whose mothers have limited education do better on PISA tests than do comparable students in other OECD countries.

In 2009, we went to the Netherlands to examine the Dutch experience with WSF and to consider what lessons it might offer for U.S. education policy.

Deepen your understanding of this article with questions and activities from this month's ***Kappan* Professional Development Discussion Guide** by Lois Brown Easton, free to members in the digital edition at **kappanmagazine.org**.

DUTCH SCHOOL FUNDING

Dutch primary schools receive 90% of their funding from the national government and only 10% from municipal governments and other sources. Parental choice is universal in the Netherlands. For more than 20 years, from 1985 to 2006, native Dutch pupils whose parents had low education were funded at 1.25 times the rate of more advantaged students. Children of poorly educated immigrant parents were funded at 1.9 times, or nearly double, the standard rate.

The specifics of WSF remained remarkably consistent from 1985 through 2006. In 1993, the definition of low parental education for native Dutch pupils was tightened to apply to both parents, rather than just one, because of concerns that the Netherlands was designating a higher proportion of its citizens as disadvantaged than was appropriate for a developed country. In 2006, significant changes were made. In response to growing political discontent over immigrants, the formula was modified to eliminate immigrant status and to rely entirely on the parents' education level. Much of our research is based on data for 2005-06, the last year before the phasing in of the modified system.

The Dutch system began in a political struggle over public and private schooling in the late 19th and early 20th centuries. Under a 1917 constitutional provision, the national government began funding all schools — whether public or private, religious or secular — on an equal per pupil basis. About 70% of Dutch primary students attend private schools that are publicly funded.

The 1917 constitutional change also established the principle of "freedom of education," which has two important consequences. First, parents have the constitutional right to enroll their child in a publicly funded school that matches their family's values, even if this means joining with other parents to start a new one. Second, although the central government provides almost all of the funding, schools enjoy considerable operational autonomy. Thus two ideas that U.S. conservatives believe would be furthered by a system of WSF — parental choice and school autonomy — have been bedrocks of the Dutch system for nearly a century.

Dutch school boards can operate from one to several dozen schools. In Amsterdam alone, there are about 40 school boards for more than 200 primary schools. National funds flow through the boards, though per pupil funding is calculated at the school level. The system is comparable to a system of state-funded charter schools in which funds flow directly from the state to the schools or, where boards operate multiple schools, to the boards, which typically take a small percentage off the top to cover their management costs.

While the Dutch have funded primary schools on a per pupil basis for a long time, the concept of "weights" did not emerge until the mid-1980s. The influx of uneducated immigrants that began in the 1960s had produced concentrations of economically disadvantaged pupils in urban areas. In addition, policy makers were concerned about the poor educational performance of substantial numbers of native Dutch pupils — particularly those whose parents had limited education, many of whom lived in rural areas. Given the presence of such groups, equal funding of schools could not ensure equal quality schooling because some schools had far higher proportions of challenging students than others.

In 1985, under legislation known as the Educational Priority Policy, the Dutch Parliament added weights to the school funding system. The goal was to give schools serving large numbers of disadvantaged students additional resources to address the special needs of their students. This approach promotes what is called "vertical equity" in the United States.

PATTERNS OF RESOURCES

The government set the additional weights at 0.25 for native Dutch with poorly educated parents and 0.90 for immigrants. However, the only way the government could afford the recommended weights was to introduce a threshold of 9%, below which schools receive no extra funding based on the weights. For example, a school with 200 students would need extra weighting equivalent to 18 students to meet the 9% threshold and qualify for the additional dollars. Thus it would need at least 20 students with a 0.9 weight or 72 students with a 0.25 weight to meet the threshold.

Our research focused on resource patterns across schools in the four big cities — Rotterdam, Amsterdam, The Hague, and Utrecht — which have large concentrations of immigrant students. These cities have more than 500 primary schools, and the schools with the highest proportions of weighted students were allocated 74% more in per pupil allocations than schools with few such students. There was no evidence that local municipalities countered this pattern by skewing their small amounts of supplemental funding in the other direction. Indeed, their funding appears to follow the same progressive pattern.

Our analysis also shows that, in 2006, primary schools with the largest proportion of highly weighted pupils had, on average, about 58% more teachers per pupil than did schools with the lowest proportions of such pupils. High-weight schools also had more support staff, a category that includes assistant teachers, administrative personnel, and caretakers. On average, these schools had about one support position for every two teachers versus one such person for every six teachers in low-weight schools.

The U.S. system of school finance differs from this progressive Dutch funding pattern in three important respects. First, in the United States, the widespread disparities in school spending across states typically work to the disadvantage of students in poor states.

Second, the comparable disparities in spending across districts within a state often places large urban school districts at a disadvantage because they have a disproportionate number of challenging students. State aid programs typically compensate for only part of these differences.

The third difference involves how resources are allocated among schools within districts. In the United States, schools serving the most disadvantaged students are often shortchanged by receiving the least qualified teachers.

Despite some specific programs, such as Title I, designed to benefit schools serving disadvantaged students, the resulting patterns of funding across schools within a district are typically far from equitable. Concerns about inequitable funding have provided the major justifications for introducing weighted student funding in some U.S. cities.

WOULD IT WORK HERE?

The Dutch have clearly demonstrated that a developed country can use weighted student funding and maintain such a system over a long period of time. However, structural, political, and cultural differences may make it hard to establish such a system in the United States.

Centralized funding. Even if we think about the Netherlands, with its 16.5 million people, as comparable to a U.S. state, Dutch school funding is far more centralized — from preschool through higher education — than in the United States. Dutch funding policy is determined at a political and administrative level where efforts to promote equity among various groups within the population can take precedence over local interests, including the desire of middle-class parents to push for advantages for their own children.

With the exception of Hawaii, which has only one district, the only U.S. jurisdictions to adopt WSF are urban districts. Using WSF at the district level limits its potential to promote school finance equity for two reasons. First, at the district level, it's likely to be politically difficult to implement weights anywhere close to those in the Dutch system. The higher the weights, the more that schools serving disadvantaged students will benefit, and hence the greater the incentive for families of more advantaged students to move to other districts that have smaller proportions of disadvantaged students, no differential weighting, or both. To keep such families in the city, policy makers are likely to keep the weights low or to add weights to benefit more advantaged children. For example, the Houston, Texas, school district set the relatively low weight of 0.15 for low-income students and the almost comparable 0.12 weight for gifted students.

The Dutch don't expect schools *by themselves* to be able to close achievement gaps or to meet the full range of needs of disadvantaged children.

Second, using WSF at the district level does nothing to address funding disparities among districts. It brings no new money into a city, so redistribution can take place only among schools within — not across — districts.

Thus, to achieve the equity goals implicit in the Dutch system, the United States would, at a minimum, have to implement WSF at the state level. Only then would it be possible, politically and fiscally, to eliminate the large interdistrict inequities in resources and to ensure that districts with the highest proportions of disadvantaged students receive additional funds. U.S. critics of weighted student funding argue that, at the city level, such a system would simply redistribute existing funds rather than provide sufficient funds for all pupils (Baker and Rebell 2006).

Continuity of policy. Education policy is remarkably stable in the Netherlands. Policy is designed for the long term so that schools can do long-range planning. While formulas for distributing WSF and the definition of disadvantage have occasionally been adjusted, the concept of significant progressive weighting has enjoyed consistent support across the political spectrum for a quarter century.

In contrast, U.S. education reform seems to be subject to fads and "flavors of the month." Rather than building on the work of their predecessors, state and district superintendents, big city mayors, and school principals often prefer to make their mark with their own reform ideas. Current calls by the Obama Administration for significant changes in the Elementary and Secondary Education Act (currently called No Child Left Behind) are a case in point. This lack of policy continuity could be a problem for sustaining a progressive weighting system.

Social values. It is difficult to overstate the importance of the widespread agreement on some key social values in the Netherlands. As a trading nation, the Netherlands long ago learned the importance of pluralism and tolerance, of allowing persons of diverse backgrounds to come and go, and of showing them respect, if not always affection. In addition, the Dutch are offended at the thought that any particular group of people is put at a disadvantage because of such avoidable circumstances as poverty, poor health, or inadequate education. This general acceptance of what is, in effect, a group-based affirmative action policy is an important reason for the durability of WSF in the Netherlands.

The Dutch don't expect schools *by themselves* to be able to close achievement gaps or to meet the full range of needs of disadvantaged children. The Dutch also offer a range of social services, primarily through the various municipalities. These services include preschool programs starting at age 2½, homework and guidance for truant pupils and early school leavers, and "extended" or "community" schools that provide enrichment activities for disadvantaged pupils. The Dutch formalized this approach in 1985 as part of the same Educational Priority Policy that established WSF. The policy authorizes separate funds to local municipalities in "educational areas" with substantial numbers of disadvantaged pupils. Another separate funding stream aimed at immigrants focuses on teaching the Dutch language and intercultural education (Herweijer 2009).

The Dutch also have a strong public health system that works closely with primary schools. The system begins with prenatal care and continues through preschool, with an emphasis on preventing medical and dental problems through routine health examinations. Doctors and nurses are assigned to work with groups of schools, and many have their offices in school buildings. Such measures help explain why the Dutch rank at the top of the UNICEF rankings of child well-being in rich countries, while the United States is at the bottom.

CONCLUSION

Weighted student funding in the Netherlands has clearly brought about a remarkably equitable system for funding primary schools. Our analysis shows that this success is due to powerful structural, political, and cultural features of Dutch society that are absent from the American context. These differences suggest that it would be difficult to transfer the full Dutch system to the United States. Although several U.S. cities have used WSF to benefit schools serving large numbers of disadvantaged students, such redistribution does nothing to offset funding disparities across districts.

Some conservatives in the United States look to the Dutch experience as evidence that WSF for individual schools could be used to promote more parental choice and school autonomy in U.S. schools. However, they should understand that WSF in the Netherlands emerged because parental choice of school and school autonomy were already in place. For their part, progressives should keep in mind that their agenda — funding equity through significant weighting — could easily fall by the wayside in the absence of strong political leadership promoting that objective. **K**

REFERENCES

Baker, Bruce D. "Within-District Resource Allocation and the Marginal Costs of Providing Equal Educational Opportunity: Evidence from Texas and Ohio." *Education Policy Analysis Archives* 17, no. 3 (2009): 1-28.

Baker, Bruce D., and Michael A. Rebell. "Robbing Peter to Pay Paul." *Education Week,* Nov. 29, 2006: 30-31.

Thomas B. Fordham Institute. *Fund the Child: Tackling Inequity & Antiquity in School Finance*. Washington, D.C.: Thomas B. Fordham Institute, 2006.

Herweijer, Lex. "Country Background Report for the Netherlands." *OECD Thematic Review on Migrant Education*. The Hague: The Netherlands Institute for Social Research, 2009.

UNICEF. "Child Poverty in Perspective: An Overview of Child Well-Being in Rich Countries." *UNICEF Report 7*. Florence, Italy: Innocenti Research Centre, 2007.

7

Review of Education (2005) 51:269–287
DOI 10.1007/s11159-005-7733-1

IMPROVING THE QUALITY OF EDUCATION THROUGH SCHOOL-BASED MANAGEMENT: LEARNING FROM INTERNATIONAL EXPERIENCES

ANTON DE GRAUWE

Abstract – School-based management is being increasingly advocated as a shortcut to more efficient management and quality improvement in education. Research, however, has been unable to prove conclusively such a linkage. Especially in developing countries, concerns remain about the possible detrimental impact of school-based management on school quality; equity among different schools in the same system; the motivation of and relationships between principals and teachers; and financial as well as administrative transparency. The present study defines school-based management and, in view of its implementation in different world regions, examines some of its advantages and disadvantages. In particular, the author explores the strategies which must accompany school-based management in order to ensure a positive impact on quality. These are found to include (1) guaranteeing that all schools have certain basic resources; (2) developing an effective school-support system; (3) providing schools with regular information on their performance and advice on how they might improve; and (4) emphasizing the motivational element in the management work of the school principal.

Zusammenfassung – DIE VERBESSERUNG DER QUALITÄT VON BILDUNG DURCH SCHULBASIERTES MANAGEMENT: AUS INTERNATIONALEN ERFAHRUNGEN LERNEN – Schulbasiertes Bildungsmanagement wird immer häufiger als schnell wirksames Mittel zum effizienteren Management und zur Qualitätsverbesserung in der Bildung propagiert. Eine direkte Verbindung konnte jedoch von der Forschung bisher nicht nachgewiesen werden. Besonders in Entwicklungsländern gibt es Bedenken, dass sich schulbasiertes Bildungsmanagement nachteilig auf die Qualität von Bildung auswirkt, wie z. B. im Bezug auf die Gleichheit zwischen verschiedenen Schulen im selben System und die Motivation von und die Beziehungen zwischen Schulleitern und Lehrern sowie die finanzielle und administrative Transparenz. Die vorliegende Studie definiert schulbasiertes Bildungsmanagement und untersucht Vor- und Nachteile dieses Ansatzes im Hinblick auf dessen Umsetzung in verschiedenen Regionen der Welt. Der Schwerpunkt liegt auf Strategien, die schulbasiertes Management begleiten müssen, um eine positive Auswirkung auf die Qualität sicherzustellen. Der Autor befindet, dass diese Strategien folgende Punkte einschließen: (1) die Garantie, dass alle Schulen über bestimmte Basis-Resourcen verfügen, (2) die Entwicklung eines effektiven Systems zur Unterstützung von Schulen, (3) die regelmäßige Versorgung der Schulen mit Information über ihre Leistung sowie Beratung, wie sie sich verbessern können, und (4) die Betonung des motivierenden Elementes in der Verwaltungsarbeit des Schulleiters.

Résumé – AMÉLIORER LA QUALITÉ DE L'ÉDUCATION PAR LA GESTION SCOLAIRE : APPRENDRE DES EXPÉRIENCES INTERNATIONALES – La gestion scolaire a été de plus en plus préconisée comme un raccourci vers une gestion plus efficace et une amélioration de la qualité de l'éducation. Cependant, la recherche n'a pas été en mesure d'établir définitivement un tel enchaînement de faits. En particulier dans les pays en voie de développement, il reste des inquiétudes quant à l'impact préjudiciable possible de la gestion scolaire sur la qualité de l'école; l'égalité entre les différentes écoles dans un même système ; la relation entre les directeurs et les instituteurs et leur motivation ; et la transparence financière aussi bien qu'administrative. L'étude présente définit la gestion scolaire et, en vue de sa mise en œuvre dans les différentes parties du monde, examine certains de ses avantages et de ses inconvénients. En particulier, l'auteur explore les stratégies qui doivent accompagner la gestion scolaire afin d'assurer un impact positif sur la qualité. On estime qu'elles comprennent (1) la garantie que toutes les écoles aient des ressources fondamentales sûres ; (2) le développement d'un système effectif pour aider les écoles ; (3) l'alimentation des écoles en informations régulières sur leurs performances et en conseils sur la façon dont elles peuvent s'améliorer ; et (4) l'accentuation de l'élément de motivation dans le travail de gestion du directeur de l'école.

Resumen – MEJORAR LA CALIDAD DE LA EDUCACIÓN MEDIANTE UNA GESTIÓN BASADA EN LA ESCUELA Y APRENDER DE LAS EXPERIENCIAS INTERNACIONALES – La gestión basada en la escuela se está defendiendo de forma creciente como solución rápida para lograr una gestión más eficiente y mejorar la calidad en la educación. No obstante, los estudios realizados sobre el tema no han podido probar la existencia de estos efectos de forma concluyente. Más que nada en los países en desarrollo, subsisten las preocupaciones en cuanto a los posibles efectos negativos que una gestión basada en la escuela podría tener sobre la calidad de la escuela y por ende de la enseñanza, sobre la equidad entre diferentes escuelas dentro de un mismo sistema, sobre la motivación de directores y docentes y las relaciones que existen entre ellos y sobre la transparencia económica y financiera. El autor define lo que es una gestión basada en la escuela y analiza algunas de sus ventajas y desventajas en vista de su implementación en diferentes regiones del mundo. En particular, el autor analiza las estrategias que deben acompañar a una enseñanza basada en la escuela para asegurar un efecto positivo sobre la calidad. Estas estrategias están basadas en las siguientes medidas: (1) garantizar determinados recursos básicos para todas las escuelas, (2) desarrollar un sistema efectivo de apoyo a las escuelas, (3) informar a las escuelas, a intervalos regulares, sobre su rendimiento y asesorarlas sobre las posibilidades de mejorarlo, y (4) reforzar el elemento motivacional en el trabajo de gestión de los directores de las escuelas.

Резюме – УЛУЧШЕНИЕ КАЧЕСТВА ОБРАЗОВАНИЯ ЧЕРЕЗ ВНУТРИШКОЛЬНОЕ УПРАВЛЕНИЕ: ИЗ МЕЖДУНАРОДНОГО ОПЫТА – Внутришкольное управление получает все большую поддержку в качестве кратчайшего пути к более эффективному управлению и улучшению качества образования. Тем не менее, проведенные исследования не смогли окончательно обосновать такую взаимосвязь. Особенно в развивающихся странах остается проблема возможного негативного воздействия внутришкольного управления на качество школьного образования; равенства среди разных школ в одной системе; мотивации и взаимоотношений между директорами и учителями; а также финансовой и административной прозрачности. В данном исследовании дается определение внутришкольного управления, и рассматриваются некоторые его положительные и отрицательные стороны с учетом его реализации в разных регионах мира. В частности, автор статьи исследует стратегию, которая должна сопровождать внутришкольное управление в целях обеспечения позитивного влияния на его качество. Она включает следующее: 1. гарантию определенных базовых ресурсов для всех школ; 2. развитие эффективной системы поддержки школ; 3. предоставление школам регулярной информации о результатах их деятельности и совета о возможном улучшении их деятельности; и 4. акцент на мотивацию в управленческой деятельности директоров школ.

School-based management, school-based governance, school self-management and school site management: different terms with somewhat different meanings, but all referring to a similar and increasingly popular trend which involves allowing schools more autonomy in decisions about their management; that is, in the use of their human, material and financial resources.[1] Throughout this study, we will use the term 'school-based management' and its abbreviation, SBM, to refer to this wide array of policies. The popularity of this trend is clear for all to see through the diversity of agencies showing interest in or manifestly promoting school-based management, the number of articles discussing its merits and demerits and, most crucially, the growing number of countries that have adopted aspects of this policy. Concern with educational quality has seldom been at the heart of this policy – the reasons for its introduction are related more to financial and managerial arguments. Nevertheless, its impact on quality is undoubtedly a core and contentious issue, with some authors claiming that school-based management is the panacea for quality improvement, while others argue that its introduction has led to deterioration in quality, especially in the weakest schools. This study will analyse these different arguments and explore the conditions under which school-based management can contribute to quality improvement.

Defining school-based management

Before entering into this debate, some clarity is needed on the meaning of school-based management. The variety of terms invoked earlier reflects a diversity of experiences. Nevertheless, a general definition is easy to produce: School-based management involves the transfer of decision-making power on management issues to the school level. Such a definition, however, does not answer two fundamental questions: Which decisions are transferred? Who, at the school level, receives this authority?

In response to the second question, Caldwell (1998) draws a distinction between school-based management, where responsibilities are transferred to professionals within the school (generally the principal with senior teachers), and school-based governance, which implies giving authority to an elected school board representing parents and the community.

Leithwood and Menzies (1998b) go somewhat deeper and identify four models of school-based management :

(1) Administrative control – the principal, as representative of the education administration, is dominant;
(2) Professional control – the teaching staff receives the authority;
(3) Community control – a local group or the parents, through a board, are in charge;
(4) Balanced control – the parents and the professionals (teachers and principal) share authority equally.

A common form of school-based governance is where a school is put in the hands of a group of private managers because the school's public management has failed to obtain the desired results. The Charter Schools in the United States are such a case: The school managers sign a charter identifying the results they promise to obtain and are given wide-ranging freedom in school management. A few such schools also exist in the United Kingdom, and some regions in Colombia are experimenting with this model.

Responses to the first question – which decisions are transferred – are equally diverse. For Geoff Spring, the architect of far-reaching reforms in several Australian states, the central issues are: (1) the delegation of real powers to the principal in managing financial and human resources (this includes staff selection and configuration and an almost fully decentralised budget); and (2) legislation transferring significant powers to the community, for example in the selection of the principal and the adaptation of the curriculum (De Grauwe 1999).

It must be stressed, however, that such autonomy is counterbalanced as well as limited by the development of a strong accountability framework. In some cases, that framework consists of curriculum guidelines, regular national examinations and the publication of school results; and it is so restrictive that schools are now arguably less autonomous than before these reforms. This is the complaint regularly repeated by teachers in the United Kingdom and New Zealand (Fitzgerald et al. 2003; Poulson 1998). The question of whether school-based management has led to more or less school autonomy is a controversial one. It is clear that school-based management does not give schools a blank cheque: Indeed, more autonomy equals more accountability.

A brief assessment of the prevalence of school-based management

It is almost impossible to list all countries that have adopted, in one form or another, school-based management policies. Due to the diversity of policies that this term encompasses, coupled with the fact that there is at times a wide disparity between policy and reality, such an inventory would be extremely imprecise. What follows is therefore an incomplete and superficial overview, one which evaluates the prevalence of this reform and the variety of situations in which it is applied. It is based on several publications (Caldwell 1994; Abu-Duhou 1999; McGinn and Welsh 1999) and on discussions, many of an informal nature, which the author has conducted with educational planners or policy-makers in different countries.

The Anglo-Saxon world (the United Kingdom, New Zealand, and several states in Australia and the United States) was without a doubt the first region in which school-based management occupied the policy agenda; this happened from the late 1970s onwards. In Asia, in the early 1990s, Hong Kong started the School Management Initiative. Sri Lanka has now also integrated the concept into its policy, although it would be hazardous to claim that all schools there are autonomously managed. Korea is an example of a country where official declarations pay tribute to school-based management, while in Indonesia and, to a lesser extent, in Nepal, international agencies are promoting and piloting the policy. In the Arab world, school-based management is much less prevalent. Although education policies increasingly emphasise the need for decentralisation, this has yet to result in a profound reform of the way schools are managed.

In Eastern Europe, the political revolutions of the 1990s led to major changes in education policies. Most countries have now redistributed responsibilities to local education offices as well as to schools, and some have gone nearly as far as the Anglo-Saxon regions mentioned above. Hungary is given regularly as an example but is far from being alone. Romania, which remains rather centralised and has undergone little reform, is perhaps the odd man out in this region.

The situation in Africa is interesting. Post-apartheid South-Africa has, for a number of reasons – some political, others managerial – given the School Management Boards a great deal of authority. This includes determining the level of fees and the language of teaching. This has allowed formerly 'white' schools to remain fairly exclusive, but it has also helped gain the commitment of the upper and upper middle classes to the new education system and the new rainbow state. It is a very specific situation, different from the rest of Africa. In French-speaking Africa, due to pressure from international agencies as well as the scarcity of resources made available by the state, the role played by head-teachers is changing. Because schools tend not to receive sufficient resources from their Ministries of Education, they are forced to collect additional resources from the community (or alternatively from elected local authorities). As a result, school principals manage some funds autonomously. When these funds are used to recruit extra staff, the principals also manage those staff. At the same time, international agencies are proposing to provide block grants to schools which they can spend as they wish. Due to these different factors, school principals are starting to play a greater role in decision-making. It is therefore correct to say that there is greater school autonomy, but this is not the result of national policies, and neither is it reflected in those policies. This poses a problem because there is little control over school funds and little support to school boards and principals.

In Latin America, some popular initiatives also fall within the realm of school-based management. EDUCO in El Salvador offers communities strong control over teachers and in this way tries to engender a feeling of accountability among the teaching staff. In Chile, some performance-related financing of schools has existed for quite some time, while in various Brazilian states (Minas Gerais and Ceara among others) a school's principal is no longer nominated at central level, but elected from a list of available candidates by the teaching staff and/or the community.

It is possible to construct a scale of school-based management situations, ranging from those in which few decisions of importance are transferred to school professionals to those in which the parents and the community exercise significant power over decisions concerning the school's management. It is useful also to make a distinction between those systems where school-based management has been developed as a national policy and those where teachers and parents, faced with lack of government support, have no other choice than to take the initiative by, for example, recruiting additional teachers or charging fees. Australia, the United Kingdom and New Zealand are examples of the former scenario, while the latter is the case in many developing countries.

The diversity of scenarios and contexts makes the debate about school-based management and quality a complex one. There is also an ideological element to consider. School-based management has been advocated on the basis of a strong belief in the professionalism of school staff, yet equally by those convinced that teachers need to be controlled more tightly and made accountable for their performance. Indeed, "its meaning has been rearticulated since the 1960s and 1970s through social-democratic, managerial and quasi-market versions ... [and] consequently, the concept remains a contested one" (Lingard et al. 2002: 24).

The pros and cons of school-based management

There are a number of solid arguments to support the introduction of school-based management. They are well known and need little introduction (Dimmock 1993; Caldwell 1994). The five most common are:

- *School-based management is more democratic*: Allowing teachers and parents to make decisions about education is certainly more democratic than keeping those decisions in the hands of a select group of central-level officials.
- *School-based management is more relevant*: Locating the decision-making power closer to where problems are being experienced will lead to more relevant policies, as local staff generally know their own situation better.

- *School-based management is less bureaucratic*: Decisions will be taken much more quickly if they do not need to go through a long bureaucratic process (from school level through several intermediary offices to the central level), but can be made at a level close to the school.
- *School-based management allows for greater accountability*: Giving schools and teachers greater authority implies that they can be held directly accountable to parents and the community. Such accountability is expected to act as a tool for greater effectiveness.
- *School-based management allows for greater mobilisation of resources*: Teachers and especially parents will be more eager to contribute to the funding of their school if they have a voice in the organisation and management it.

There is also some general research evidence to support the introduction of school-based management. Indeed, it has been demonstrated that the quality of education depends more on the way schools are managed than on the availability of resources (Dalin 1994; Carron and Chaû 1996; Heneveld and Craig 1996). It has also been shown that the capacity of schools to improve teaching and learning is strongly mediated by the quality of the leadership provided by the head-teacher. Both factors could be used to argue for stronger control over management within the school.

There are, however, a series of concerns around the introduction and implementation of school-based management. The following highlight what appear to be the crucial ones, particularly with regard to developing countries.

In many, if not most, developing countries, the trend towards school-based management, and the wider decentralisation of public services, including education, has not been the result of an internal debate. The conviction might have existed that such a policy would lead to higher quality, but that argument was more of an afterthought. Pressure by local authorities or communities for a more participatory decision-making process has generally been absent. Rather, in many of these countries, two forces combine to push for decentralisation: first, external pressure from international development agencies and experts; and second, internal political expediency in national contexts where the public authorities are unable to organise or finance basic public services. The question emerges as to whether this policy is owned and internalised by those supposed to be its main beneficiaries, namely teachers and parents.

The context of countries such as Australia and the United Kingdom, where school-based management policies were first introduced, is very different from that of most developing countries. For one thing, the public authorities are generally efficient, with a communications network reaching all schools. Before the introduction of school-based management reforms, public authorities were felt to be too restrictive. Therefore, the reforms were seen as a strategy to limit their involvement. In many developing countries, particularly in remote, disadvantaged areas, the problem is the opposite –

the absence of a supportive state framework. Weak governments cannot be expected to develop accountability frameworks to counterbalance school autonomy or to offer support to schools. The absence of an efficient and supportive state is risky not only for the individual schools, but also for the system as a whole, insofar as it is threatened by disintegration and disparity.

The effect of school-based management on principals and communities

Two groups are expected to be the main beneficiaries of school-based management as well as the main guarantors of its successful implementation: the senior teachers, especially school principals, on one hand and, on the other, parents and even the wider community. For both groups, the transfer of responsibilities involves challenges.

In many developing countries, only a minority of head-teachers can be properly described as well-trained professionals (Kandasamy and Blaton 2004). Quite a number are simply teachers who have benefited from end-of-career promotion, something which is hardly their fault. If blame needs to be assigned, it lies with central policy-makers whose declarations have not been accompanied by sufficient measures to strengthen the position of head teachers. In most countries, selection and recruitment practices have not changed, capacity-building initiatives cover few staff, and professional development opportunities remain scarce. Head-teachers, especially in the more remote schools, are often isolated and receive little or no support from the administration. In many countries, the incentives to become or remain a head-teacher are decreasing rather than increasing. The feebleness of reforms results in a wide discrepancy between the present profile of the head-teacher, which has undergone very little change, and the ideal profile of an innovative pedagogical leader and a proactive manager.

School-based management has, in several cases, made life harder for school principals by increasing their administrative and managerial workload to the detriment of their role as pedagogical leaders. It is wrong to presume that school staff and especially principals are always ready and willing to undertake reform. There is already much demand on their time and, as a result, only a "relatively small proportion of a school staff's total energies are available for improvement purposes"(Leithwood and Menzies 1998a: 280). This factor is important in both developing and developed countries. In addition, many management-related decisions, especially financing and staffing issues, are intricate and complex. Studies covering four OECD countries found that "principals were troubled by ethical dilemmas in all four countries and some reported an increase in the frequency with which they were confronted with difficult decisions in recent years" (Dempster 2000: 51). This combination of a heavier workload and increased stress has led to a drought of candidate principals in an increasing number of countries (Whitaker 2003; Williams 2003).

There is also the issue of gender. While the teaching profession is becoming increasingly feminised, the position of head-teacher remains male-dominated in many countries. This provokes the question of what impact school-based management is likely to have on the prevalence of women as head-teachers. It is a question that has received little attention so far, particularly in developing countries. Little empirical information is thus available, but two contrasting hypotheses can be proposed. On one hand, a successful leader in a school with SBM will need to be supportive and collegial, with a willingness to negotiate, so as to bring all teachers along on the road to reform. This may describe the type of leadership that women are generally more comfortable with (Limerick and Anderson 1999: 407). On the other hand, increased pressure, especially in terms of time, may render it more difficult for women who also have domestic responsibilities to occupy such posts.

With regard to the community, it evidently occupies a central place in school-based management through local involvement in the school board or council. The precise powers of these boards differ: At one extreme, in New Zealand or in some states in Australia, they play an important role in principal and teacher recruitment, in major budgetary decisions and in extra-curricular affairs; at the other extreme, some boards are merely treated as cash cows for enterprising principals or school boards. Whatever the case may be, getting a community involved in school life is not an easy matter, and the problem is not simply one of capacities. In communities with many social and political tensions, the school board has, in some instances, become an instrument in the hands of the elite to build up its power, leading to greater inequities. Evidence from New Zealand and Australia shows the under-representation of minority groups in the composition of some school boards (Fergusson 1998).

A related concern is the lack of transparency, especially in the use of funds at school level by the principal and the board. Recently completed research by the International Institute for Educational Planning (IIEP) on school functioning in the context of decentralisation in West Africa shows that parents and teachers have nearly no knowledge of or control over the use of the fees which they pay for their children's schooling. In a context where accountability to the local and to the central level is weak, it is doubtful that school-based management leads to better use of funds. The lack of transparency is in many cases an expression of the monopolisation of power at the local level, and decentralising funds to that level can, in such a case, strengthen that monopoly (Lugaz and De Grauwe, forthcoming).

Indeed, the effectiveness of school-based management depends greatly on the accountability that the school feels towards the community as well as pressure that the same community can exercise on the school. For the community to play that role, four requirements should be met, as identified by Lawler (1986): knowledge and skill, power, information, and rewards. This is hardly the case in many communities, which puts in doubt one of the main arguments of the advocates of school-based management: that it will create a stronger accountability framework than the centralised management system.

Another concern is that the interests of the stakeholders at school level do not always coincide. Policies such as putting school budgets in the hands of the communities (for instance, in some Indian districts and in EDUCO schools in El Salvador) gain little sympathy among school staff; and, although strengthening in-school supervision may be popular among head-teachers, it is less so among teachers. Conflicts have arisen between teachers and principals about the use of funds and the evaluation of performance, with an adverse impact on the collegial relationships necessary for a quality school. Leithwood and Menzies (1998a: 276) claim that "the single biggest hurdle to developing an effective school council is interpersonal conflict of one sort of another".

There is a wider concern, more political in character, which sees school-based management as part of a policy allowing parents to choose schools, thereby promoting competition between schools. It is hoped that such competition will lead to greater diversity and quality in education. The well-known position behind this belief is that of 'market efficiency'; that is, that allowing the free market to operate is the most efficient way to obtain best value for public money. It is not the purpose of this article to enter in depth into this complex and extensive ideological debate. Three points of particular relevance to developing countries, however, are worth mentioning:

- This argument is of little relevance to the most disadvantaged population groups, who, due to shortages of schools and lack of finances, have little if any choice between schools;
- Such competition, where it exists, has in many cases been to the detriment of equity: Schools need to improve through collaboration rather than competition;
- the fear is not fully unfounded that school-based management forms part of a "fundamental shift which is moving the concept of education as a public good inexorably towards a view of education as a private good" (Dempster 2000: 53).

These arguments, however, should not lead to a rejection of all reform and automatic preservation of the status quo. The reform of education as a public service should not be seen as contrary to its preservation, but as a strategy to strengthen it and to create greater commitment to that public good.

The impact of school-based management on quality

It is hardly surprising, considering the variety in contexts, in policies and in implementation strategies combined with ideological differences, that contrasting opinions exist on the impact of school-based management on the quality of schools. One of the most comprehensive overviews, by Leithwood and Menzies (1998a), examined 83 empirical studies on school-based management and arrived at the following conclusion: "There is virtually no firm, research-based knowledge about the direct or indirect effects of school-based management on students ... the little research-based evidence that does exist suggest that the effects on students are just as likely to be negative as positive."

An earlier review by Fullan (1993) arrived at the same conclusion. Caldwell (1998: 14), one of the architects of school self-management reforms in much of Australia, expresses a similar opinion: "There is also no doubt that evidence of a direct cause-and-effect relationship between self-management and improved outcomes is minimal. This is understandable given that few initiatives in self-management have been linked in a systematic way to what occurs in classrooms."

It should be kept in mind that school-based management has seldom been introduced as a measure to directly improve the quality of teaching and learning. Rather, it is expected that certain interventions which school-based management promotes or offers space for – such as planning, monitoring and communication – lead to an improvement in results. Experiences from different countries seem to confirm this. Gaziel (1998) concludes from a study of Israeli schools that greater school autonomy has a positive impact on teacher motivation and commitment and on the school's achievement orientation. In the United Kingdom and New Zealand, the increased decision-making power of principals has allowed them to introduce innovative programmes and practices (Williams 1997). Geoff Spring, the architect of reforms in South Australia and Victoria, claims that school-based management has led to higher student achievement. It is unclear, however, how far this has been caused by management reform or by accompanying pedagogical interventions, such as the setting up of self-help networks of schools and greater use of the internet (De Grauwe 1999).

A study of Nicaragua (King and Ozler 1998) has shown that autonomous schools, most of which cater for deprived areas, may produce results that are as good as those from other schools. This positive finding is related to their relative autonomy in staff selection and staff monitoring. A well-known and regularly quoted example is that of the EDUCO schools in El Salvador, where communities have received significant authority over schools, including in financial and staffing areas. An early evaluation of the programme found that enhanced community and parental involvement in EDUCO schools has improved students' language skills and diminished student absenteeism, which may have long-term effects on achievement (Jimenez and Sawada 1998). The results of the OECD's Programme for International Student Assessment (PISA) in 2000 (OECD 2004: 7) suggest that

> in those countries in which principals report, on average, a higher degree of school autonomy with regard to choice of courses, the average performance in reading

> literacy tends to be significantly higher. The picture is similar, though less pronounced, for other aspects of school autonomy, including the relationship between mean performance and the degree of school autonomy in budget allocation.

The same summary of PISA results, however, warns that "this finding cannot, of course, be interpreted in a causal sense as, for example, school autonomy and performance could well be mutually reinforcing or influenced by other factors". The research by Gaziel (1998) on Israel also tempers any enthusiasm about school-based management it might have contributed to by emphasising that only 4% of the variance in effectiveness between autonomous and non-autonomous schools could be explained by school-based management variables. Studies of contexts as different as New Zealand (Williams 1997) and French-speaking West Africa (Lugaz and De Grauwe, forthcoming) found that, in general, greater school autonomy in management has led to very little change in pedagogical practices. School boards are generally more interested in decisions related to financing than in those related to teaching. Their involvement in staffing issues often leads – and this is especially the case in West Africa – to the selection of less-competent but better-connected staff. On the other hand, teachers' involvement in school planning and management remains very limited, and they tend to have little knowledge of financing issues. In such cases, school-based management may even have a negative impact on school results.

A series of case-studies of successful schools undertaken in seven Asian countries by the Asian Network of Training and Research Institutions in Educational Planning did not identify school autonomy as an issue of great importance to school principals (Sujatha, forthcoming). The fact that most decisions remain strongly under the control of the central authorities is of little worry to them. They generally do not demand a say in issues relating to pedagogy – the curriculum, the language, even the school calendar and the daily timetable. At the same time, however, it is clear that they do take a number of other initiatives related to the internal organisation of the school, relations with the community, disciplining of students, teacher motivation, and the use of assessment results to improve quality. However, their autonomy in regard to these issues is not dependent on the school's status; almost every head-teacher, even in the most centralised systems, has some control over those factors.

Ensuring that school-based management improves quality

The question therefore becomes: What strategies and interventions need to accompany the introduction of school-based management so that quality is improved? It is worth emphasising that certain pre-conditions must be met if school-based management is to be feasible: Schools need to have a minimum of resources and competent teachers. Schools in which the principal has no management training whatsoever, in which the teachers have few teaching materials, and where the surrounding community is extremely poor with little expertise in education can hardly be expected to enthusiastically adopt strategic planning and self-evaluation. Where teachers are recognised professionals, benefiting from the accompanying status, privileges and working conditions, decentralisation, especially to the school level, makes much more sense. However, even a well-functioning school cannot go it alone immediately. Geoff Spring, based on his experience in Australia, stresses that it is a big mistake to remove the old structure of support too early (De Grauwe 1999). This is even more the case with 'weaker' schools, which probably need support more than autonomy.

It has already been highlighted that policy changes to support the greater role and increased workload of the school leadership have been generally lacking. Indeed, there is an urgent need to develop an integrated policy at central level explicitly aiming to improve school management and strengthen the role of the head-teacher. Such a policy should, among other things:

- Clarify areas of autonomy and levels of accountability so that head teachers feel strengthened rather than overburdened;
- Accompany autonomy and accountability with a strong and consistent support system, especially for new or isolated head teachers;
- Improve recruitment and selection procedures, for instance, by identifying potential head-teachers and developing a system of mentoring by selected practising head-teachers;
- Develop a motivating career path by offering professional development opportunities and strengthening in-service training;
- Set up a mutual support system and discussion forum for head-teachers.

Various elements of this policy are already in place in some countries. In Korea, recruitment patterns have been changed in order to attract younger candidates, and plans have been made to allow some school communities a voice in the selection of head-teachers. In Sri Lanka, a school-based management policy has redefined the responsibilities of different levels of educational management, including the school principals. In Malaysia, a system of early identification of promising future head-teachers was recently developed. Before occupying its posts, the staff is given training, including mentoring by practising head-teachers (Kandasamy and Bloaton 2004).

Schools need information on their performance through a series of indicators that allow them to compare their own evolution and progress, or lack of it, with that of other schools locally, within a district or within the nation as a whole. This helps them identify their strengths, weaknesses and priorities as well as prepare a school development plan. Providing such information may not, however, be sufficient. In some cases, informing schools that they are doing poorly has only had a further demotivating effect on the staff (Kellaghan and Greaney 2001). Such information needs to be accompanied by capacity-building in data analysis in addition to support for improvement strategies. The role of the local and district education authorities is also crucial.

Increasing a school's autonomy does not, of course, imply that local education authorities no longer have a role to play. The opposite is true in many cases. Autonomous schools need more support, which in turn places new demands on local education authorities. They need to have access to quality information on schools so as to know who needs help most and what type of support will be useful. The role of local authorities will be transformed by the widespread application of school-based management: in basic terms, from enforcer of official rules to supporter of innovation and initiative – in other words, from the role of supervisor to that of advisor. Fullan and Watson (2000) consider the establishment of such a support infrastructure the most important factor in the success of school-based management. The OECD (2004: 5), citing the results of the PISA 2000 study, also stresses this issue: "Raising performance levels therefore critically relies on effective support systems, either located at individual school levels or in specialised support institutions, which provide professional advice and assistance to teachers and school management."

Various models are used by different countries or projects to achieve this. In Queensland, Australia, the "regional structure was replaced by a district structure whose main functions were not bureaucratic duplication of central office activities, but rather assisting schools in improving student outcomes" (Lingard et al. 2002: 19). In other words, the existing structure was adapted in two ways: Its focus became one of support rather than control; and the distance between the school and the support office became smaller. A somewhat similar structure was set up in the United States in New Jersey called the School Review and Improvement Team. Its tasks go somewhat further to include (Walker 2002: 12)

> Working with the district and the principals to ensure the effective implementation of whole school reform and school-based management; consulting with the school management teams to ensure that all of the SMT responsibilities are effectively fulfilled; serving as liaisons between the schools and the Whole School Reform Model developers, and consulting with the superintendents on the transfer or removal of teachers and principals.

Discussions with a large number of schools in New Jersey, however, showed quite some dissatisfaction with these teams, linked to the fact that they were not sufficiently focussed on support and that the team facilitators lacked the necessary experience and knowledge of the change process. Three main points are, then, worth stressing in relation to school support structures.

Firstly, setting up a support structure is not a simple matter. One can use the existing structures and attempt to transform them, but in many cases the culture of the existing structure will be hard to transform. The alternative is to set up a new structure, as Morocco, for example, is attempting to do with the creation of *Groupes d'Appui Pédagogique* (Yekhlef and Tazi, forthcoming). This, however, might lead to another problem: conflict and incoherence between these new functionaries and the 'traditional' supervisors.

Secondly, it is difficult to find the correct balance between support and control, between offering advice and enforcing accountability. A system which is overly focussed on accountability might have a detrimental impact on poorly performing schools, which will no doubt be told that they are doing a poor job, but perhaps not given advice on how to improve. Fullan and Watson (2000: 459) described the difficulty of creating a balanced support structure:

> No external formal accountability system can have an impact in the long run unless it has a capacity-building philosophy. While this is the foremost primary goal, the external accountability system must also have the responsibility to intervene in persistently failing situations. Balancing accountability support and accountability intervention is obviously a tough call, but this is precisely how sophisticated the external infrastructure must become.

Finding the balance between support and control depends partly on the quality of the schools and the resources available within the school. Arguably, the transposition of the concept of school evaluation from the developed countries, within a context of a demand for greater public accountability, to developing countries and under-resourced schools can have adverse effects: The school evaluation strategy which is being promoted is generally not appropriate to such schools. They need genuine support, not simply pressure.

The third factor to consider in relation to support structures is that support will only be significant and lead to sustainable capacities when it is regular and consistent. That implies that in many countries it cannot be offered to all schools because resources do not permit it. A good argument can be made that support should be extended first of all to the schools most in need of it. This is the principle which has inspired the major reform of the school supervision system in Chile and which has had a positive impact on individual schools and on disparities between schools (Navarro 2002).

We can also refer to a project in Sri Lanka which has taken up the challenge of improving the teaching and learning processes in 'disadvantaged' schools by squarely aiming at changing the school culture, and, as a matter of priority, the attitudes of the principal and the teachers (Perera 1997). A team of specially trained facilitators works for two years with a group of disadvantaged schools. A facilitator visits each school nearly every month for a full day's workshop with the staff. The focus is on finding, together with the staff, the strengths and weaknesses of the school and how to improve its functioning. In between the workshops, each member of staff is involved in an improvement programme and notes in an activity book the work undertaken and the problems encountered. At the same time, the schools, which work in an environment of great scarcity, are given some extra resources, partly to strengthen their motivation. The programme's impact has been positive, but it has so far failed to transform the overall organisation of the school supervision service in Sri Lanka.

Not only district but also central authorities will continue to play a core role, especially in monitoring the performance of schools and of local authorities with a particular view to redressing disparities. School-based management carries an evident equity risk: Where schools are allowed to select teachers and where parents are given the right to select schools, it does not take long before the most interested parents and the best teachers choose and are chosen by the 'best' schools. The needs of an individual school then come into conflict with those of the system as a whole. Monitoring should therefore cover both quality and equity. The task of monitoring consists of the construction of an information base, as mentioned above, the analysis of this information and the definition of actions to be taken in response to the problems or weaknesses identified. Analysing the information demands the definition of norms, standards or objectives, which might be administrative in character (e.g., pupil/teacher ratios) or pedagogical (e.g., minimum levels of learning). The action to be taken can take the form of sanctions, of rewards or of support and guidance.

An essential point is that schools and teachers will need capacity-building if school-based management is to work. This needs to involve more than just training; it must include positive working conditions, incentives and the creation of motivating posts. Ideally, different services aiming at raising standards in the classroom need to be co-ordinated and integrated into a general school support programme. Teacher pre- and in-service training, teacher support, and supervision could be organised around networks of schools, where a cluster of actors work together to strengthen schools' capacities. In a number of coun-tries, Senegal being one example, in the absence of cluster support organised from above, school directors have taken the initiative to set up such school groupings and offer each other regular advice through school visits and seminars, to which all schools contribute (Lugaz and De Grauwe, forthcoming).

These various arguments concerning the need to develop supportive strategies to accompany school-based management lead to a seemingly more evident, yet in practice quite complex, issue: Not all schools have equal capacities. This means that each school needs to be treated as an individual institute. The level of autonomy that can be offered to a school should reflect this issue. In other words, it is necessary to develop a flexible policy which grants autonomy based on a school's strengths and needs. Briggs and Wohlstetter (2003: 369) propose making a distinction between the highest-performing schools who "earn the privilege of local autonomy"; lower-performing schools who "receive little autonomy until they can demonstrate capacity to bring about improvements" and can count on technical assistance and coaching from the district; and medium-performing schools, who receive less assistance from the districts, but are "organised into networks for mutual support''. Such a policy of flexible decentralisation exists already in South Africa, where schools can opt for different levels of autonomy, depending on their internal strengths and resources.

Conclusion

The conclusion of this study is not that school-based management is a policy without value to developing societies, nor that it does not carry any promise for quality improvement. Rather its implementation will need to be accompanied by strategies to build capacities of schools, head-teachers and communities, motivated by a clear focus on quality improvement and a concern for equity. What is needed perhaps more than school-based management is a system of management oriented on school support.

Notes

1. An earlier version of this paper was prepared as a background document for the EFA Global Monitoring Report 2004/05.

References

Abu Duhou, Ibtisam. 1999. *School-based Management*. Paris: IIEP/UNESCO.

Briggs, Kerri L., and Priscilla Wohlstetter. 2003. Key Elements of a Successful School-based Management Strategy. *School Effectiveness and School Improvement* 14(3): 351–372.

Caldwell, Brian. 1994. School-based Management. In: *International Encyclopedia of Education*, ed. by Torsten Husén and T. Neville Postlethwaite, 5302–5308. Oxford: Pergamon.

———. 1998. *Self-managing Schools and Improved Learning Outcomes*. Canberra: Department of Employment, Education, Training and Youth Affairs.

Carron, Gabriel, and Ta Ngoc Chaû. 1996. *The Quality of Primary Schools in Different Development Contexts*. Paris: IIEP/UNESCO.

Dalin, Per. 1994. *How Schools Improve: An International Report*. London: Cassell.

De Grauwe, Anton. 1999. The Challenges for the School of the Future. *IIEP Newsletter* 17(4): 10–11.

———. 2003. Les Réformes des Services d'Inspection: Modèles et Idéologies. *Revue Française de Pédagogie* 145: 5–20.

Dempster, Neil. 2000. Guilty or Not: The Impact and Effects of Site-based Management on Schools. *Journal of Educational Administration* 38(1): 47–65.

Dimmock, Clive. 1993. *School-based Management and School Effectiveness*. London: Routledge.

Fergusson, Val. 1998. *Supervision for the Self-managing School: The New Zealand Experience*. Paris: IIEP/UNESCO.

Fitzgerald, Tanya, Howard Youngs, and Peter Grootenbroer. 2003. Bureaucratic Control or Professional Autonomy? Performance Management in New Zealand Schools. *School Leadership and Management* 23(1): 91–105.

Fullan, Michael. 1993. *Change Forces: Probing the Depths of Educational Reform*. Bristol, PA: Falmer.

Fullan, Michael, and Nancy Watson. 2000. School-based Management: Re-conceptualising to Improve Learning Outcome. *School Effectiveness and School Improvement* 11(4): 453–473.

Gaziel, Haim. 1998. School-based Management as a Factor in School Effectiveness. *International Review of Education* 44(4): 319–333.

Heneveld, Ward, and Helen Craig. 1996. *Schools Count: World Bank Project Designs and the Quality of Primary Education in Sub-Saharan Africa*. Washington, DC: World Bank.

Jimenez, Emmanuel, and Yasuyuki Sawada. 1998. *Do Community-managed Schools Work? An Evaluation of El Salvador's EDUCO Program*. Washington, DC: World Bank.

Kandasamy, Maheswari, and Lia Blaton. 2004. *School Principals: Core Actors in Educational Improvement*. Paris: The Asian Network of Training and Research Institutions in Educational Planning (ANTRIEP) Report. Paris: IIEP.

Kellaghan, Thomas, and Vincent Greaney. 2001. *Using Assessment to Improve the Quality of Education*. Paris: IIEP.

King, Elizabeth, and Berk Ozler 1998. *What's Decentralization Got to Do with Learning? The Case of Nicaragua's School Autonomy Reform*. Washington, DC: World Bank.

Lawler, Edward. 1986. *High Involvement Management*. San Francisco: Jossey-Bass.

Leithwood, Keith, and Teresa Menzies. 1998a. A Review of Research Concerning the Implementation of Site-based Management. *School Effectiveness and School Improvement* 9(33): 233–285.

———. 1998b. Forms and Effects of School-based Management: A Review. *Educational Policy* 12(3): 325–347.

Limerick, Brigid, and Cheryl Anderson. 1999. Female Administrators and School-based Management: New Models in an Era of Change? *Education Management and Administration* 27(4): 401–414.

Lingard, Bob, Dabra Hayes, and Martin Mills. 2002. Development in School-based Management: The Specific Case of Queensland, Australia. *Journal of Educational Administration* 40(1): 6–30.

Lugaz, Candy, and Anton De Grauwe. Forthcoming. *Améliorer l'école dans un Contexte de Décentralisation: Les Expériences en Afrique de l'Ouest*. Paris: IIEP/UNESCO.

McGinn, Noel, and Thomas Welsh 1999. *Decentralization of Education: Why, When, What and How?* Paris: IIEP/UNESCO.

Navarro, Luis. 2002. *La Supervisión Técnico-pedagógica en Chile* [Pedagogical supervision in Chile]. Paris: IIEP/UNESCO.

OECD. 2004. *Raising the Quality of Educational Performance at School*. Paris: OECD.

Perera, Wilfred. 1997. *Changing Schools from Within: A Management Intervention for Improving School Functioning in Sri Lanka*. Paris: IIEP/UNESCO.

Poulson, Louise. 1998. Accountability, Teacher Professionalism and Education Reform in England. *Teacher Development* 2(3): 419–432.

Robertson Peter J., and Kerri L. Briggs. 1998. Improving Schools through School-based Management: An Examination of the Process of Change. *School Effectiveness and School Improvement* 9(1): 28–57.

Sujatha, K. Forthcoming. *Improving School Management: Learning from Successful Schools in Asia. A Report of the Asian Network of Training and Research Institutions in Educational Planning*. Paris: IIEP/UNESCO.

Teddlie, Charles. 2003. [Review of:] Improving Schools through Teacher Development: Case Studies of the Aga Kahn Foundation Projects in East Africa. *School Effectiveness and School Improvement* 14(2): 233–245.

Walker, Elaine M. 2002. The Politics of School-based Management: Understanding the Process of Devolving Authority in Urban School Districts. *Education Policy Analysis* Archives 10(33). Http://epaa.asu/epaa/v10n33.html, accessed 23 June 2004.

Whitaker, Kathryn. 2003. Principal Role Changes and Influence on Principal Recruitment and Selection: An International Perspective. *Journal of Educational Administration* 41(1): 37–54.

Williams, Richard C. 1997. Sweeping Decentralization of Educational Decision-making Authority: Lessons from England and New Zealand. *Phi Delta Kappan* 78(8): 626–631.

Williams, T. R. 2003. Ontario's Principal Scarcity: Yesterday's Abdicated Policy Responsibility – Today's Unrecognized Challenge. *Australian Journal of Education* 47(2): 159–171.

Yekhlef, Amina, and Malak Tazi. Forthcoming. *Réformer l'Inspection dans le Contexte de la Décentralisation. La Mise en Place des GRAP au Maroc*. Paris: UNESCO/IIEP.

The author

Anton De Grauwe is a Programme Specialist at the UNESCO International Institute for Educational Planning (IIEP). Prior to joining IIEP, he worked in the Caribbean as a secondary school teacher and at the UNESCO regional office in Dakar as Assistant Programme Specialist. He holds an M.Sc. in Social Planning from the London School of Economics and is currently completing a Ph.D. at the Institut d'Études Politiques in Paris. His research interests include basic education in developing countries, school supervision, and decentralisation.

Contact address: International Institute for Educational Planning, 7–9 rue Delacroix, 75116 Paris; France. E-mail: a-de-grauwe@iiep.unesco.org.

8

Does Local School Control Raise Student Outcomes? Evidence on the Roles of School Autonomy and Parental Participation

VICTORIA GUNNARSSON
World Bank

PETER F. ORAZEM
Iowa State University

MARIO A. SÁNCHEZ and AIMEE VERDISCO
Inter-American Development Bank

> All around the world in matters of governance decentralization is the rage. (Bardhan 2005)

As early as 1962, international agencies such as the United Nations and the World Bank were advising that the decentralization of public service delivery could serve as a development strategy. The strategy has become even more prominent over the past 15 years, particularly in education.[1] Decentralization efforts in developed countries include various programs in Australia, Canada, New Zealand, Spain, the United Kingdom, and in at least 44 states in the United States. Among the developing countries, Burkina Faso, Brazil, Chile, Colombia, El Salvador, Honduras, India, and Nicaragua have introduced new programs aimed at devolving power to the local schools. Even the autocratic government in Pakistan initiated an effort to devolve responsibility for school management to local authorities, removing a functioning democracy as a necessary precondition for school decentralization.

The move toward more local control is motivated by the belief that de-

Elizabeth King, Guilherme Sedlacek, and the referees provided numerous helpful comments and suggestions. This research benefited from research support provided by the Inter-American Development Bank. The findings, interpretations, and conclusions are the authors' own and should not be attributed to the World Bank or the Inter-American Development Bank, their boards of directors, or any of their member countries.

[1] See Fiske (1996), Bird and Vaillancourt (1998), Walker (2002), and Bray and Mukundan (2003) for reviews of the progress of efforts to decentralize educational service delivery.

 0013-0079/2009/5801-0002$10.00

centralized control will result in better school outcomes, holding constant the level of resources devoted to the school. Local decision makers should have more information on local needs and conditions and can adjust resource allocations accordingly. Central dictates that are aimed at maximizing welfare on average may oversupply the service in some areas and undersupply it in others. Local officials should respond better to local needs because they are more exposed to pressure from constituents and because they may use quality public services to attract or retain residents.

Evidence from various countries suggests that decentralized decisions change how resources are allocated. Faguet (2004) found that when Bolivia devolved authority from the center to the municipal level, resources were reallocated away from large-scale projects to smaller education and sanitation projects and from richer to poorer communities. Galasso and Ravallion (2005) found that when local community groups were allowed to identify beneficiaries in a Bangladesh food-transfer program, the benefits were better targeted to poorer households. Alderman (2001) reported better targeting from decentralized transfer programs in Albania.

While studies suggest that decentralized authority can alter resource allocations and improve targeting to the needy, there is less evidence that desired outcomes are enhanced by local control. In the case of schooling outcomes, even the most supportive studies tend to argue that decentralization helps some schools but not others. There are numerous reasons why local control may yield poor outcomes. Bardhan (2002, 2005) argues that autonomous decisions are particularly prone to fail in developing countries. First, populations may not be mobile, so households may not move because of poor-quality public services. Second, local officials may be subjected to undue influence by prominent local families seeking to divert public resources toward their private needs. A related problem is that there may be no tradition of monitoring of local officials by local residents, so presumptions of greater accountability with local control may not hold in fact. Finally, local officials may lack the necessary experience or skills to manage resources in countries with few well-educated professionals. Any of these problems could create difficulties for decentralized school systems.

This study examines how local control of schools affects student outcomes across eight Latin American countries. We focus on one possible reason for previous mixed findings regarding the impact of school autonomy and/or community participation on learning: that local managerial effort is itself a choice. Any effort to devolve authority to the local school level will require that local school principals, teachers, parents, or community leaders choose to exert effort to manage the school. This endogeneity of local school managerial effort complicates the interpretation of the cross-sectional pattern of learning outcomes and reported school autonomy or local community school participation. We illustrate the problem using a data set composed of individual child achievement test scores for third and fourth graders in eight Latin American countries. Among the findings of this study:

1. School autonomy and parental participation vary more within countries than between countries, suggesting that, in practice, decentralization depends more on local choice than on nationwide decree or legislative fiat.
2. Empirical results confirm that schools in localities with more educated parents and that are more remotely located are more likely to act autonomously, have parental participation, and provide adequate school supplies. National policies mandating central control moderate but do not eliminate these tendencies.
3. Schools that practice autonomous decision making do not generate superior test scores. However, better equipped schools, and schools with more involved parents, have better school outcomes. When school resource and parental participation are treated as endogenous, their effects become even more strongly positive and significant.
4. Taken as a whole, the study suggests that devolution of power to local schools cannot be accomplished by central mandates alone but must take into account local incentives to manage schools.

I. Background

In Latin America, as in many of the developing regions of the world, efforts to encourage school autonomy and/or community participation are aimed at making schools more productive. These efforts have taken numerous forms, including downsizing the central educational bureaucracy and modifying its functions, moving authority and responsibility to local levels of government, introducing school-based management and community-based school financing, initiating performance-based financing schemes, deregulating the choice of school books and materials, and expanding school choice through vouchers, charter schools, or open enrollment programs.[2] There is also considerable variation in the person or persons given responsibility for decision making at the school level (Espínola 2001). The local decision maker could be the principal, teachers, parents, members of the community, or some combination of the four. The range of local decisions and responsibilities also varies between curriculum planning, setting

[2] For background on these programs, see Lauglo (1995), Bird and Vaillancourt (1998), Whitty, Power, and Halpin (1998), McEwan and Carnoy (2000), and Peterson and Campbell (2001).

academic standards, evaluating students, choosing school materials, maintaining the school, and hiring and evaluating personnel.

In this study, we abstract from the particular mechanism used to affect decentralization. We concentrate instead on the degree to which two types of local authority are employed to run the school. The first, school autonomy, is taken as the power accorded the local school administration to make school-management decisions. The second, community participation, is taken as the power accorded the local parents and/or community members to affect those same decisions. Our aim is to measure the impact of these two loci of control on student outcomes.

The responsibility for school management rests with the central governments in some countries, regional authorities in others, and local authorities in the rest. Many countries allocate a subset of these decisions to each of these levels (OECD 1998, 2000; Walker 2002; Winkler and Gershberg 2002). A summary of the government level holding legal responsibility for various school-management functions in various Latin American countries is presented in table 1 (PREAL 2002).[3] There are substantial differences across countries in how decisions are made regarding teacher hiring, evaluation, and compensation. In Argentina and Peru, hiring promotion and salary decisions are made at the state or provincial level, while in Bolivia and the Dominican Republic, it is the national authorities that manage personnel matters. In Brazil, Chile, Colombia, and Honduras, teachers are hired at the state, municipal, or even school level, but salaries are set at the central level. The loci for decisions regarding school-facility maintenance, buying textbooks, and setting curriculum also vary both between and within countries. Maintenance of facilities and equipment is taken at the municipal or school level in most countries, except in Argentina and Peru, where the semicentral level governs. In Bolivia, the Dominican Republic, and Honduras, the choice of textbooks and curricula is controlled at the national level, while Brazil has devolved these decisions to the state and municipal levels. In Peru, textbooks are selected by families. Overall, the educational systems in Bolivia and the Dominican Republic are highly nationalized; those of Brazil, Chile, and Colombia are more locally managed; and those of Argentina and Peru are somewhere in between.

Several studies have attempted to assess how changes in the locus of school

[3] PREAL based its evaluations on a review of national policies and legislation. The 2002 survey is contemporaneous with our data set, but a more recent update by PREAL showed little change in the locus of control over schools in Latin American countries.

TABLE 1

SUMMARY OF CENTRAL AND LOCAL RESPONSIBILITIES IN EDUCATION

	Hiring Teachers	Hiring Principals	Teacher Promotions	Salaries	Investment	Maintenance	Books	Curriculum
Argentina	Province	Province	Province	Province	Nat'l/Province	Province	Province	Province
Bolivia	National	National	National	National	National	School	National	National
Brazil	State/Municipal	State/Municipal	State/Municipal	State/Municipal	State/Municipal	State/Municipal	State/Municipal	State/Municipal/ School
Chile	Municipal	Municipal	Region	National	Municipal	Municipal	National	National/School
Colombia	Department/ School	Department	Department	National	Municipal	Municipal	Municipal	Department
Dominican Republic	National	National	National	National	National	School	National	National
Honduras	Department/ School	Department	National	National	National	School	National	National
Peru	State	State	State	National	National	State	Families	National

Source. PREAL 2002.

Note. For our measure of the degree of centralized control of schools, we use 3 to indicate national control; 2 for state, provincial, departmental, or municipal control; and 1 for school-level control. When the responsibilities are shared between government levels, the average of the scores was used.

authority have affected schooling outcomes in Latin America.[4] Jimenez and Sawada (1999) found that student attendance and test performance were higher in the EDUCO schools in El Salvador, schools that were managed by local parent committees. Vegas (2002) reports that in Chile, public and private schools that exercise more teacher autonomy and local control have higher test scores. In Argentina, schools that adopted local control earlier in a national decentralization effort appear to have superior student outcomes (Galiani, Gertler, and Schargrodsky 2008). King and Ozler (2005) found that schools that practiced more autonomy in Nicaragua had improved student test scores compared to schools that were not autonomous. At the aggregate level, Lindaman and Thurmaier (2002) found a positive relationship between fiscal decentralization and improvements in national indices of human development. A general conclusion arising from these studies is that reforms that push the locus of decision making toward the school tend to produce improved student performance.

However, the relationship between more autonomy and better learning remains far from universal (Coleman 1990; Hannaway and Carnoy 1993; Savedoff 1998; Finn, Manno, and Vanourek 2001; Reinikka and Svensson 2004). For any of the reasons suggested by Bardhan (2002), local school managers may fail to manage schools as effectively as would central management. However, even in the above-cited studies that report positive average impacts of decentralization on student outcomes, the improved results are not found in all schools. In the EDUCO schools, the positive results are concentrated among the schools with the most active community participation and with better school inputs. In Argentina, the benefits are strongest in the wealthier districts and those that decentralized earliest.[5] In Chile and Nicaragua, it was the schools that reported having more autonomy or parental input that had the better student performance, but not all of the schools that had the legal right or obligation behaved autonomously. In all four country cases, the gains from decentralization come mainly from schools that actually engaged in local school

[4] Our emphasis in this article is on the public school system. There is considerable interest in the use of private school vouchers as a means of decentralizing control of schools, but that process is considerably different from the move toward local control of public schools. Somer, McEwan, and Willms (2004) found that across a sample of 10 Latin American countries, students perform systematically better in private than in public schools, but the effect is driven primarily by differences in peers and, to a lesser extent, socioeconomic status across public and private students. Angrist et al. (2002) and Angrist, Bettinger, and Kremer (2006) demonstrate that in randomized samples in Colombia, students who obtained private school vouchers in a lottery performed better in school and graduated with greater frequency than did the sample of students who did not get the vouchers.

[5] This last comment is a bit misleading, as the reference group in the Galiani et al. (2008) study is the schools that were always decentralized, so the gains from decentralization are measured relative to continually autonomous schools rather than nonautonomous schools.

control (de facto autonomy) and not from all the schools that had the legal authority to manage schools (de jure autonomy).

The contribution of this study is to formally confront the decision by the local authority of whether or not to exercise control over the school. Rather than presuming the local school managerial effort is determined exclusively by legislative fiat, we assume that the local authority can choose how much effort to exert in running the school. As a consequence, the exertion of local authority must be treated as an endogenous variable, and estimates that treat the exercise of local authority as exogenous will be biased.

One example of discretion exercised regarding whether to exert local initiative in school management is the Colombia voucher program. While national in scope, some municipalities opted not to participate. King, Orazem, and Wohlgemuth (1999) demonstrate that municipal decisions regarding whether to participate depended on local fiscal capacity and the size of potential local benefits. Even the experiences of localities in an experimental installation of a decentralization program will reflect a local choice of whether to accept responsibility for the school. Of the EDUCO schools in El Salvador and the *Consejos Directivos* (autonomous school boards) program in Nicaragua, only those electing to manage more intensively (de facto autonomy) as opposed to just signing the contract (de jure or legally scheduled autonomy) had measurable successes. Unclear is whether the success is due to the decentralization or to the local attributes that may have affected willingness to manage.

The next section presents an estimation strategy for measuring the impact of school autonomy and parental participation on schooling outcomes. The data set we use in the estimation is described in Section III. Section IV discusses the empirical findings, and the last section suggests ways that the study could be extended.

II. Estimation Issues

Past studies of school productivity (Glewwe 2002; Glewwe and Kremer 2006) have pointed to child, household, teacher, and school characteristics in explaining school performance. This study adds measures of local control over the school as additional inputs into the educational production function. To be precise, the observed test score for child i in school j in country k can be described by an equation of the form

$$q_{ijk} = f(z_{ijk},\ x_{jk},\ a_{1jk},\ a_{2jk},\ \eta_{ijk}), \tag{1}$$

where q_{ijk} is the ith child's test score; z_{ijk} includes attributes of the child's parents, household, and community; and x_{jk} represents the level of educational materials provided in school j. Local managerial effort in school j is divided into two components: a_{1jk} is the autonomous managerial effort exercised by the school principal, and a_{2jk} is the parental and local community participation in the management of the school. The term is a random error in the child's test score, including, for example, innate ability.

In principle, one could estimate a linearized form of equation (1) using ordinary least squares. However, the principal and the parents will be deciding whether to exert managerial effort in the school, in part, based on their anticipated impacts on school outputs. The level of school inputs will also depend on local provision as well as central distribution of school supplies. As a result, x_{jk}, a_{1jk}, and a_{2jk} are all jointly selected with q_{ijk}. If the parents and school officials make these decisions with knowledge of the children's innate abilities, then least-squares estimation of equation (1) will be biased.

However, we would expect that the jth school in country k makes decisions on x_{jk}, a_{1jk}, and a_{2jk} such that[6]

$$\begin{aligned} x_{jk} &= x(Z_{jk}, A_k, \varepsilon_{xjk}) \\ a_{1jk} &= a_1(Z_{jk}, A_k, \varepsilon_{1jk}) \\ a_{2jk} &= a_2(Z_{jk}, A_k, \varepsilon_{2jk}), \end{aligned} \tag{2}$$

where Z_{jk} is a vector of community-level measures of parent, school, and community attributes that could potentially affect the productivity of the school; A_k is the central authority's rules regulating school authority; and the ε_{ijk} are vectors of random error terms. The empirical work that follows exploits the variation across countries in constitutional authority over school resource allocation in order to identify x_{jk}, a_{1jk}, and a_{2jk} in estimating equation (1). We justify this estimation strategy in greater detail below after we introduce the data set.

III. Data

To investigate the impact of local school management on school outcomes, we use a multicountry survey carried out in 1997 over eight Latin American countries by the Latin American Laboratory of Quality of Education (LLECE). Our sample includes third and fourth graders in Argentina, Bolivia, Brazil,

[6] An earlier version of the study (Gunnarsson et al. 2006) contains a model in which local school authorities decide how much administrative effort to exert in order to maximize the output of the school, given information on the cost of exerting effort. The model yields reduced-form equations consistent with eq. (2).

Chile, Colombia, the Dominican Republic, Honduras, and Peru.[7] The samples were constructed to include public and private schools, and schools in metropolitan, urban, and rural areas. The samples are not strictly proportional, noticeably undersampling rural children in Brazil and Chile and undersampling urban/metro children in the Dominican Republic.[8] We include only the public schools in this analysis, as the private schools would not face the same constraints on local school control.

Children in the selected classrooms were given tests of mathematics and language. The same exam was administered in each country, with the exception that the language exam was in Portuguese in Brazil and Spanish elsewhere. The mathematics exam had a maximum score of 32, and the language exam had a top score of 19. We use the raw exam scores as our measure of child schooling outcomes.

In addition to collecting test scores on sampled children in each school, self-applied questionnaires were given to the school principal, to the teachers, to parents (or legal guardians) of the tested children, and to the children themselves. Table A1 reports the variable definitions and information sources, and table A2 reports the sample statistics for those variables. For apparently random causes, the number of observations for children taking the mathematics and language exams differed, but sample statistics did not differ much between the groups of students taking the two exams.[9]

We should comment on Cuba, a country included in the LLECE database but which we exclude from our analysis. Cuba's children have test scores that averaged about one standard deviation above the mean across the other countries. Carnoy (2007) attributes the Cuban success to a nondemocratic, centrally dictated, and strictly enforced system that removes the ability of local school officials or parents to make choices that could retard a child's academic success. Such a political system is far removed from our maintained hypothesis that local principals or parents decide whether or not to manage the school or

[7] The LLECE also collected data on Costa Rica, Mexico, Paraguay, and Venezuela. The LLECE deleted the data for Costa Rica from their public use sample apparently because the data failed their standards for reliability and comparability. We excluded other countries when they lacked information necessary to estimate the models. Paraguay did not include information on school inputs or parent participation for 90% of the schools. Venezuela and Mexico did not include information on child age, a key variable explaining child performance in school. The Venezuela data also were plagued with missing information, while our Mexico data also did not distinguish between public and private schools.

[8] LLECE (1998) provides a detailed description of the sampling.

[9] Each child was supposed to take both exams, but some took only one. In addition, there were apparently randomly occurring problems with matching test scores to parent, teacher, and school variables.

accept central authority. As Carnoy (2007, 43) summarizes, "the degree of political control inherent in the Cuban state over the past 45 years . . . is far beyond anything but the more extreme versions of social control . . . currently appearing in democratic country political debates."[10]

A. Empirical Definitions of School Autonomy, Community Participation, and School Supplies

The LLECE survey contains multiple measures of the degree of autonomy exercised by the school. Each school principal answered questions regarding the school's authority in hiring staff, allocating the budget, designing curriculum, disciplining and evaluating students, and organizing extracurricular activities.[11] As shown in section A of table 2, schools have the least autonomy in hiring and paying teachers and in allocating budgets, while student promotions and extracurricular activities are more typically controlled by the school. Our measure of school autonomy, a_{1jk}, is the weighted sum of these responses, where the weights were generated by estimating the first principal component of the principals' responses. The first principal component explained 52% of the covariation in the eight responses used in the LLECE sample. All responses entered with positive weights, suggesting that the various indicators of school autonomy are mutually reinforcing. None of the later results we report were sensitive to variation in the factors included in the autonomy measure.

In the top section of table 3, we report the average weighted autonomy score by country. It is useful to see how the practice of school autonomy compares to the legal mandates summarized in table 1. Across these countries, the greatest self-reported autonomy is in Brazil and Colombia, countries with relatively decentralized systems in table 1. The least self-reported autonomy is found in Honduras and the Dominican Republic, two of the more centralized systems.

Parental and community participation, a_{2jk}, is taken as the weighted sum of teacher responses to questions regarding parental participation in the school. As before, the weights are set by principal component analysis. A single factor

[10] There are some peculiarities in the Cuban data that may cause some to question Carnoy's conclusions regarding the source of the Cuban advantage. Whereas the Cuban system is characterized as overwhelmingly authoritarian, it nevertheless has the highest level of self-reported principal autonomy and parental participation of all the countries in the LLECE sample. Either this indicates that the responses to the LLECE questions may be less than candid, or it means that the source of the Cuban advantage cannot be the strict adherence to the dictates of the education minister.

[11] While the questions are not necessarily reflective of the principal's own exercise of authority as opposed to that exercised by the school staff as a whole, it is convenient to refer to the principal as the school manager.

TABLE 2

SUMMARY INFORMATION ON CONSTRUCTION OF MEASURES OF AUTONOMY, PARTICIPATION, AND SCHOOL SHORTAGES

A. Responses used in the creation of the autonomy variable

Asked of principal: With 1 = no autonomy, 2 = some autonomy, and 3 = high autonomy, what degree of autonomy does the school have in:

- Hiring personnel? (1.36; .26)[a]
- Allocating budget? (1.66; .38)
- Choosing textbooks and materials? (2.32; .42)
- Admissions, suspensions or expulsions? (2.36; .29)
- Student promotions? (2.78; .31)
- Setting disciplinary regulations? (2.46; .49)
- Setting curricular priorities? (2.50; .62)
- Planning and executing extracurricular activities? (2.67; .46)

First factor loading using the iterated principal factor method explained 52% of the covariation across the eight autonomy indicators.

B. Responses used in the creation of the participation variable

Asked of the teacher: With 1 = low, 2 = medium, and 3 = high, what is the level of parental participation in:

- School activities? (1.80; .65)[a]
- Interest in the child's development? (1.69; .65)

First-factor loading using the iterated principal factor method explained 99% of the covariation across the three participation indicators.

C. Responses used in the creation of the shortage variable

Asked of the teacher: With 1= adequate and 2 = inadequate; what is the level of:

- Classroom lighting? (1.31; .48)[a]
- Classroom temperature? (1.49; .38)
- Classroom hygiene? (1.26; .49)
- Classroom security? (1.42; .59)
- Classroom acoustics? (1.54; .38)

Asked of the teacher: With 0 = yes and 1 = no, do the students have:

- Language textbooks? (.22; .45)
- Math textbooks? (.45; .50)

Asked of the teacher: With 0 = yes and 1 = no, are there enough textbooks so that the students have:

- One textbook each? (.57; .43)

First-factor loading using the iterated principal factor method explained 54% of the covariation across the eight inadequacy indicators.

D. Correlation between aggregate autonomy, participation, and shortage measures

	Autonomy	Participation	Shortage
Autonomy	1.00		
Participation	.06	1.00	
Shortage	−.13	−.21	1.00

E. ANOVA Evaluation of autonomy, participation, and shortage variables

ANOVA analysis of autonomy:

- 91% of the variation in autonomy is within country
- 9% of the variation in autonomy is across countries

ANOVA analysis of participation:

- 94% of the variation in participation is within country
- 6% of the variation in participation is across countries

ANOVA analysis of inadequacy:

- 74% of the variation in shortage is within countries
- 26% of the variation in shortage is across countries

[a] Average value and factor loading in parentheses for the mathematics sample.

TABLE 3

COUNTRY-LEVEL MEANS AND REGRESSION COEFFICIENTS FOR AUTONOMY, PARTICIPATION, AND SHORTAGE

	Argentina	Bolivia	Brazil	Chile	Colombia	Dominican Republic	Honduras	Peru
Means:[a]								
Autonomy	7.19	7.44	7.86	7.30	7.96	7.05	7.04	7.35
Participation	2.32	2.03	2.19	2.29	2.50	2.50	2.12	2.14
Shortage	3.70	4.54	3.19	3.20	3.82	4.18	3.47	4.21
Coefficients:[b]								
Mathematics:								
Autonomy	.362	−.013	.738**	−.041	−.541	.784	.009	.639**
Participation	.939*	.648	.520*	.420	−.201	−1.062	−3.395	.809*
Shortage	−.964**	−.277	.025	.073	−.418	.701	−.512	.340
Language:								
Autonomy	.023	.086	.139	.086	−.342	1.057**	−.959**	.238
Participation	.492**	.394	.221	.802**	.589**	−.384	−.591*	.394
Shortage	−.174	−.402	.191	.398*	−.113	.761**	.063	−.125

[a] Country average of school-level measures of the school autonomy, parental participation, and inadequacy of school-supplies variables defined in table 2.

[b] Coefficients from country-level regressions comparable to the least-squares specification used in table 5 that treat autonomy, participation, and shortage as exogenous. We reject the null hypothesis that coefficients are equal across countries.

* Indicates significance at the .10 level.

** Indicates significance at the .05 level.

loading captures virtually all the covariation in the responses, as can be seen in section B of table 2. It is harder to relate parental participation to the constitutionally set locus of control in table 1. The two countries with the greatest parental participation, Colombia and the Dominican Republic, are at opposite ends of the range of legal centralization.

A weighted sum of teacher responses to questions regarding the inadequacy of the quantity or quality of school supplies is used as an inverse measure of x_{jk}. Teachers were asked to indicate whether various facilities and academic materials were insufficient for academic purposes. Section C of table 2 lists the indicators of school facilities and materials. The first principal component explained 54% of the covariation across the eight instruments used. As with the other aggregations, all the factor loadings were positive, indicating that shortages in one area typically were accompanied by inadequacies in the other school materials and facilities. The most widespread shortages were the lack of sufficient textbooks per student. Over 40% of teachers also complained about classroom temperature and poor acoustics. Shortages are reported most frequently in the most centralized system, Bolivia, and the fewest shortages are reported in the least centralized systems, such as Brazil and Chile.

Our use of factor analysis to combine measures is somewhat unusual in the economics literature, although it is more commonly employed by other social science researchers. Our use of these combined measures of school management and inputs rather than each individual subcomponent is justified on both pragmatic and statistical grounds. First, when there are multiple measures of the same conceptual variable, each subject to random error, averaged values of the measures are more reliable than are any single measure. This is particularly important in our setting where there is no single agreed-upon measure of school autonomy or community participation in the literature. Second, as we saw above, there is a high degree of correlation among the various individual measures of these conceptual variables. Using many coefficients to represent the impact of a single conceptual variable, say school quality, spreads the quality effect across many potentially imprecisely estimated coefficients. Concentrating the impact into a single metric aids both precision and interpretability.[12] Finally, on pragmatic grounds, we do not have enough instruments to separately identify multiple measures of school autonomy, participation, and input sufficiency.

[12] The practice of estimating educational production functions with numerous measures of school quality included as regressors has yielded few consistent results across studies. Multicollinearity and endogeneity are two of the main problems confronting this literature. See Glewwe and Kremer (2006) for a recent discussion of the findings from educational production functions in developing countries.

B. Stylized Facts regarding Autonomy, Participation, and Shortage

School autonomy and community participation are different. One might presume that schools with greater autonomy on personnel, curricular, or disciplinary matters would also have more parental or community participation in the school. However, in our sample, the two measures of local effort are virtually independent. The simple correlation between the two measures across countries is only weakly positive (sec. D in table 2). While it is possible that other measures of parental participation would be more strongly tied to school autonomy,[13] parental participation and school autonomy are clearly unique empirical constructs in our analysis.

The exercise of local autonomy is a choice only weakly driven by constitutionally assigned school responsibilities. We presume that the exercise of local control over the school is subject to local choice, an assumption that would seem at variance with the existence of constitutionally assigned local and central responsibilities for the management of schools. While we will ultimately exploit the correspondence between constitutional responsibilities summarized in table 1 and the local exercise of school management, the linkage is hardly definitive. Evidence that local autonomy is subject to choice is found in the ANOVA estimates reported at the bottom of table 2. Efforts to devolve control of schools from central to local authorities have involved the passage of new laws mandating the transference of power from the center to the periphery. If this assignment of responsibility were effectively enforced, we would expect that most of the variation in school autonomy in our data set would be across countries and not within countries. To the extent that the legal environment also dictates parental freedom to participate in local schools or it provides for a level of support for public schools, we might expect that most of the variation in parental participation and in the adequacy of school supplies would also occur across and not within countries. However, only 9% of the variation in school autonomy, 6% of the variation in participation, and 26% of the variation in supply shortages could be explained by differences across countries. The great majority of the variation in decentralized school management and school quality occurs within and not between countries.

These findings are striking. Apparently, even in centralized systems, local schools can take the initiative to design or adopt strategies that could alter the effectiveness and/or efficiency of the teaching-learning process. Alternatively, in a decentralized system, schools that do not feel capable of allocating

[13] Our measure concentrates on parental interest in education and participation in school activities. Questions do not concentrate on parental participation on school committees, fund-raising campaigns, or other more formal participation in school management that might be more complementary with the principal's efforts to manage the school.

school resources may simply adopt central policies or guidelines, as would happen in a centralized system.

Instruments and other variables. The apparent endogeneity of local school autonomy a_{1jk}, parental participation a_{2jk}, and school input provision x_{jk} will require plausible instruments that would shift the probability of local effort but will not be directly tied to child test scores. We opted to use cross-country variation in measures of A_k. Even if the constitutionally mandated locus of control over schools resides with the central government, it does not necessarily prevent the exercise of local control over the school, but they will raise the cost of exerting local authority. This strategy is similar in spirit to that used by Angrist and Krueger (1991), Tyler (2003), and Rothstein (2007), who used variation in state truancy laws to identify the amount of time individuals spend in school and/or child labor in studies of returns to schooling. Truancy laws do not prevent children from illegally avoiding school, but they do raise the costs of dropping out in states with stricter laws.[14]

Our measures of A_k are taken from the information summarized in table 1. Each type of managerial responsibility was given a value of 1 for local, 2 for state or provincial, and 3 for national control. The average score of the first four columns was taken to represent constitutional authority for school personnel (hiring and promotions); the average of the next two columns reflected authority for school facilities (inventory and maintenance); and the average of the last two columns represented authority for curriculum (books and curriculum). Higher values indicate that more centralized management is constitutionally mandated. These measures are highly correlated with one another so that countries that have centralized decision making in one area tend to have more centralized control of others. As a consequence, we will be more interested in the joint effect of these three measures of central control as opposed to any one measure.[15]

[14] Earlier versions of this article also used variation across schools in the principal's managerial experience and in the socioeconomic status of the community as additional instruments. Solon, Page, and Duncan (2000) and Oreopoulos (2003) found that community attributes had no effect on human capital outcomes once household attributes were controlled, suggesting that the socioeconomic status of the community should be a legitimate instrument for the exercise of local school management. Nevertheless, we agree with the referees that local community attributes could plausibly have a direct effect on school outcomes in this application, in addition to their impact on school managerial decisions, invalidating them as an instrument. Although our results are qualitatively similar when we use the principal and community attributes, we focus our attention on the results that use only the constitutional rules as instruments.

[15] Our identifying assumption is that constitutional responsibility for the management of school personnel, curricula, and infrastructure is not assigned in response to student performance on these tests. That assumption seems reasonable in that the legal responsibilities were set across the countries before the tests were conceived. Nevertheless, it is possible that these constitutional provisions are

The remaining variables are largely self-defining. Measures of Z_{jk} are intended to capture differences in the home and community socioeconomic environment that could affect both the incentives and capacity to support local schools, as well as individual child learning. These measures include parental education, books in the home, an indicator of whether the parents speak Spanish or Portuguese, and a series of dummy variables indicating community size.

IV. Regression Analysis

A. Determinants of School Autonomy, Parental Participation, and Adequacy of School Supplies

We begin with the reduced-form representations of equation (2), explaining variation in school autonomy, parental participation, and shortage of school materials. We performed the estimation at the school level using school-level averages of child and household variables.[16] Estimates correct for clustering at the country level. Results are reported in table 4.

Of greatest interest is how the exercise of local public school control is moderated by national policies. The effect of local autonomous decision making is moderated by national policies that place the locus of control at the center. In all cases, the three measures of central authority are jointly significant, although not individually significant in the shortage regression. The individual effects have mixed signs, but the summed effect of the three measures consistently shows that centralized locus of power is correlated with lower reported local effort to manage schools. Evaluated at sample means for the eight countries, the effect of constitutionally mandated centralized school management is to lower school autonomy by 13%, to lower parental participation by 13%, and to increase shortages of school supplies by 25%.

There is strong evidence that local school managerial effort is enhanced when the students have more educated parents. The joint test of the hypothesis that the three measures of parental attributes have no impact is strongly rejected in each equation. Moreover, evaluating the summed effects at sample means, parental education, book ownership, and language skills together raises the average index of school autonomy by 36%, raises parental participation by 72%, and lowers the shortage index by 30%.

---

correlated with excluded factors that affect average performance on tests. We can say that our instruments were not significantly correlated either individually or as a group with cross-country variation in per capita income, poverty rates, public debt, or income inequality.

[16] We also estimated the autonomy, participation, and shortage equations at the individual level, correcting for clustering, and obtained virtually identical results to those reported in table 4. Nevertheless, as pointed out by a referee, the school-level estimates are more consistent with the conceptual model that these decisions about local control of the school are being made by the school or community.

TABLE 4

LEAST-SQUARES REGRESSIONS EXPLAINING AUTONOMY, PARTICIPATION, AND SHORTAGE

Variable	Autonomy	Participation	Shortage
Instruments:			
Hiring and promotions	1.748**	.493	1.212
	(.053)	(.403)	(.707)
Books and curriculum	−1.566**	−.346*	−.699
	(.379)	(.176)	(.417)
Inventory and maintenance	−.829**	−.360*	−.058
	(.216)	(.162)	(.258)
Child:			
Age	−.043	−.008	.039
	(.012)	(.070)	(.072)
Boy	.252	.021	−.047
	(.330)	(.136)	(.302)
Parent/household:			
P Educ	1.664	.556	.312
	(1.030)	(.552)	(.418)
P Books	.550**	.379**	−.305
	(.185)	(.092)	(.227)
P Spanish	−.082	.259*	−.797**
	(.404)	(.121)	(.230)
Community:			
Small urban	.433**	.040	.266**
	(.128)	(.127)	(.068)
Rural-adj	.437**	.207**	−.206**
	(.071)	(.085)	(.080)
Rural-iso	.205	.329*	−.210
	(.234)	(.143)	(.168)
Constant	5.736**	.828	3.508**
	(1.591)	(1.039)	(1.311)
R^2	.195	.123	.277
N	410	410	410
Diagnostic tests of the instruments:			
F-test[a]	14.05**	7.17**	14.52**
Summed effect (%)	−.98 (−13%)	−.29 (−13%)	1.02 (27%)

Note. Cluster-corrected standard errors in parentheses for regression output. *P*-values in parentheses for *F*-tests. Regressions are run on the school-level clustering by country and include dummy variables controlling for missing values. Regressions using the language sample are similar.

[a] Test of hypothesis that the coefficients on the instruments are jointly equal to zero.

* Indicates significance at the .1 level.

** Indicates significance at the .05 level.

Using schools in metropolitan centers as the reference point, we find that it is the schools in smaller urban and rural areas that are the most likely to exert autonomous effort and to have parental participation. Rural schools are also less likely than metropolitan schools to experience supply shortages, although schools in the central cities are supplied better than those in other urban environs. Apparently, schools in the center are willing (or are compelled) to accept central control while schools on the periphery are allowed to (or have to) develop more local control.

The results from table 4 show clearly that the local exercise of control over public schools is not a random occurrence but is strongly tied to variables that should indicate local managerial capacity of the principal, the community, and the parents. These efforts are moderated but not reversed by constitutional mandates reserving school management to the central authority. Consequently, it is incorrect to presume that local public school management is exogenous.[17] The next subsections illustrate how conclusions regarding the productivity of local school management are sensitive to assumptions of the exogeneity or endogeneity of measured local managerial effort.

B. Test Score Estimation Assuming Exogenous Autonomy, Participation, and Input Shortage

We first discuss the results from direct estimation of equation (1) without correcting for the endogeneity of autonomy, participation, and school inputs. The unit of observation is the individual child, but all estimates correct for clustering at the school level. These results are reported in the second and fourth columns of table 5.

The specification may seem sparse compared to other educational production functions that often include many school attributes. However, our three school measures are aggregations of 18 different factors, so one could view our specification as a restricted form of a more general specification more commonly employed in previous work. The results do accord well with common findings. Boys do better in math while girls do better in language. The various indicators of parental attributes are uniformly positive and jointly significant with the strongest effects for books in the home and parental language ability. The highest scores were in the more urban schools, although the coefficients were not always precisely estimated.

Turning to our main interest, when treated as exogenous, school autonomy has no significant effect on test scores. Parental participation raises language test scores significantly but does not have a statistically significant effect on mathematics scores. Even when significant, the parental participation effect is small, amounting to less than one more point on the test from a one standard deviation increase in parental participation. Shortages had a significant negative effect on both test scores, but again, the effect was modest. A one standard

[17] We should reiterate that we do not include private schools in the analysis. Private schools are autonomous by definition, and their exercise of autonomy would not be expected to change with the level of centralized authority mandated for public schools. We do note that, consistent with expectations, private school principals included in the LLECE samples reported higher levels of autonomy than did their public school counterparts.

TABLE 5
LEAST-SQUARES AND TWO-STAGE LEAST-SQUARES EQUATIONS EXPLAINING TEST SCORES

	Mathematics		Language	
Variable	Ordinary Least Squares (OLS)[a]	Two-Stage Least Squares[b]	Ordinary Least Squares (OLS)[a]	Two-Stage Least Squares[b]
Autonomy	.069	−.118	−.101	−.209
	(.239)	(.153)	(.108)	(.119)
Participation	.221	3.607**	.335**	2.395**
	(.255)	(.422)	(.123)	(.183)
Shortage	−.457**	−2.787**	−.350**	−.249**
	(.212)	(.161)	(.116)	(.038)
Child:				
Age	.059	.112**	.083	.137**
	(.079)	(.038)	(.047)	(.027)
Boy	.468**	.508**	−.465**	−.402**
	(.153)	(.112)	(.097)	(.082)
Parent/household:				
P Educ	.600	.249	.908**	.626**
	(.467)	(.367)	(.297)	(.207)
P Books	1.177**	.795**	.804**	.638**
	(.128)	(.081)	(.075)	(.056)
P Spanish	1.963**	−.271	1.576**	1.020**
	(.736)	(.306)	(.504)	(.224)
Community:				
Small urban	.836	1.293**	.159	.017
	(.707)	(.186)	(.285)	(.116)
Rural-adj	−1.078*	−1.798**	−1.527**	−1.504**
	(.650)	(.169)	(.351)	(.122)
Rural-iso	−.119	−1.011**	.350	.338
	(1.273)	(.355)	(.775)	(.242)
Constant	9.518**	15.220**	8.052**	.208
	(2.456)	(1.698)	(1.258)	(.900)
R^2	.078	.120	.106	.117
N	10,411	10,411	11,451	11,451

Note. Cluster-corrected standard errors in parentheses.
[a] Autonomy, participation, and shortage treated as exogenous and controlling for clustering at the school level.
[b] Two-stage least-squares estimation treating autonomy, participation, and shortage as endogenous, using the instruments listed in table A1. Two-stage estimates were obtained from running the first-stage estimation on the school level, correcting for clustering at the country level, and then running the second stage using the first-stage predicted level, correcting for clustering at the school level. The second-stage estimates were bootstrapped to generate correct standard errors.
* Indicates significance at the .1 level.
** Indicates significance at the .05 level. Regressions also include dummy variables controlling for missing values.

deviation increase in shortage resulted in less than a 0.5 point decrease in test scores.

C. *Estimates Controlling for Endogeneity*

Results controlling for endogeneity are reported in the third and fifth columns of table 5. Estimation was complicated by the differences in units of observation: the school level in the first stage and the child level in the second. This prevented us from using a joint estimation strategy, so we opted for a two-stage estimation procedure and then corrected the standard errors using a bootstrap procedure.[18]

Compared to the least-squares estimates, the estimated school autonomy effects turn uniformly negative but remain insignificant for both mathematics and language. The estimated parental participation effect becomes much larger and statistically significant. School-supply shortages remain statistically significant and become more important in the case of the mathematics test.

The parental participation result can be rationalized if parents participate more readily in the school when they observe the school performing poorly given its resources. If true, the least-squares estimate would be biased downward because of the negative influence of test scores on parental participation. Alternatively, parental participation may be measured with error, so the least-squares coefficients are subject to attenuation bias. In either event, the estimates suggest that parental participation is more useful for school outcomes than is suggested when the factor is treated as exogenous in least-squares regressions. Encouraging parental participation appears to be a more promising avenue for improving school outcomes than mandating school autonomy.

Recall that even when significant, parental participation and supply shortages had a very small impact on student test scores when estimated using ordinary least squares. Correcting for endogeneity, a one standard deviation increase in parental participation raises the mathematics score by 2.4 questions (7.6%) and the language score by 1.6 questions (8.4%). A one standard deviation increase in supply shortages lowers the mathematics test score by 2.7 points (8.5%) and lowers the language score by 0.2 points (1.3%). Although we do not have prior estimates to compare with our findings, we believe that if parental participation or supply shortages are to have any impact, these estimates seem to be of reasonable magnitudes.

We note again that all of our observations of student outcomes are conditional on the child being in attendance at this particular school. We do not have information on children in the neighborhood who attend private schools or who have dropped out of school. As such, all of our schooling outcomes must be interpreted as conditioned on the choice to attend a public school.

[18] The first-stage regressions were run on the school-level clustering for countries, and the second-stage regressions were run on the child-level clustering for schools. The second-stage standard errors were computed by generating 1,000 samples of schools with replacement, merging the predicted values into the second stage and then generating the sampling distribution of the second-stage estimates.

If the decision to send a child to public school is influenced by the degree of local autonomy, parental participation, or the adequacy of school supplies, the distribution of children in public schools may differ depending on these factors. We have no means of judging the potential impact of such sorting on our results.

C. Extensions

When we began this study, we were concerned that we could not distinguish between management exercised by local school teachers or principals from management exercised by parents or the community. In practice, the two measures turned out to be nearly uncorrelated, suggesting that our concern was unfounded. Nevertheless, we replicated the analysis using only one local management measure at a time. These results are in the second and third columns of each group of estimates reported in table 6. When treated as endogenous, and parental participation is excluded, school autonomy appears to have a positive and statistically significant impact on test scores. This result suggests that one may be misled about the importance of local school management if the role of parents or the community is not considered jointly with the role of the principal.

A second question concerns the use of country-specific fixed effects. We cannot control simultaneously for country fixed effects and for endogenous local school management because our source of identification is the country-specific constitutional locus of authority over schools. Nevertheless, we can examine how fixed effects alter our least-squares estimates. Comparing fixed-effect estimates in column 5 with those in column 2, we find that conclusions regarding parental participation and autonomy are the same, but school supplies are no longer statistically significant.[19] We do not know what would happen if we could impose fixed effects on our preferred specification.

Another question concerned our use of the factor-weighted sums of the eight autonomy, two parental participation, and eight shortage measures instead of adding these 18 variables separately. Again, we cannot perform the analysis correcting for endogeneity because we lack sufficient instruments, but we can compare results under the exogeneity assumption. To make the comparison, we aggregated the individual factor coefficients at their sample means. To be precise, letting θ_k be the regression coefficient on the kth factor, which has mean value μ_k, column 6 reports the weighted sum $\partial q/\partial w = \sum_k \theta_k \mu_k$ as well

[19] This is not surprising in that less than 10% of the variation in autonomy and participation is due to cross-country variation. In contrast, 26% of the variation in shortage occurs across countries. See table 2 for details.

TABLE 6

COMPARISON OF REGRESSION COEFFICIENTS OF DIFFERENT MODELS OF THE EFFECT OF AUTONOMY AND PARTICIPATION ON TEST SCORES

	Ordinary Least Squares (OLS)					Two-Stage Least Squares[a]		
Variable (1)	Autonomy and Participation (2)	Autonomy (3)	Participation (4)	Autonomy and Participation[b] (5)	Autonomy and Participation[c] (6)	Autonomy and Participation (7)	Autonomy (8)	Participation (9)
Mathematics:								
Autonomy	.069	.076		.001	−.706	−.118	.398**	
	(.239)	(.239)		(.233)	(1.770)	(.153)	(.150)	
Participation	.221		.227	.258	.708	3.607**		3.493**
	(.255)		(.252)	(.249)	(.560)	(.422)		(.394)
Shortage	−.457**	−.492**	−.465**	−.103	−.554	−2.787**	−3.206**	−2.759**
	(.212)	(.214)	(.218)	(.198)	(.840)	(.161)	(.161)	(.164)
Language:								
Autonomy	−.101	−.094		−.056	−1.340	−.209	.656**	
	(.108)	(.109)		(.103)	(.890)	(.119)	(.114)	
Participation	.335**		.331**	.339**	.949**	2.395**		2.504**
	(.123)		(.124)	(.106)	(.310)	(.183)		(.178)
Shortage	−.350**	−.408**	−.338**	.016	−.378	−.249**	−.329**	−.254**
	(.116)	(.117)	(.117)	(.110)	(.530)	(.038)	(.039)	(.039)

Note. Regressions also include all other variables reported in table 4. Cluster-corrected standard errors are in parentheses.

[a] Two-stage estimates were obtained from running the first-stage estimation on the school level, correcting for clustering at the country level, and then running the second stage using the first-stage-predicted values on the child level, correcting for clustering at the school level. The second-stage estimates were bootstrapped to generate correct standard errors. Bootstrapped and cluster-corrected standard errors are in parentheses.

[b] These estimates were generated from regressions, including country dummy variables.

[c] These estimates were generated from regressions using the individual autonomy, participation, and shortage measures listed in table 2 rather than their factor-weighted aggregate values. The reported effects are the summed weighted coefficients in each group, where the weights are the sample means of the factors.

** Indicates significance at the .05 level.

as the standard deviation of the sum for each element of $w = (x, a_1, a_2)$. The standard errors are as large as one would expect when aggregating across many imprecise parameters.[20] Nevertheless, the signs are similar to what we find using our aggregated management measures, although the estimated coefficients on autonomy are even more negative and those on parental participation more positive than in our preferred specification in column 2. It seems apparent that our use of aggregations of individual management measures is not driving our conclusions.[21]

Finally, we repeated the estimation of the test score equation separately for each country. Again, this prevents us from using cross-country variation to identify endogenous local school-management decisions, so we can only perform the least-squares analysis. Coefficient estimates for the three variables are reported in the bottom section of table 3. The results mimic the mixed findings from earlier studies that treated local school autonomy, parental participation, and school inputs as exogenous. Many coefficients are individually insignificant in the country-specific equations, and all three variables have instances of sign switching across countries. These results indicate why treating local school management and school inputs as endogenous may be important for correctly assessing their impacts on student outcomes.

V. Conclusions

A sample encompassing eight Latin American countries shows no evidence that more autonomous schools perform better than less autonomous schools. These conclusions are not sensitive to controls for the plausible endogeneity of school autonomy. However, after correcting for endogeneity, the impact of parental participation on student test scores is consistently positive and significant. Reducing shortages in school supplies and infrastructure also improves student outcomes consistently.

Parental participation and school autonomy are not random occurrences. They are positively influenced by parental human capital and the size and remoteness of the community. Whether because of perceived local school needs or the lack of central supervision, it is the schools in less populated and more

[20] This demonstrates why our use of principal components to aggregate across similar factors may yield better inferences about the educational production process than would including all of the highly correlated and conceptually similar factors in the regression.

[21] Joint tests of significance of the individual factors failed to reject the null hypothesis that all the coefficients were zero. We also tested whether we could accept the restrictions implied by the use of a weighted average of the factors that translated the 18 factors into three. Restrictions were accepted at standard significance levels in the case of the two participation measures and the eight shortage factors but rejected for autonomy. We can only perform the test assuming exogeneity, so these tests are just suggestive.

remotely located areas that are most likely to exert managerial effort. Our finding that local school management is a matter of choice seems to accord well with findings by other researchers. In Colombia, the cities that participated in the voucher program were those with the strongest fiscal standing and that had the administrative capacity to manage the program. In Argentina, the areas that decentralized first were those with the strongest socioeconomic standing. In El Salvador and Nicaragua, positive results from decentralization were concentrated among the schools that actually chose to exert effort and not all that were accorded the right to manage.

These findings should give pause to the widespread clamor for decentralization. It is highly likely that schools that willingly manage schools perform better than if they did not exert that effort. However, it seems clear that the choice to manage is largely a local and not a central decision. Consequently, policies should grant autonomy in circumstances where the local community would willingly exercise local control. For the majority of schools that would choose not to manage locally, centralized managerial decisions regarding the allocation of school resources and other administrative decisions may yield the best results.

Appendix

TABLE A1
VARIABLE DESCRIPTION

Variable	Description
Endogenous variables:	
Math score (*q*)	Mathematics test score out of 32 possible (C)
Language score (*q*)	Language test score out of 19 possible (C)
Autonomy (a_1)	Composite variable measuring the level of school autonomy (Pr)
Participation (a_2)	Composite variable measuring the level of parental participation (T)
Shortage (*x*)	Composite variable measuring the inadequacy of school supplies and facilities (T)
Exogenous variables:	
Child:	
Age	Student age (years) (C)
Boy	Dummy if student is a boy (C)
Parent/household:	
P Educ	Average education of parent(s) or guardian(s) (P)
P Books	Number of books in student's home (P)
P Spanish	Dummy if parents speak Spanish (Portuguese) with their children (P)
Community:	(Reference: Urbanized zone in the capital area)
Small urban	Dummy indicating if school is located in a marginal zone in the capital or in a large city or town with more than 100,000 people (S)
Rural-adj	Dummy indicating if school is located in a town/village with less than 100,000 people or in a rural area in close proximity close to a town (S)

TABLE A1 (*Continued*)

Variable	Description
Rural-iso	Dummy indicating if school is located in a rural area with less than 500 people and located more than 50 km from a town (S)
Instruments:	
Hiring and promotions	Average of the level of centralization of decision making in hiring staff and regulating salaries and promotions (1 = school control, 3 = national control; PREAL)
Books and curriculum	Average of the level of centralization of decision making in buying textbooks and setting curriculum (1 = school control, 3 = national control; PREAL)
Inventory and maintenance	Average of the level of centralization of decision making in school supply inventory and building maintenance (1 = school control, 3 = national control; PREAL)

Sources. C: child survey or test; Pr: principal's survey; T: teacher's survey; P: parent's survey; S: survey designer's observation; PREAL: estimate taken from Partnership for Educational Revitalization in the Americas (PREAL 2002).
Note. Notation in parentheses shows the link between the conceptual variable and its empirical construct. Subscripts are suppressed for notational convenience.

TABLE A2
SUMMARY STATISTICS

Variable	*N*	Mean	SD	Min.	Max.
Endogenous variables:					
Math score (q)	10,411	14.76	6.04	.00	32.00
Language score (q)	11,451	11.34	4.29	.00	19.00
Autonomy (a_1)	10,411	7.50	1.10	4.00	9.68
Participation (a_2)	10,411	2.25	.67	1.30	3.90
Shortage (x)	10,411	3.76	.98	2.33	6.04
Exogenous variables:					
Child:					
Age	10,411	9.94	1.63	6.00	18.00
Boy	10,411	.50	.50	.00	1.00
Parent/household:					
P Educ	10,411	.93	.22	.00	1.00
P Books	10,411	2.26	.85	1.00	4.00
P Spanish	10,411	.93	.25	.00	1.00
Community:					
Small urban	10,411	.30	.46	.00	1.00
Rural-adj	10,411	.47	.50	.00	1.00
Rural-iso	10,411	.04	.19	.00	1.00
Instruments:					
Hiring and promotions	10,411	2.12	.54	1.50	3.00
Books and curriculum	10,411	2.08	.61	1.50	3.00
Inventory and maintenance	10,411	1.72	.51	1.00	2.50

Note. These are the sample statistics from the group for which we have mathematics test scores. Sample statistics for the language test sample are almost identical. Notations in parentheses show the link between the conceptual variable and its empirical construct. Subscripts are suppressed for notational convenience.

References

Alderman, Harold. 2001. "Multi-Tier Targeting of Social Assistance: The Role of Intergovernmental Transfers." *World Bank Economic Review* 15:33–53.

Angrist, Joshua D., Eric Bettinger, and Michael Kremer. 2006. "Long-Term Educational Consequences of Secondary School Vouchers: Evidence from Administrative Records in Colombia." *American Economic Review* 96:847–62.

Angrist, Joshua D., and Alan B. Krueger. 1991. "Does Compulsory School Attendance Affect Schooling and Earnings?" *Quarterly Journal of Economics* 106 (November): 979–1014.

Angrist, Joshua D., et al. 2002. "Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment." *American Economic Review* 92: 1535–58.

Bardhan, Pranab. 2002. "Decentralization of Governance and Development." *Journal of Economic Perspectives* 16:185–206.

———. 2005. *Scarcity, Conflicts and Cooperation: Essays in the Political and Institutional Economics of Development.* Cambridge, MA: MIT Press.

Bird, Richard M., and Francois Vaillancourt, eds. 1998. *Fiscal Decentralization in Developing Countries*. Cambridge: Cambridge University Press.

Bray, Mark, and M. V. Mukundan. 2003. "Management and Governance for EFA: Is Decentralisation Really the Answer?" Paper commissioned for the EFA Global Monitoring Report 2003/4, Bangkok. http://unesdoc.unesco.org/images/0014/001467/146754e.pdf.

Carnoy, Martin. 2007. *Cuba's Academic Advantage: Why Students in Cuba Do Better in School.* Stanford, CA: Stanford University Press.

Coleman, James S. 1990. *Equality and Achievement in Education*. Boulder, CO: Westview.

Espínola, Viola. 2001. "Autonomía escolar: Factores que contribuyen a una escuela más efectiva." Working paper, Inter-American Development Bank, Washington, DC. http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=627148.

Faguet, Jean-Paul. 2004. "Does Decentralization Increase Responsiveness to Local Needs? Evidence from Bolivia." *Journal of Public Economics* 88:867–94.

Finn, Chester E., Jr., Bruno V. Manno, and Gregg Vanourek. 2001. "Charter Schools: Taking Stock." In *Charters, Vouchers and Public Education*, ed. Paul E. Peterson and David E. Campbell. Washington, DC: Brookings.

Fiske, Edward B. 1996. *Decentralization of Education: Politics and Consensus*. Washington, DC: World Bank.

Galasso, Emanuela, and Martin Ravallion. 2005. "Decentralized Targeting of an Anti-poverty Program." *Journal of Public Economics* 89:705–27.

Galiani, Sebastián, Paul Gertler, and Ernesto Schargrodsky. 2008. "School Decentralization: Helping the Good Get Better, but Leaving the Poor Behind." *Journal of Public Economics* 92:2106–20.

Glewwe, Paul. 2002. "Schools and Skills in Developing Countries: Educational Policies and Socioeconomic Outcomes." *Journal of Economic Literature* 50:436–82.

Glewwe, Paul, and Michael Kremer. 2006. "Schools, Teachers and Educational Outcomes in Developing Countries." In *Handbook of the Economics of Education*, ed. E. Hanushek and F. Welch. Amsterdam: Elsevier Science.

Gunnarsson, Victoria, Peter F. Orazem, Mario Sanchez, and Aimee Verdisco. 2006. "Does Local School Control Raise Student Outcomes? Theory and Evidence on the Roles of School Autonomy and Community Participation." Working Paper no. 4005, Iowa State University.

Hannaway, Jane, and Martin Carnoy. 1993. *Decentralization and School Improvement*. San Francisco: Jossey-Bass.

Jimenez, Emmanuel, and Yasuyuki Sawada. 1999. "Do Community-Managed Schools Work? An Evaluation of El Salvador's EDUCO Program." *World Bank Economic Review* 13:415–41.

King, Elizabeth M., Peter F. Orazem, and Darin Wohlgemuth. 1999. "Central Mandates and Local Incentives: The Colombia Education Voucher Program." *World Bank Economic Review* 13:467–92.

King, Elizabeth M., and Berk Ozler. 2005. "What's Decentralization Got to Do with Learning? School Autonomy and Student Performance." Working Paper no. 54, Interfaces for Advanced Economic Analysis, Kyoto University. http://www.kier.kyoto-u.ac.jp/coe21/dp/51-60/21COE-DP054.pdf.

Lauglo, Jon. 1995. "Forms of Decentralization and Their Implications for Education." *Comparative Education* 31:5–29.

Lindaman, Kara, and Kurth Thurmaier. 2002. "Beyond Efficiency and Economy: An Examination of Basic Needs and Fiscal Decentralization." *Economic Development and Cultural Change* 50:915–34.

LLECE. 1998. "First International Comparative Study of Language, Mathematics, and Associated Factors in Third and Fourth Grades." Technical report, UNESCO-Santiago.

McEwan, Patrick J., and Martin Carnoy. 2000. "The Effectiveness and Efficiency of Private Schools in Chile's Voucher System." *Educational Evaluation and Policy Analysis* 22:213–39.

OECD. *Education at a Glance*. 1998. Paris: Organization for Economic Cooperation and Development.

———. *Education at a Glance*. 2000. Paris: Organization for Economic Cooperation and Development.

Oreopoulos, Philip. 2003. "The Long-Run Consequences of Living in a Poor Neighborhood." *Quarterly Journal of Economics* 118:1533–75.

Peterson, Paul E., and David E. Campbell, eds. 2001. *Charters, Vouchers and Public Education*. Washington, DC: Brookings.

PREAL. 2002. *Creando autonomía en las escuelas*. Santiago: Programa de Promoción de la Reforma Educativa en América Latina y el Caribe.

Reinikka, Ritva, and Jakob Svensson. 2004. "Local Capture: Evidence from a Central Government Transfer Program in Uganda." *Quarterly Journal of Economics* 119:679–705.

Rothstein, Donna S. 2007. "High School Employment and Youths' Academic Achievement." *Journal of Human Resources* 42 (Winter): 194–213.

Savedoff, William D., ed. 1998. *Organization Matters: Agency Problems in Health and Education in Latin America*. Washington, DC: Inter-American Development Bank.

Solon, Gary, Marianne E. Page, and Greg J. Duncan. 2000. "Correlations between

Neighboring Children in Their Subsequent Educational Attainment." *Review of Economics and Statistics* 82:383–92.

Somers, Marie-Andrée, Patrick J. McEwan, and J. Douglas Willms. 2004. "How Effective Are Private Schools in Latin America?" *Comparative Education Review* 48: 48–69.

Tyler, John H. 2003. "Using State Child Labor Laws to Identify the Effect of School-to-Work on High School Achievement." *Journal of Labor Economics* 21 (April): 381–408.

Vegas, Emiliana. 2002. "School Choice, Student Performance, and Teacher and School Characteristics: The Chilean Case." Policy Research Working Paper no. 2833, World Bank, Washington, DC.

Walker, Elaine M. 2002. "The Politics of School-Based Management: Understanding the Process of Devolving Authority in Urban School Districts." *Education Policy Analysis Archives* 10, no. 33. http://olam.ed.asu.edu/epaa/v10n33.html.

Whitty, Geoff, Sally Power, and David Halpin. 1998. *Devolution and Choice in Education: The School, the State, and the Market*. Bristol, PA: Open University Press.

Winkler, Donald R., and Alec Ian Gershberg. 2002. "Los efectos de la descentralización del sistema educacional sobre la calidad de la educación en América Latina." Photocopy, PREAL, Santiago.

9

Educational Evaluation and Policy Analysis
Summer 1997, Vol. 19, No. 2, pp. 141–164

Assessing the Effects of School Resources on Student Performance: An Update

Eric A. Hanushek
University of Rochester

The relationship between school resources and student achievement has been controversial, in large part because it calls into question a variety of traditional policy approaches. This article reviews the available educational production literature, updating previous summaries. The close to 400 studies of student achievement demonstrate that there is not a strong or consistent relationship between student performance and school resources, at least after variations in family inputs are taken into account. These results are also reconciled with meta-analytic approaches and with other investigations on how school resources affect labor market outcomes. Simple resource policies hold little hope for improving student outcomes.

Reflecting its policy significance, an enormous amount of research has focused on the relationship between resources devoted to schools and student performance. Recent interest generated by current policy debates has helped clarify both the interpretation of this work and the resulting policy implications. This article updates previous reviews of the literature and adds the perspective of the recent discussions of the results. With over three decades of analysis, new studies have reinforced earlier conclusions: Today's schools exhibit continuing inefficiency in their operations as there is no strong or consistent relationship between variations in school resources and student performance. Alternative interpretations of the evidence plus apparently contradictory findings of different strands of this work can be reconciled in a straightforward manner with this conclusion.

These results add further impetus for changing the focus of much of current policy development that has resource policies at its heart. Added resources within the current organization and incentives of schools are neither necessary nor sufficient for improving student achievement. Instead, incentive structures that encourage better performance and recognize differences of students, teachers, and schools offer much greater likelihood of success than the centralized decision-making approaches currently prevalent.

Overview of the Analysis of Educational Production Functions

The investigation of the effects of school resources began in earnest with the publication of the "Coleman Report" (Coleman et al., 1966). This congressionally mandated study by the U.S. Office of Education startled many by suggesting that schools did not exert a very powerful influence on student achievement. Subsequent attention was directed both at understanding the analysis of the Coleman Report[1] and at providing additional evidence about the effects of resources.

The statistical analyses relevant to this work have a common framework that has been well understood for some time (Hanushek, 1979). Student achievement at a point in time is related to the primary inputs: family influences, peers, and schools. The educational process is also cumulative, so that both historical and contemporaneous inputs influence current performance.

With the exception of the Coleman Report, the subsequent analysis seldom has relied on data collected specifically for the study of the educational process. Instead, it has tended to be opportunistic, employing available data to gain insights into school operations. The focus of much of this work has been the effect of varying resources on student achievement. This focus flows from the underlying perspective of production functions, from its obvious relevance for policy, and from the prevalence of relevant resource data in the administrative records that are frequently used.

Over the past 30 years, a steady stream of analyses has built up a consistent picture of the educational process. This section describes the available studies, while the next considers the results. This summary concentrates on a set of published results available through 1994,[2] updating and extending previous summaries (Hanushek, 1981, 1986, 1989). The basic studies meet minimal criteria for analytical design and reporting of results. Specifically, the studies must be published in a book or journal (to ensure a minimal quality standard), must include some measure of family background in addition to at least one measure of resources devoted to schools, and must provide information about statistical reliability of the estimate of how resources affect student performance. The objective was to collect information from all studies meeting these criteria to avoid any preselection problems.[3]

The summary relies on all of the separate estimates of the effects of resources on student performance. For tabulation purposes, a "study" is a separate estimate of an educational production function found in the literature. Individual published analyses typically contain more than one set of estimates, distinguished by different measures of student performance, by different grade levels, and frequently by entirely different sampling designs. If, however, a publication includes estimates of alternative specifications employing the same sample and performance measures, only one of the alternative estimates is included.[4] Thus, the 90 individual publications that form the basis for this analysis contain 377 separate production function estimates. While a large number of studies were produced as a more or less immediate reaction to the Coleman Report, half of the available studies have been published since 1985.[5]

The studies are drawn from schools across the country and contain information about a variety of measures of student outcomes. Table 1 provides an overview of the included studies. Three quarters of the studies measure student performance by standardized tests, while the remainder use a variety of different measures including such things as continuation in school, dropout behavior, and subsequent labor market earnings. Not surprisingly, test score performance measures are more frequently employed for studying education in elementary schools, while a vast majority of the studies of other outcomes relate to secondary schools. Table 1 also displays the level of aggregation of the school input measures—an issue considered in detail below. One quarter of the studies consider individual classrooms, while 10% measure school inputs only at the level of the state. Moreover, fully one quarter of the studies employing non-test measures rely solely on interstate variations in school inputs.

The Impact of School Resources

The overall approach here is to summarize the combined evidence about the effects of various school resources. As will be apparent, given the

TABLE 1
Distribution of Outcome Measures by Schooling Level and by Aggregation Level of School Inputs

	Standardized test	Other measure	Total
Schooling level			
Elementary school	162	11	173
Secondary level	120	84	204
Aggregation level of school inputs			
Classroom	89	8	97
School	95	53	148
District	83	8	91
County	2	3	5
State	13	23	36
Total	282	95	377

Note: Source—Author's tabulations.

large number of studies it is quite possible to find individual studies supporting one or another positions—such as supporting the efficacy of providing some specific programs or resources. Because there are widely divergent results from individual studies, this analysis concentrates on systematic effects that hold across the available studies.

Studies of educational performance include a variety of different measures of resources devoted to schools. Commonly employed measures include

• The real resources of the classroom (teacher education, teacher experience, and teacher-pupil ratios);
• Financial aggregates of resources (expenditure per student and teacher salary); and
• Measures of other resources in schools (specific teacher characteristics, administrative inputs, and facilities).

The real resource category receives the bulk of attention for several reasons. First, these best summarize variations in resources at the classroom level. Teacher education and teacher experience are the primary determinants of teacher salaries. When combined with teachers per pupil, these variables describe variations in the instructional resources across classrooms. Second, these measures are readily available and well measured. Third, they relate to the largest changes in schools over the past three decades. Table 2 displays the dramatic increases in these school inputs, with pupil-teacher ratios falling steadily, teacher experience increasing, and the percentage of teachers with master's degrees actually doubling between 1960 and 1990. Fourth, studies of growth in performance at the individual classroom level, commonly thought to be the superior analytical design, frequently have these resource measures available but not the others.

The real resource measures stand in contrast with the other measures. The financial aggregates, particularly expenditure per pupil, are typically not even calculated for the classroom or the school, but instead are only available for the school district or for entire states. Thus, studies employing these are the most aggregated studies. They also tend to have relatively poor measures of family background, and studies focusing on spending are not amenable to value-added specifications (see below). In sum, these studies are of noticeably lower quality than the best—and the typical—study investigating real classroom resources.[6] The measures of other school resources also are frequently measured poorly and tend to be available only at the district level. At the same time, because these resources tend to be relatively smaller in terms of overall spending, one would not expect these factors to be less important in determining student achievement.

Basic Results

Table 3 presents the overall summary of results. In terms of real classroom resources, only 9% of the studies considering the level of teachers' education and 15% of the studies investigating teacher-pupil ratios find positive and statistically significant effects on student performance.[7] These relatively small numbers of statistically significant positive results are balanced by another set finding statistically significant negative results—reaching 13% in the case of teacher-pupil ratios. While a large portion of the studies merely note that the estimated coefficient is statistically insignificant without giving the direction of the estimated effect, those statistically insignificant studies re-

TABLE 2
Public School Resources in the United States, 1961–1991

Resource	1960–61	1965–66	1970–71	1975–76	1980–81	1985–86	1990–91
Pupil-teacher ratio	25.6	24.1	22.3	20.2	18.8	17.7	17.3
% teachers with master's degrees	23.1	23.2	27.1	37.1	49.3	50.7	52.6
Median years teacher experience	11	8	8	8	12	15	15
Current expenditure/ ADA (1992–93 $s)	$1,903	$2,402	$3,269	$3,864	$4,116	$4,919	$5,582

Note: Source—U.S. Department of Education, 1994.

TABLE 3
Percentage Distribution of Estimated Effect of Key Resources on Student Performance, Based on 377 Studies

Resources	Number of estimates	Statistically significant: Positive	Statistically significant: Negative	Statistically insignificant: Positive	Statistically insignificant: Negative	Statistically insignificant: Unknown sign
Real classroom resources						
Teacher-pupil ratio	277	15%	13%	27%	25%	20%
Teacher education	171	9	5	33	27	26
Teacher experience	207	29	5	30	24	12
Financial aggregates						
Teacher salary	119	20%	7%	25%	20%	28%
Expenditure per pupil	163	27	7	34	19	13

Note: Source—Author's tabulations.

porting the sign of estimated coefficients are split fairly evenly between positive and negative. A higher proportion of estimated effects of teacher experience are positive and statistically significant: 29%. Importantly, however, 71% still indicate worsening performance with experience or less confidence in any positive effect. And because more experienced teachers can frequently choose their school and/or students, a portion of the positive effects could actually reflect reverse causation (Greenberg & McCall, 1974; Murnane, 1981). In sum, the vast number of estimated real resource effects gives little confidence that just adding more of any of the specific resources to schools will lead to a boost in student achievement. Moreover, this statement does not even get into whether or not any effects are "large." Given the small confidence in just getting noticeable improvements, it seems somewhat unimportant to investigate the size of any estimated effects.

The financial aggregates provide a similar picture. There is very weak support for the notion that simply providing higher teacher salaries or greater overall spending will lead to improved student performance. Per pupil expenditure has received the most attention, but only 27% of the estimated coefficients are positive and statistically significant. In fact, from the statistically significant negative estimates, we see that 7% even suggest some confidence that adding resources would harm student achievement. In reality, as discussed below, studies involving per-pupil expenditure tend to be the lowest quality studies, and there is substantial reason to believe that even the reported results overstate the true effect of added expenditure.

Other Measures

Outside of the basic resource factors, a vast number of specific measures of teachers and schools have been included at one time or another. Few measures have been repeated frequently enough to permit any sort of tabulation. One set of exceptions involves either administrative inputs or facilities. While these categories include a wide range of specific measures, the results of such investigation, as tabulated in Table 4, show little consistent effect on student performance.[8] An additional exception is teacher test score, where teachers have been given some sort of achievement or IQ test and their score on those has been related to their students' performance. Table 4 displays the results of the 41 studies that include teacher test scores. Of all of the explicit measures that lend themselves to tabulation, stronger teacher test scores are most consistently related to higher student achievement, even though only 37% provide positive and statistically significant effects.

Aggregation

Studies vary widely in their design, in the character of the underlying samples and data that are available, and in their estimation approach. As displayed in Table 1, one of the most obvious differences relates to the aggregation of the underlying data. While the ideal analysis matches individual students with the school and family resources, this design is frequently precluded by the available data. In a fully specified linear model, however, aggregation of explanatory variables reduces the precision of any estimates but does not lead to biased estimates. Problems arise when there are either nonlinearities, such as

TABLE 4
Percentage Distribution of Other Estimated Influences on Student Performance, Based on 377 Studies

Resources	Number of estimates	Statistically significant: Positive	Statistically significant: Negative	Statistically insignificant: Positive	Statistically insignificant: Negative	Statistically insignificant: Unknown sign
Teacher test scores	41	37%	10%	27%	15%	12%
Administrative inputs	75	12	5	23	28	32
Facilities	91	9	5	23	19	44

Note: Source—Author's tabulations.

interactions of school and family factors, or specification problems, such as omitted variables. Even with these problems, however, there is no real expectation about the direction of any effect on estimates that might accompany aggregation of school resource variables.[9] While the next section offers evidence about the interaction of aggregation and specification errors, here we simply describe how the results vary with aggregation of the school resource measures.

Table 5 displays the distribution of studies by level of aggregation of the school resource measures for teacher-pupil ratio and expenditures. (This discussion is restricted to teacher-pupil ratios and expenditure per pupil because only five studies consider teacher education measured at the county or state level and only six consider teacher experience at that level.) The unmistakable pattern of the results is that resources appear to have a stronger positive influence and to be more frequently statistically significant as the level of aggregation increases from the school to the district to the state. For example, for teacher-pupil ratios, the percentage of positive and statistically significant estimates goes from 12% to 21% and 64% as the estimates go from the classroom level to aggregation at the district and state level, respectively. Simply put, analyses at higher levels of aggregation are noticeably more likely to conclude that added resources (teacher-pupil ratios or overall spending) improve student performance. The influence of aggregation is especially dramatic when only state-to-state differences in resources are observed, and it is this pattern that leads to serious questions about the interpretation of the results.

State Sampling

Overall policies toward schools are made at the individual state level.[10] Individual states,

TABLE 5
Percentage Distribution of Estimated Effect of Teacher-Pupil Ratio and Expenditure Per Pupil on Student Performance

Resources	Number of estimates	Statistically significant: Positive	Statistically significant: Negative	Statistically insignificant: Positive	Statistically insignificant: Negative	Statistically insignificant: Unknown sign
A. Teacher-pupil ratio						
Total	277	15%	13%	27%	25%	20%
Classroom	77	12	8	18	26	36
School	128	10	17	26	28	19
District	56	21	16	39	20	4
County	5	0	0	40	40	20
State	11	64	0	27	9	0
B. Expenditure per pupil						
Total	163	27%	7%	34%	19%	13%
Classroom	4	0	0	0	0	100
School	83	17	7	35	23	18
District	43	28	9	37	26	0
County	5	0	0	40	20	40
State	28	64	4	32	0	0

Note: Rows may not add to 100 because of rounding.

through their state constitutions, are responsible for providing public schooling and for setting the operating environment for schools. With the exception of Hawaii, all states delegate substantial responsibility for the provision of public schooling to local school districts, but they do so in a very constrained manner. State governments have developed elaborate rules and regulations dictating what local districts can and cannot do in the operations of schools, in the provision of specific programs, in the hiring and firing of teachers, and so forth. The states also govern how funds for schools are raised, including not only the split of responsibility between state and local jurisdictions but also the tax instruments that may be used. States further exert varying influence over the formation and operation of any private schools in the state. Additional variation in the operation of state schooling systems has come from court interpretations of state policies, most notably in the area of school finance. A majority of states have gone through court cases challenging their methods of financing local schools based on the varying educational provisions of state constitutions.

Given the variations in policies across states and given the central importance that is frequently attached to modifying state education policies, it would not be surprising to find that state policies influence school performance. Unfortunately, little progress has been made at identifying, defining, or measuring the most important aspects of state policies in terms of their effect on student performance or the efficiency of resource usage. Whether well measured or not, such state factors can have a significant impact on the results of common statistical analyses, such as those summarized here. For example, if states that provide a higher level of funding also tend to have more productive policy environments, then a regression analysis that doesn't control for the policy environment will tend to exaggerate the effect of funding on performance.

The magnitude and even direction of any such specification bias is unknown a priori because the bias depends on both the importance of variations in state policy and the correlations between state policies and school resources. The existing studies, however, permit some insight into the effects. Specifically, general state policies will have a common effect on each of the districts within a state, so that production function studies employing sample observations from within a given state will not suffer from these specification biases, but studies drawing observations across states will.[11] Additionally, the effect of biases is not independent of the modeling strategy. Hanushek, Rivkin, and Taylor (1996) show that as data are aggregated to the level of the omitted variable (e.g., state average data are used when state level factors are left out), any bias must worsen.

Table 6 shows the combined effects of aggregation and of cross-state sampling on the estimated effects of schools. Of the 277 studies of teacher-pupil ratios, 157 come from single-state samples, while 120 are drawn from multiple states. Of the 163 studies of expenditure per pupil, 89 come from single-state samples with the remainder coming from multiple-state samples. The multiple-state samples are further divided into two groups: those with no intrastate variation in school resources (i.e., where resources are measured at the state level) and those with intrastate variation. Estimation that employs samples crossing states systematically suggests that resources are more important for student performance than those analyzing achievement within individual states. Looking, for example, at the teacher-pupil results, there are consistently more positive and statistically significant estimates from the multiple-state samples (18%) compared to single state samples (12%). There are also noticeably fewer negative and statistically significant estimates (8% for multiple-state samples versus 18% for single-state samples). Similar results hold for expenditure per pupil. Moreover, the apparent importance of resources increases with aggregation, just what the theory suggests in the case of misspecification at the state level. At the state level of estimation, almost two thirds of the estimates for both teacher-pupil ratios and expenduture per pupil are positive and statistically significant. The fact that positive bias is present in more disaggregated studies that draw multiple-state samples provides clear evidence that omission of measures of state policies is important.

Study Quality and Value-Added Models

One of the concerns about summarizing literatures, particularly in the tabular way done here, is that no weight is given to study quality. Indeed,

TABLE 6
Percentage Distribution of Estimated Effect of Teacher-Pupil Ratio and Expenditure Per Pupil by State Sampling Scheme and Aggregation

		Statistically significant		Statistically insignificant		
Level of aggregation resources	Number of estimates	Positive	Negative	Positive	Negative	Unknown sign
A. Teacher-pupil ratio						
Total	277	15%	13%	27%	25%	20%
Single state samples[a]	157	12	18	31	31	8
Multiple state samples[b]	120	18	8	21	18	35
With within-state variation[c]	109	14	8	20	19	39
Without within-state variation[d]	11	64	0	27	9	0
B. Expenditure per pupil						
Total	163	27%	7%	34%	19%	13%
Single state samples[a]	89	20	11	30	26	12
Multiple state samples[b]	74	35	1	39	11	14
With within-state variation[c]	46	17	0	43	18	22
Without within-state variation[d]	28	64	4	32	0	0

Note: Rows may not add to 100 because of rounding.
[a] Estimates from samples drawn within single states.
[b] Estimates from samples drawn across multiple states.
[c] Resource measures at level of classroom, school, district, or county, allowing for variation within each state.
[d] Resource measures aggregated to state level with no variation within each state.

in selecting studies for tabulation, an effort was made to collect the entire universe of studies that met the minimal publication, specification, and reporting criteria. While this approach was taken to minimize any concerns that selection of studies led to the results, it opens the possibility of including low-quality studies that might bias the overall results.[12]

One class of studies—those employing a value-added specification—is generally regarded as being conceptually superior and likely to provide the most reliable estimates of education production functions. These studies relate an individual's current performance to the student's performance at some prior time and to the school and family inputs during this intervening time. The superiority of this approach comes from the use of prior achievement to ameliorate any problems arising from missing data about past school and family factors and from differences in innate abilities of students (Hanushek, 1979).[13]

Table 7 provides a summary of value-added results, both for all 96 separate estimates of resource effects and for the 39 estimates that come from samples in a single state. Clearly, these estimates are very much reduced from the overall set that is available, and thus any conclusions are subject to more uncertainty just because of a limited number of underlying investigations. On the other hand, because of the superiority of these analyses, each study deserves more weight than one of the general studies reviewed previously.

These results strongly underscore the lack of effectiveness of general policies to increase teacher-pupil ratios or to hire more teachers with master's degrees or other graduate work. Within the single-state value-added studies, only 4% (i.e., 1 out of 23 estimates) of the studies of teacher-pupil ratios and none of the 33 studies of teacher education indicate a positive and statistically significant impact on student performance. The reduced sample of studies also lessens the apparent relationship with teacher test scores. The only resource input faring as well in the value-added studies as in the general database is teacher experience. One would expect that inclusion of prior student achievement would reduce the importance of any reverse causation, so the value-added studies suggest that teacher choice is not driving the relative strength of teacher experience.

The refined analyses included in these higher-quality studies strengthens the view that resources are not closely related to student performance. The lack of high-quality studies for expenditure per pupil also figures into the preference for considering the results of the real resource models over the aggregate expenditure

TABLE 7
Percentage Distribution of Other Estimated Influences on Student Performance, Based on Value-Added Models of Individual Student Performance

		Statistically significant		Statistically insignificant		
Resources	Number of estimates	Positive	Negative	Positive	Negative	Unknown sign
A. All studies						
Teacher-pupil ratio	78	12%	8%	21%	26%	35%
Teacher education	40	0	10	35	30	25
Teacher experience	61	36	2	31	20	11
Teacher test score	11	27	9	18	27	18
B. Studies within a single state						
Teacher-pupil ratio	23	4%	13%	30%	39%	13%
Teacher education	33	0	9	33	27	30
Teacher experience	36	39	3	22	17	19
Teacher test score	9	22	11	11	33	22

Note: Source—Author's tabulations.

per pupil results. The expenditure models are almost always aggregated analyses, often lacking very detailed measures of family backgrounds and estimated in level versus value-added form. This analysis indicates that the results from expenditure studies, weak as they might be, tend to overstate the true effects.

Interpretation of Results

These results have a simple interpretation: There is no strong or consistent relationship between school resources and student performance. In other words, there is little reason to be confident that simply adding more resources to schools as currently constituted will yield performance gains among students. This finding has a series of obvious policy implications, but before turning to these, it is useful to clarify precisely what is and is not implied by these data.

Perhaps the most important fact to underscore is that this finding does not imply that all schools and teachers are the same—quite the contrary. Substantial evidence suggests that there are large differences among teachers and schools.[14] The simple fact remains that these differences are not closely related to teacher salaries or to other measured resources devoted to programs. The Coleman Report, which found that measured school resources explained a small portion of the variance in student achievement, has been commonly interpreted as implying that "schools don't make a difference." This latter interpretation confused the effects of measured differences with the full effects of schools and has been shown to be wrong. It ignores the significant difference between measured resources (of the kind on which policy frequently focuses) and the true effects of schools. In fact, it is just this difference between true effects and those of standard resources that forms the basis for the policy considerations below.

The previous evidence about the effectiveness of resources is readily interpreted as indicating that there is a distribution of underlying resource parameters. In some circumstances resources are used effectively, but these are balanced by others that indicate ineffective use. The interpretation is easiest to see from the overall distribution of results about parameter estimates in Tables 3–7. If the effect of resources were always zero and a series of valid estimates were obtained across a group of studies, one would expect to find the null hypothesis of no effect rejected 5% of the time (for a 95% significance level), with 2.5% of the studies finding a positive and statistically significant effect and 2.5% finding a negative and statistically significant effect. In fact, there are uniformly more positive and more negative rejections (except in the high-quality studies of Table 7). While there are other explanations, ones that probably contribute some to the results, it seems plausible that some schools and districts find productive uses of added resources and use extra resources to boost the performance of their students.

The concern from a policy viewpoint is that nobody can describe when resources will be used effectively and when they will not. In the absence of such a description, providing these general resources to a school implies that sometimes resources might be used effectively, other times they may be applied in ways that are actually damaging, and most of the time no measurable student outcome gains should be expected. This heterogeneity of results in the current system guides the policy discussion below.

The other possible explanations of the "fat tails" of the distribution of estimates deserve consideration. The first is publication bias. Hedges' 1990 summary of his prior research and that of others is instructive.

> The published literature is particularly susceptible to the claim that it is unrepresentative of all studies that may have been conducted (the so-called publication bias problem). There is considerable empirical evidence that the published literature contains fewer statistically insignificant results than would be expected from the complete collection of all studies actually conducted. There is also direct evidence that journal editors and reviewers intentionally include statistical significance among their criteria for selecting manuscripts for publication. The tendency of the published literature to overrepresent statistically significant findings leads to biased overestimates of effect magnitudes from published literature, a phenomenon that was confirmed empirically by Smith's study of ten meta-analyses, each of which presented average effect size estimates for both published and unpublished sources. [references omitted] (Hedges, 1990, p. 19)

For this discussion, it does not matter whether individual researchers tend to search for "statistically significant" results or whether journals are biased toward accepting them. In any event, the distribution of results would no longer reflect unbiased statistical tests, and the published results underlying the summaries in Tables 3–7 would overstate the magnitude and significance of each of the resource effects.[15]

The second explanation was alluded to previously. If the estimates are biased—say, through misspecification of the underlying relationship—a factor can appear important even though it has no effect on student performance. Its perceived importance and statistical significance will depend on the strength of the omitted factor and on its sample relationship with included-resource measures (which will vary from sample to sample). In other words, varying specification bias could be driving part of the underlying distribution of estimated effects. This situation corresponds, for example, to the omission of measures of state differences in school regulations and policies, which has different effects on the estimates depending on the aggregation of the resource measures and on whether samples are drawn across states. Again, the underlying biases would push the results toward finding more statistically significant estimates than would be the case when there are not systematic resource effects.

Neither explanation for the observed distributions of resource effects provides more support for the importance of resources. Both point to the conclusion that the weak results previously displayed are actually overstating the strength of any resource relationships.

Controversies About Resource Effects

The preceding interpretations of the general ineffectiveness of school resource policies has been challenged. These challenges are outlined and evaluated here.

Labor Market Outcomes

Taken as a group, the production function studies give little indication that variations of resources have anything to do with present variations in student performance. However, the widely publicized findings of Card and Krueger (1992a) indicate that variations in school resources are related to earnings differences among workers.[16] Several issues could contribute to reconciling these conclusions: differences in levels of resources considered, differences in measurement of student performance, differences in specification, and aggregation bias in the statistical analysis.

The Card and Krueger (1992a) analysis begins with samples of adult workers from the 1970 and 1980 censuses of population and fills in information about the schooling circumstances of individuals from information about their year and state of birth. The workers in their sample attended schools between the 1920s and the 1970s, implying variations in the level of resources going far beyond what is found today. This suggests one reconciliation: If added resources have diminishing effects on student achievement, current school operations may be largely "on the flat" of the production function, while Card and

Krueger observe ranges from the past where resources had stronger effects.[17] A related possibility might be that the political economy of schools has changed over time. For example, with the rise of teachers' unions and the resulting change in bargaining positions, resources might be used in different ways and have different student achievement implications now than in the past (e.g., Borland & Howsen, 1992; Hoxby, 1996; Peltzman, 1993). In other words, it is quite possible that the enormous changes in educational resources did have an effect on outcomes in the first half of this century, but that more recent studies are also correct in finding "no effect" for the sorts of resource changes discussed in current schools.

A second suggested reconciliation revolves around the measurement of outcomes. The previously compiled production function estimates are heavily weighted toward analyses of standardized test scores, while the Card–Krueger analysis concentrates on labor market earnings.[18] It is possible that schools do not affect test performance of students but do affect skills and earnings. As Burtless (1996) points out, it seems implausible that schools do not affect what they explicitly are attempting to do (improve test performance) but do affect earnings, something they seldom measure or even consider a direct objective. The previous conclusions from production function estimates, however, hold equally when results are divided between studies that use test scores as a measure of outcomes and those that use other measures of outcomes like college continuation or earnings. This can be seen in Table 8, which presents the available studies for expenditure per student divided by the measure of outcomes. Both the lack of general effects and the biases with aggregation hold regardless of outcome measurement.

One specific issue has received extra attention and is emphasized by Card and Krueger (1996). Do high-resource schools encourage students to stay in school longer (which has obvious impact on earnings)? Answering this question is, perhaps, more difficult than answering the straight achievement question because labor-market opportunities will affect the school-completion decision as will net tuition and parental financial support when contemplating college. That question is a focal point of Hanushek, Rivkin, and Taylor (1996). In that study of school completion, school resources have no significant impact on student behavior once individual achievement and school costs are considered.[19] Betts (1996) reviews a number of these studies of educational attainment and suggests some positive effects of resources. For the studies tabulated here (which

TABLE 8
Percentage Distribution of Estimated Effect of Expenditure Per Pupil on Student Performance by Outcome Measure and Aggregation of Resource Effects (163 estimates)

Outcome measure	Number of estimates	Statistically significant		Statistically insignificant		
		Positive	Negative	Positive	Negative	Unknown sign
A. Test score outcomes[a]						
Total	109	25%	9%	28%	21%	17%
Classroom	4	0	0	0	0	100
School	57	19	9	28	21	23
District	38	26	11	37	26	0
County	2	0	0	0	50	50
State	8	75	13	13	0	0
B. Other (nontest) outcomes[b]						
Total	54	31%	2%	46%	15%	6%
School	26	12	4	50	27	8
District	5	40	0	40	20	0
County	3	0	0	67	0	33
State	20	60	0	40	0	0

Note: Rows may not add to 100 because of rounding.
[a] All studies measure student performance by some form of standardized test score.
[b] All studies employ some outcome measure (such as income or school attainment) other than a standardized test score.

differ from those considered by Betts), there tend to be positive effects of expenditure on school attainment, but there are only 25 total studies and only 5 estimated from within individual states.[20] Thus, the small samples make it difficult to resolve this issue conclusively.

Moreover, there is considerable evidence that test scores are increasingly related to labor-market performance (for example, Bishop, 1991; Grogger & Eide, 1993; Murnane, Willett, & Levy, 1995; Neal & Johnson, 1996; O'Neill, 1990). It seems unlikely that school resources affect just the component of earnings that is uncorrelated with cognitive skills. Moreover, school resources are not consistently related to earnings (Betts, 1996). This finding is particularly clear when direct measures of the school resources relevant to individuals are available (Betts, 1995; Grogger, 1996). As an overall summary, the lack of relationship with school resources is more generally true for recent studies of earnings than earlier investigations, while more recent studies have tended to find stronger effects of cognitive skills on earnings.

The final set of reasons that could help explain the different conclusions involves specification issues. To begin with, many of the direct analyses of earnings include just the level of school resources but none of the other factors that might influence student achievement and skill development. For example, it is plausible that students attending schools with a high level of resources also have parents who contribute more time, energy, and money to their education. If parental inputs are left out of the calculation, any estimated effects of school resources will tend to overstate the true independent effect of resources. Further, as pointed out above, aggregation of school inputs is also likely to exacerbate any biases due to specification issues (Hanushek, Rivkin, & Taylor, 1996). Most of the earnings analyses observe school resources measured only at the aggregate state level. The Card–Krueger estimates come from resource data aggregated to the state level, but no measures of state policy differences are included, so their estimates are subject to this bias.[21]

The end result of this comparison is that the estimates of Card and Krueger (1992a, 1992b) at most suggest that very low levels of resources—say, those found in the poorest states before and during the Great Depression or in segregated school systems—may affect student outcomes. But there is little reason to believe that this conclusion offers helpful policy advice given the current levels of resources.

Meta-Analysis and the Summary of Results

In some research areas, such as in considering the health effects of a certain drug therapy, there is frequently an interest in compiling results from a variety of trials. Specialized techniques to combine the results of separate studies and thus assess the magnitude and significance of some relationship have been developed. These approaches go under the general title of "meta-analysis." Quite clearly, the preferred approach to assessing disparate results would involve combining the underlying data of the studies directly to develop statistical inferences and tests of hypotheses across the studies. Unfortunately, the original data are seldom available for reanalysis—and even when they are, combining data from different sources can be difficult—which forces a variety of compromises in the aggregation of results. The previous data on studies in Tables 3–8 represent one approach to the aggregation of results, an approach that relies on the minimal set of factors standardly reported. But instead of simply reporting the distribution of results—which is, sometimes derisively, called vote-counting in the meta-analysis literature—others have attempted to do formal statistical tests.[22]

A well-known version of applying formal statistical tests to education production-function data is found in Hedges, Laine, and Greenwald (1994) and Greenwald, Hedges, and Laine (1996). They wish to do formal hypothesis-testing using the available data from essentially the same set of published studies employed here. Some of the problems with doing this are immediately evident. Combining testing information is best motivated from thinking about a series of independent laboratories all providing results from a simple common experiment. But the education production-function estimates are far from a series of independent laboratories producing estimates of a single common parameter. Published estimates pursue a variety of different modeling strategies, so it is hard to define a common parameter in a way that is susceptible to formal testing. More important, published articles frequently do not (and cannot) provide sufficient information. For example, if parameter estimates are correlated across studies—say, because they reflect performance in different grades of one school district—estimation of the combined variance of the estimator would require knowledge of the covariances—something that is never provided. To be sure, such problems enter into the distributional tabulations previously presented, but they are clearly less central to the interpretation of the results than in the case of combined significance testing. To deal with the lack of independence of results, Hedges et al. preselect a very specific sample of available evidence. This procedure—forced by their methodology—not only throws away considerable information about resource effects but also leads to badly biased samples. As described in the appendix, their sample, by itself, would be sufficient to produce their conclusions.

The most basic problem with this statistical analysis, however, is that it addresses a completely uninteresting question—one that has little relevance from a policy viewpoint. Hedges et al. suggest that the central hypothesis is whether "money matters." In reality, the question they pose is whether there is any evidence that resources or expenditure differences *ever, under any circumstances* appear to affect student performance. The formal statement is clear when they test the null hypothesis that all parameters indicating the effect of a specific resource on student performance are simultaneously equal to zero (i.e., $H_0 : \beta_1 = \beta_2 = \ldots = \beta_n = 0$, where the β_i are the underlying parameters relating a specific resource to student performance in one of the *n* available studies). If any single underlying parameter (i.e., one β_i) for the combined sample of studies across varied schooling circumstances is not zero, the null hypothesis is false (that is, someplace there is a systematic effect on student performance). The statistical procedures are designed in such a case to reject the null hypothesis, leading to acceptance of the alternative that at least one study indicated the resource was someplace related to performance.[23]

The obvious interpretation of the previously reported results, as discussed above, is that there is a distribution of underlying parameters that tends to be centered close to zero. But even if the distribution were exactly centered on zero and it were very tightly distributed around zero, the methods of Hedges et al. are designed to reject the null hypothesis that all of the underlying parameter values are zero.[24]

Their formal tests lead to rejection of this restricted null hypothesis.[25] These results are sometimes interpreted as a refutation of the conclusion that educational inputs don't affect performance. But in my view, this work both confirms the previous substantive results and points to the same policy conclusions. By thinking of an underlying distribution of resource parameters, attention is focused naturally on the need for an appropriate structure of the educational environment to ensure that added resources deliver positive effects. As all of the analysis shows, productive results are possible, even if seldom achieved currently. But understanding that there is an underlying distribution of effects highlights the inappropriateness of simple resource policies within the context of current schools.[26]

STAR Experiment

In the mid-1980s, because of ambiguity about the effects of class size on student performance, the state of Tennessee launched a random-assignment experiment in reducing class size (Word et al., 1990). The design was heavily influenced by an early summary of research by Glass and Smith (1979). That study suggested that student achievement was roughly constant across class sizes until the class size got down to approximately 15 to 1. After 15 to 1, reductions in class size appeared to yield gains in student performance. Based on this, a group of kindergarten through third-graders in Tennessee were randomly assigned to either large classes (22–24 students) or small classes (14–16 students).[27] Students were followed over time as they progressed from kindergarten through third grade.

The student testing shows that children in smaller classes did better at the end of kindergarten and that this better performance was maintained through the third grade.[28] The key to interpretation revolves around expectations about student performance over time. One view is that education is a cumulative process, building on past achievement. From this view, if a student learns certain skills in the first grade, they tend to carry over to later grades, albeit possibly with some depreciation. According to this view, the basic evidence of the STAR study suggests that smaller classes may be important at kindergarten but have no average effect subsequently. Specifically, because the growth in achievement across experimental and control students is the same from first through third grade, the added resources of the smaller classes appear to add nothing to student performance.

An alternative expectation is that students are expected to fall back to a common mean performance each year. This is equivalent to a view that educational performance is not cumulative. Under this set of expectations, maintaining the difference in performance at the end of kindergarten requires continuing application of additional resources.

Yet a third alternative would be that the lowered class size did not affect learning but instead influenced the socialization of students into schools and learning settings. Such an effect would be consistent with a one-time shift in the level of student performance. It would also suggest that any resources devoted to lowering class sizes should be concentrated just on the earliest grades.

The way to identify the effects of class size in the presence of these alternative interpretations would be to assign some of the experimental children to larger classes after the earliest grades. Unfortunately, this was not done within the experiment. However, follow-ups of these students after they had returned to regular class settings showed that they maintained a large portion but not all of the prior differences (Mosteller, 1995). This latter finding supports either the general cumulative model or the socialization model and indicates that class size reductions after kindergarten have little potential effect on achievement.

The Tennessee experiment does focus attention on earlier grades. The earlier discussion in this article looked across all grades and could mask differences between earlier and later schooling. To consider this possibility, the previous estimates of the effects of teacher-pupil ratios are divided into elementary and secondary schools. As Table 9 shows, there is little difference between the estimated effects in elementary and in secondary schools, but if anything, there is less support for increasing teacher-pupil ratios at the elementary level. This evidence does not, however, restrict attention just to the earliest grades as the STAR experiment suggests should be done.

The experimental approach has obvious advantages in situations like this where the treatment—smaller classes—is well defined and easily implemented. It is unfortunate, given the policy attention devoted to class-size issues, that there has been no serious follow-up of the STAR experiment with similar experiments. As discussed in Hanushek with others (1994), improved experiments can potentially save considerable money by pinpointing when and where resources might productively be applied instead of moving directly to major public funding of full-scale programs.[29]

Policy Implications

The interpretation of these results depends fundamentally on how the policy- and decision-making process is conceived. At one level, these conclusions clearly imply that educational policy-making is more difficult than many would like. If resources had a consistent and predictable effect on student performance, policy-making would be straightforward. State legislatures could decide how much money to invest in schools and could trust local districts to apply funds in a productive manner. But the fact that local districts do not use funds effectively complicates this picture. The clearest message of existing research is that uniform resource policies will not work as intended.

Similar policy dilemmas face the courts in school-finance cases. The courts have entered into education decision-making in deciding on suits brought by people who believe that state legislatures are not fulfilling their constitutional obligations to provide equitable or adequate education to identified students in each state. While frequently motivated by concerns about student achievement, in reality both the judicial statement of the issue and the proposed remedies revolve around the level and distribution of resources. If resource availability is not a good index of educational outcomes or if providing for overall resource levels does not ensure a desired level of performance, the courts face the same dilemma as legislatures. Simply providing more funding or a different distribution of funding is unlikely to improve student achievement (even though it may affect the tax burdens of school financing across the citizens of a state).

A variation of this general theme is to argue that, while resources alone may not be sufficient to guarantee achievement, adequate resources are surely necessary. Undoubtedly, this is an ac-

TABLE 9
Percentage Distribution of Estimated Influence of Teacher-Pupil on Student Performance, by Level of Schooling

School level	Number of estimates	Statistically significant		Statistically insignificant		
		Positive	Negative	Positive	Negative	Unknown sign
Elementary schools	136	13%	20%	25%	20%	23%
Secondary schools	141	17	7	28	31	17
All schools	277	15	13	27	25	20

Note: Source—Author's tabulations.

curate statement at some level because a school with no funds would not be expected to add anything to student achievement. Nonetheless, as shown in Table 2, real spending per student increased by more than 70% between 1970 and 1990, even though student performance appears to have remained essentially unchanged.[30] Further, nothing in the previous analytical results about the effects of resources suggests that there is a level below which resources have clear and powerful effects on achievement—which would be a demonstration that some schools are below the threshold of "necessity." Just asserting that there is some level of necessary expenditure does not make the case for pure resource policies in today's schooling environment. While it is not possible to define scientifically how much is "necessary," it seems clear that the dramatically larger spending of today has taken virtually every school system in the country beyond some minimal level.

A related issue—one highlighted in some recent school-finance court cases—centers on whether funding for schools is "adequate." Such concepts may have popular appeal, but they have no policy superiority to traditional district equity arguments when translated into resource requirements. First, what is adequate is a purely political and economic issue that it likely to change both with the demands of the economy and with political views on appropriate levels of government support of programs. Second, and more important, the previous analyses of the lack of a relationship between resources and student performance hold no matter what goals are placed for student achievement or how they are arrived at. Thus, there is no objective method of indicating what resources are required for an "adequate" level of student performance.

If the object of policy is student achievement, simply changing the resources available to schools while retaining the existing decision-making in schools is unlikely to have the desired effects. Its main impact will be to increase the costs of schools.

The considerations of overall spending levels, either in legislatures or the courts, largely rest on the premise that local districts are best situated and motivated to use funds wisely and productively. There is ample evidence, however, that policymakers do not fully believe that. The extensive bodies of rules and regulations at the federal and state levels are mainly designed to ensure that local districts do not do undesirable things in operating their schools and indicate a considerable distrust of the motivations and/or abilities of local districts. To set regulations appropriately, one would need to know how resources or process considerations affect student performance—which we do not know in any way sufficient for designing most regulatory approaches to good schooling. An extension of this that pervades much of the thinking and decision-making about schools is the view that educational approaches can be effectively set centrally. This is consistent with a widely held view that "what works" is known. For example, Smith, Scoll, and Link (1996) unequivocally assert just that. (At the same time, they are totally unsurprised and unconcerned that what works is unrelated to the resources devoted to schools, simply noting that "How money is spent is far more important than how much is spent" (p. 23).) This statement about knowing what works is quite consistent with the myriad of articles and policy prescriptions that promote this or that plan as the panacea. If one believes this perspective, however, it implies that local school administrators are either uncaring or simply don't know what works because otherwise they would use available resources more effectively.[31] It also suggests that just providing better dissemination of information will effectively correct the problems. In reality, this is a scathing indictment of today's schools because it implies rather widespread malfeasance.

This policy conundrum is precisely what led the Panel on the Economics of Education Reform to concentrate not on the specific resources and policies of schools but on the incentive structure. Its report, *Making Schools Work*, emphasizes the need to alter current incentives in schools radically (Hanushek with others, 1994). The simple premise is that the unresponsiveness of performance to resources is largely a reflection that very little rests on student performance. Good and bad teachers or good and bad administrators can expect about the same career progressions, pay, and other outcomes. This then makes the choice of programs, organization, and behaviors less dependent on student outcomes than on other things that more directly affect the actors in schools.

Underlying the incentive perspective is also a more benign opinion of school personnel. Specifically, school personnel are not just ignoring a set of policies that would lead to obvious improvements but instead are simply following existing incentives. An added part of this argument is that the kinds of policies that will work in given situations with given personnel and students vary and that these policies are not easily described and centrally regulated. The assumption is that, given better incentives, school personnel can be motivated to search out what will work in their specific situations. Under current incentives, they appear to devote more of their attention and energies elsewhere.

Take the specific example of policies to reduce teacher-pupil ratios and class sizes. Many people find it difficult to believe that lowering class sizes will not lead to improved student performance, because teachers could devote more attention to the needs of each individual student if there were fewer students. While the overall evidence provided earlier pointed to no clear relationship between teacher-pupil ratios and student performance, my own interpretation is that there are almost certainly some teachers, some specific classes, and some groups of students for whom smaller classes can lead to real performance gains but that these circumstances are balanced by others where there are no obvious advantages to smaller classes. Without performance incentives, the question of class size policy is often viewed from the vantage point of fairness, which is frequently interpreted as calling for lowering all class sizes uniformly. In other circumstances, the teacher-pupil ratio may rise without actually affecting class sizes—through the addition of special programs or simply from negotiations to lower teacher contact time in the classroom. Such circumstances offer plausible explanations for the lack of effect on student performance of overall differences in class size or teacher-pupil ratios because well-considered reductions in class size are generally mixed in with overall, across-the-board reductions. On the other hand, if there were direct incentives to consider improving student performance, there could well be more surgical use of reduced class size—balanced perhaps with some increases in class size so that student performance could be increased for a given spending on programs. Indeed, it is conceivable that some of the best teachers were put into larger classes, where they could influence more students. These kinds of decisions seldom occur today, given the lack of direct rewards and incentives and the perspective of making overall, centralized decisions. Instead, objectives and goals other than enhanced student achievement are more readily considered and pursued.

The previous work on educational production has provided substantial evidence that there are vast differences among teachers and schools. It is just that these differences are not easily described by the resources employed or by any simple set of programmatic or behavioral descriptions. The existence of effective teachers and schools, however, implies that one approach to policy is concentrating on ways to reward better performance whenever it is found. In other words, even if the details of what will work are unavailable before the fact (or even after the fact), policy can be described in terms of outcomes, and good outcomes can be rewarded.

Such a description is itself much too simple because we have limited experience with alternative incentive schemes (Hanushek with others, 1994). The alternative incentive structures include a variety of conceptual approaches to providing rewards for improved student performance and range from merit pay for teachers to charter schools to privatization to vouchers. These are contentious proposals, in part because introduction of performance incentives might lead to having a variety of people other than current school personnel making decisions and even providing educational services. They are also proposals that could work well or poorly, depending on the details. The purpose here, however, is not to consider the pros and cons of alternatives, but to emphasize the radically different perspective on policy that is embedded in each. Performance incentives recognize that there might be varying approaches by teachers and schools that are productive. Thus, they avoid the centralized "command and control" perspective of much current policy. At the same time, they recognize that simply decentralizing decision-making is unlikely to work effectively unless there exist clear objectives and unless there is direct accountability.[32]

Given the current lack of knowledge about the design or implications of performance incentives, an aggressive program of experimentation and evaluation seems very appropriate (Hanushek with others, 1994). Nonetheless, the lack of direct information about alternatives should not be taken as support for more of what we are doing now. We actually have considerable experience with the current organization, and current approaches appear to offer little hope for general improvement.

The existing work does not suggest that resources never matter, nor does it suggest that resources could not matter. It only indicates that the current organization and incentives of schools do little to ensure that any added resources will be used effectively. Faced with this, some simply declare that we should still pursue general resource policies, but we should not pursue programs that do not work. This would be fine if programs that do and do not work could be reliably identified by policymakers. We know that they have not been accurate in their past identification.

APPENDIX

Selection of Studies Employed by Greenwald, Hedges, and Laine (1996)

The conclusions of the statistical testing of Greenwald et al. (1996) have received considerable attention, in part because they appear to follow careful statistical procedures. Unfortunately, their testing is dependent on choosing a selective sample of the available analytical results (from Table 3). The importance of sample selection is readily understood within the context of available data.

Table 10 shows the selection percentages, reflecting the proportion of available studies (by results) that are used by Greenwald et al. (1996). First, for purely technical reasons, their methodology requires that they eliminate all studies finding statistically insignificant effects but not reporting the sign (see the last column of Table 10). This action by itself eliminates 13% to 26% of the available data. The preliminary elimination of substantial evidence against significant resource effects biases the results toward finding statistically significant results. Second, additional loss is caused by the fact that their methodology cannot deal with any dependencies among the estimates, such as those caused by analyzing different students who are enrolled in a common school system. Thus, they employ rather arbitrary rules for dropping results from correlated studies by given authors (although they ignore correlations from different authors who employ a common data set). Dropping studies, even if the samples are related and the estimates from them will be correlated, clearly leads to a loss of

TABLE 10
Selection Rates for Studies Employed by Greenwald, Hedges, and Laine (1996), Total and by Results[a] (Percentages)

		Statistically significant		Statistically insignificant		
Outcome measure	Number of estimates	Positive	Negative	Positive	Negative	Unknown sign
Teacher-pupil ratio	23%	31%	19%	43%	17%	0%
Teacher education	22	44	67	27	22	0
Teacher experience	30	30	20	40	30	0
Expenditure per pupil	17	34	9	9	10	0

Note: Source—Author's tabulations.
[a] The number of studies by results employed in the statistical analyses of Greenwald et al. (1996) are compared to the total number of studies available, as found in Table 3.

information. Their specific sample selection process uniformly retains a higher proportion of the statistically significant positive results than of the overall results. In the cases of teacher education and expenditure per pupil, the sampling rate for statistically significant positive results is double the overall sampling rate. While they retain just 22% of the available estimates of the effects of teacher education, they retain 44% of those that show a positive and statistically significant effect. Similarly, for expenditure per pupil, they retain only 17% of all studies but 34% of those with positive and statistically significant estimated effects. At the same time, with the exception of the teacher education results, Greenwald et al. (1996) retain a lower proportion of statistically significant negative results than of overall results. Moreover, among the insignificant results, the sampling tends to retain a relatively higher proportion of the positive estimates than of the negative estimates (with the minor exception of essentially equal sampling rates for expenditure per pupil). The overall sampling in Greenwald et al. (1996) is dramatically biased toward retaining both statistically significant positive and insignificant but positive results, just the direction that leads to supporting their general conclusions.

Notes

This paper was completed within the context of continuing work with Stephen Rivkin and Lori Taylor. Financial support was provided by the William T. Donner Foundation.

[1]These analyses suggested serious flaws in the statistical methodology and interpretation of the Coleman Report, but most of those discussions are not relevant for this discussion. (See Bowles & Levin, 1968; Cain & Watts, 1970; Hanushek & Kain, 1972.)

[2]The tabulations do include results in Hanushek, Rivkin, and Taylor (1996) because this updating was conducted as part of that research.

[3]The studies analyzed here include all studies contained in the prior review of 1989 along with a few that had been missed in that review and newly published studies. While some studies have undoubtedly been missed in this review, it is virtually impossible that the missed studies would alter the overall conclusions given the numbers of studies reported below.

[4]Some judgment is required in selecting from among the alternative specifications. As a general rule, the tabulated results reflect the estimates that are emphasized by the authors of the underlying papers. In some cases, this rule did not lead to a clear choice, at which time the tabulation emphasized statistically significant results among the alternatives preferred by the original author. An alternative approach is followed by Betts (1996). He aggregates all of the separate estimates of a common parameter that are presented in each individual paper.

[5]New analyses have also appeared, but they are not included because the systematic search of available journals and books went just through the end of 1994. Without systematically surveying all available sources, inclusion of some studies could lead to selection biases. Among these newer studies are Betts (1995), Ehrenberg and Brewer (1995), Ferguson and Ladd (1996), Grogger (1996), Lamdin (1995), and Staley and Blair (1995). It is also the case that, given the number of sampled studies, a few added results could not affect the overall conclusions here even if they all uniformly pointed in the same direction.

[6]Some studies include expenditure per pupil along with measures of the real classroom resources. In such a case, because variations in classroom instructional expenditure are held constant, expenditure per student is interpreted as spending outside of the classroom. If only some of the classroom resources are included, the interpretation is more ambiguous and depends on the specific specification.

[7]The individual studies tend to measure each of these inputs in different ways. For example, while many studies include an indicator variable for whether the teacher has a master's degree, some will include measures of the graduate credits. With teacher-pupil ratio, some measure actual class size, while the majority measure teacher-pupil ratio. A variety of functional forms have been used, ranging from simple linear relationships to different nonlinear forms with thresholds, quadratics, and the like. In all cases, estimated signs are reversed if the measure involves pupil-teacher ratios or class size instead of teacher-pupil ratio. Further, where nonlinearities indicate positive effects over some range but not others—say, with ranges of teacher experience—the most favorable for the hypothesis of positive effects is recorded.

[8]Administrative inputs are measured with such things as overall spending, the salaries of administrators, or the qualifications of administrators. Facilities include expenditures and specific measures such as availability of laboratories, the size and presence of a library, and the property of the school. In all cases, results are tabulated such that more of the measured characteristic means greater resources.

[9]At the same time, aggregation is sometimes helpful. Specifically, when there is measurement error in the explanatory variables, aggregation can improve otherwise biased estimates. In the simplest cases of model misspecification or of errors-in-variables, there are predictions about the direction of any biases, but these predictions break down in more complicated sit-

uations of multivariate models. (See Hanushek, Rivkin, & Taylor, 1996, for a general discussion of aggregation and the potential biases.)

[10]The federal government has always had a rather limited role, directed largely at specific programs and populations. Its largest elementary and secondary programs involve funding for compensatory programs (such as Title 1), vocational education, and programs for handicapped populations. The federal government probably has a larger impact through laws and regulations (such as the Education for All Handicapped Children Act, which determined requirements for special education). The federal judiciary, through its desegregation rulings, has also had enormous impacts on schools. Nonetheless, there is little reason to believe that these elements have had a particularly strong or biasing effect on the statistical analyses of the educational production process.

[11]The preceding statement assumes linear state effects. To the extent that state policies interact with inputs into the educational process in a nonlinear manner, within-state estimates could also suffer biases.

[12]For an analysis of how study selection affects the summary of studies, see Hanushek, 1996a.

[13]A related group of studies employs synthetic cohorts. These studies do not match current and past performance of the same students, but instead either add performance of current students in earlier grades or of students of the same vintage in prior grades (e.g., Ferguson & Ladd, 1996, Sebold & Dato, 1981). The first approach has none of the features that lead to preferring value-added studies because past family, past school, and ability effects are not accurately accounted for. The second approach, which would be appropriate if there were no student mobility, leads to substantial errors with in and out movements of students. Moreover, the errors will generally be correlated with socioeconomic and school factors because these are related to mobility behavior. Greenwald, Hedges, and Laine (1996) demonstrate that these synthetic cohort studies tend to find more significant expenditure effects. (See Hanushek, 1996a, for a discussion of these results.)

[14]The clearest evidence comes from a series of covariance, or fixed-effects, estimates of performance differences across teachers (e.g., Armor et al., 1976; Hanushek, 1971, 1992; Murnane, 1975; Murnane & Phillips, 1981). These analyses consistently show large and significant differences among teachers. To give some indication of the order of magnitude, the estimated difference between a "good" and a "bad" teacher in poverty schools of Gary, Indiana, was approximately one grade level per academic year (i.e., a student with a good teacher might progress at 1.5 grade equivalents in a school year, while those with a bad teacher might progress at 0.5 grade equivalents (Hanushek, 1992)). Moreover, the consistency of individual teacher effects across grades and school years indicates that the estimated differences relate directly to teacher quality and not the specific mix of students and the interaction of teacher and students.

[15]It is possible to ignore publication bias in the interpretation here because publication bias works against the "no systematic effect" conclusion. The same is not the case when one is working to establish that resource variations are important, as in Hedges, Laine, and Greenwald (1994) or Greenwald, Hedges, and Laine (1996). In their work, the inherent biases push the results toward their conclusions.

[16]The Card and Krueger (1992a) analysis of school resources and earnings is the most discussed, but it follows a larger line of research. See, for example, Johnson and Stafford (1973), Wachtel (1976), and Welch (1966). An insightful review of past studies that considers underlying characteristics of the studies is Betts (1996).

[17]While not a direct test of this on-the-flat thesis, the lack of significantly stronger resource effects in developing countries introduces some question about this hypothesis. (See Hanushek, 1995; or, in a growth context, Hanushek & Kim, 1996.)

[18]An important specification issue is that Card and Krueger (1992a) attempt to distinguish between the effects of schooling inputs and the effects of being in different local labor markets by assuming that migration across regions is nonselective. This assumption, however, runs counter to standard economic models, and—as Heckman, Layne–Farrar, and Todd (1996a, 1996b) demonstrate—counter to the data. Thus, the data do not support a key identifying condition for the Card–Krueger estimation of school-resource effects.

Using a different methodology, however, they do find that school resources appear important in explaining differences in Black earnings after the end of segregation (Card & Krueger, 1992b). The level of resources is lower and the differences in resources are higher in that study than in current situations, again suggesting that resources may matter at low levels.

[19]The major focus of that article is the effect of aggregation of school-resource data. At the individual school level, school resources have no significant impact on completion and frequently even have the wrong sign. Aggregation to the state level does boost the apparent significance of school resources, but this is entirely explained by increased bias with model misspecification.

[20]One might expect state effects to be particularly important in determining school continuation because the availability and expense of public colleges and universities and the opportunity costs implied by different local labor markets vary significantly across states.

[21]If, on the other hand, there are important measurement errors in the school resources, aggregation

could be beneficial because this would tend to average out any measurement problems. A central concern of Hanushek, Rivkin, and Taylor (1996) is distinguishing between the harmful effects of aggregation and model misspecification and the beneficial effects of aggregation and measurement error. That analysis rejects the hypothesis that measurement error is a primary element in the apparent importance of resources in the more aggregated studies.

[22]The primary argument against vote-counting derives from the stylized analysis of combining a series of small experiments employing tests with low power, where more studies can actually lead to false conclusions. These examples have little relevance to the statistical tests developed in a regression framework with the large samples frequently available.

[23]In discussing precisely the issue of how to interpret rejection of this null hypothesis, Hedges and Olkin (1985, p. 45) state, "It is doubtful if a researcher would regard such a situation as persuasive evidence of the efficacy of a treatment."

[24]The actual application of the specific tests they employ requires a number of severe restrictions. One crucial aspect is the reliance on selective samples that are biased toward resource effects. They employ a series of arbitrary, but far from innocuous, selection rules in an attempt to make the data fit their methodology, which requires independence of the estimates. The sampling is discussed in the appendix.

[25]Note that the precise testing depends crucially on their specific choice of statistical methods and on their selective sampling of available results. (See the appendix to this article.)

[26]In addition to conducting the combined hypothesis tests, they attempt to provide estimates of the magnitude of any resource effects. They concentrate most of their attention on expenditure per pupil, which is unfortunate because these studies tend to be the weakest of all of the available studies. After considerable manipulation of the sample of studies (see appendix), they do estimate that there is a positive median effect of expenditure on test scores. These estimates are, however, quite inconsistent with aggregate spending and test performance (Hanushek, 1996b) and do not change any policy conclusions.

[27]The design was actually more complicated. The large classes were broken into two groups, one with teacher aides and one without aides. To be eligible to participate in the experiment, a school also had to be large enough so as to ensure that there was at least one small and large class. And some re-assignment of students occured after the first year of the experiment.

[28]A series of questions about the effects of initial randomization, of sample attrition, and of student mobility do remain. Unfortunately, the data from the STAR experiment have not been made generally available to researchers, so the analysis and interpretation of the results have had to rely on the published reports of the original researchers.

[29]In 1996, the state of California moved to a statewide program of providing significant additional funds to all schools that lowered class sizes in primary grades to state-prescribed levels. This program appears to have been the policy implementation of perceived results from the STAR experiment. Having done this on a statewide basis, the state has no effective way to evaluate the results of such an initiative, so that neither California nor other states can learn from this program. The existing evidence provides little reason to be optimistic about the future achievement effects of this policy.

[30]The overall performance of 17-year-olds on the National Assessment of Educational Progress (NAEP), while varying slightly by subject, indicates achievement in the mid-1990s is about the same as in the early 1970s (Hanushek with others, 1994). These trends could be complicated by nonschool factors, although these do not seem to be plausible explanations for the overall results (Hanushek 1996a, 1996b).

[31]One somewhat different reaction to the lack of consistent determinants of educational performance (as seen from the existing production function work) has been a concern that that research has been a failure because it does not clearly indicate what policies should be mandated. Again, this view accepts a level of comfort with centralized decision-making that has been discarded throughout most sectors of most economies in the world.

[32]While the decentralization considered here really refers to pure resource policies and general funding, the evidence supports this conclusion even at the level of school-based management (see Summers & Johnson, 1996).

Sources of Tabulated Results

Akin, J. S., & Garfinkel, I. (1977). School expenditures and the economic returns to schooling. *Journal of Human Resources, 12*(4), 460–481.

Anderson, G. M., Shughart, W. F., II & Tollison, R. D. (1991). Educational achievement and the cost of bureaucracy. *Journal of Economic Behavior and Organization, 15,* 29–45.

Andrews, D. R., Fayissa, R., & Tate, U. S. (1991, Summer). An estimation of the aggregate educational production function for public schools in Louisiana. *Review of Black Political Economy,* 25–47.

Armor, D., Conry-Oseguera, P., Cox, M., King, N., McDonnell, L., Pascal, A., Pauly, E., & Zellman, G. (1976). *Analysis of the school preferred reading program in selected Los Angeles minority schools.* Santa Monica, CA: Rand Corp.

Baum, D. N. (1986). A simultaneous equations model of the demand for and production of local public services: The case of education. *Public Finance Quarterly, 14*(2), 157–178.

Behrendt, A., Eisenach, J. A., & Johnson, W. R. (1986). Selectivity bias and the determinants of SAT scores. *Economics of Education Review, 5*(4), 363–371.

Beiker, R. F., & Anschel, K. R. (1973, August). Estimating educational production functions for rural high schools: Some findings. *American Journal of Agricultural Economics, 55,* 515–519.

Berger, M. C., & Toma, E. F. (1994). Variation in state education policies and effects on student performance. *Journal of Policy Analysis and Management, 13*(3), 477–491.

Bingham, R. D., Heywood, J. S., & White, S. B. (1991). Evaluating schools and teachers based on student performance. *Evaluation Review, 15*(2), 191–218.

Boardman, A., Davis, O., & Sanday, P. (1977). A simultaneous equations model of the educational process. *Journal of Public Economics, 7*(1), 23–49.

Borland, M. V., & Howsen, R. M. (1992). Student academic achievement and the degree of market concentration in education. *Economics of Education Review, 11*(1), 31–39.

Bosshardt, W., & Watts, M. (1990). Instructor effects and their determinants in precollege economic education. *Journal of Economic Education, 21*(3), 265–276.

Bosshardt, W., & Watts, M. (1994). Instructor effects in economics in elementary and junior high schools. *Journal of Economic Education, 24*(3), 195–211.

Bowles, S. (1970). Towards an educational production function. In W. L. Hansen (Ed.), *Education, income and human capital* (pp. 11–60). New York: National Bureau of Economic Research.

Brown, B. W. (1992). Achievement, costs, and the demand for public education. *Western Economic Journal, 10*(2), 198–219.

Brown, B. W., & Saks, D. H. (1975). The production and distribution of cognitive skills within schools. *Journal of Political Economy, 83*(3), 571–593.

Burkhead, J. (1967). *Input-output in large city high schools.* Syracuse, NY: Syracuse University Press.

Butler, M. R., & McNertney, E. M. (1991). Estimating educational production functions: The problem of multicollinearity. *Social Science Journal, 28*(4), 489–499.

Caldas, S. J. (1993). Reexamination of input and process factor effects on public school achievement. *Journal of Educational Research, 86*(4), 206–214.

Card, D., & Krueger, A. B. (1992a). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy, 100*(1), 1–40.

Card, D., & Krueger, A. B. (1992b). School quality and black-white relative earnings: A direct assessment. *Quarterly Journal of Economics, 107*(1), 151–200.

Cohn, E. (1968). Economies of scale in Iowa high school operations. *Journal of Human Resources, 3*(4), 422–434.

Cohn, E., & Millman, S. D. (1975). *Input-output analysis in public education.* Cambridge, MA: Ballinger.

Deller, S. C., & Rudnicki, E. (1993). Production efficiency in elementary education: The case of Maine public schools. *Economics of Education Review, 12*(1), 45–57.

Dolan, R. C., & Schmidt, R. M. (1987). Assessing the impact of expenditure on achievement: Some methodological and policy considerations. *Economics of Education Review, 6*(3), 285–299.

Dugan, D. J. (1976). Scholastic achievement: Its determinants and effects in the education industry. In J. T. Froomkin, D. T. Jamison, & R. Radner (Eds.), *Education as an industry* (pp. 53–83). Cambridge, MA: Ballinger.

Dynarski, M. (1987). The scholastic aptitude test: Participation and performance. *Economics of Education Review, 6*(3), 263–274.

Dynarski, M., Schwab, R., & Zampelli, E. (1989). Local characteristics and public production: The case of education. *Journal of Urban Economics, 26,* 250–263.

Eberts, R. W., & Stone, J. (1984). *Unions and public schools: The effect of collective bargaining on American education.* Lexington, MA: Lexington Books.

Edwards, L. N. (1975). The economics of schooling decisions: Teenage enrollment rates. *Journal of Human Resources, 10*(2), 155–173.

Ehrenberg, R. G., & Brewer, D. J. (1994). Do school and teacher characteristics matter? Evidence from "High School and Beyond." *Economics of Education Review, 13*(1), 1–17.

Ehrenberg, R. G., Ehrenberg, R. A., Rees, D. I., & Ehrenberg, E. L. (1991). School district leave policies, teacher absenteeism, and student achievement. *Journal of Human Resources, 26*(1), 72–105.

Farkas, G., Grobe, R. P., Sheehan, D., & Shuan, Y. (1990). Cultural resources and school success: Gender, ethnicity, and poverty groups within an urban school district. *American Sociological Review, 55*(1), 127–142.

Ferguson, R. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation, 28*(2), 465–498.

Fowler, W. J., Jr. & Walberg, H. J. (1991). School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis, 13*(2), 189–202.

Grimes, P. W. (1994, Winter). Public versus private secondary schools and the production of economic education. *Journal of Economic Education, 25*(1), 17–30.

Grimes, P. W., & Register, C. A. (1990, Summer). Teachers' unions and student achievement in high school economics. *Journal of Economic Education, 21*(3), 297–306.

Grimes, P. W, & Register, C. A. (1991). Teacher unions and black students' scores on college entrance exams. *Industrial Relations, 30*(3), 492–500.

Hanushek, E. A. (1971). Teacher characteristics and gains in student achievement: Estimation using micro data. *American Economic Review, 60*(2), 280–288.

Hanushek, E. A. (1972). *Education and race: An analysis of the educational production process.* Cambridge, MA: Health–Lexington.

Hanushek, E. A. (1992). The trade-off between child quantity and quality. *Journal of Political Economy, 100*(1), 84–117.

Hanushek, E. A. (1993). Can equity be separated from efficiency in school finance debates? In E. P. Hoffman (Ed.), *Essays on the economics of education* (pp. 35–73). Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.

Hanushek, E. A., Rivkin, S. G., & Taylor, L. L. (1996). Aggregation and the estimated effects of school resources. *Review of Economics and Statistics, 78*(4), 611–627.

Harnisch, D. L. (1987). Characteristics associated with effective public high schools. *Journal of Educational Research, 80*(4), 233–241.

Heim, J., & Perl, L. (1974). *The educational production function: Implications for educational manpower policy.* Ithaca, NY: Cornell University.

Henderson, V., Mieszkowski, P., & Sauvageau, Y. (1976). *Peer group effects and educational production functions.* Ottawa, Canada: Economic Council of Canada.

Jencks, C. S., & Brown, M. (1975). Effects of high schools on their students. *Harvard Educational Review, 45*(3), 273–324.

Johnson, G. E., & Stafford, F. P. (1973). Social returns to quantity and quality of schooling. *Journal of Human Resources, 8*(2), 139–155.

Jud, G. D., & Walker, J. L. (1977). Discrimination by race and class and the impact of school quality. *Social Science Quarterly, 57,* 731–749.

Katzman, M. (1971). *Political economy of urban schools.* Cambridge, MA: Harvard University Press.

Kenny, L. W. (1982). Economies of scale in schooling. *Economics of Education Review, 2*(1), 1–24.

Kiesling, H. J. (1967, August). Measuring a local government service: A study of school districts in New York state. *Review of Economics and Statistics, 49,* 356–367.

Kiesling, H. J. (1984). Assignment practices and the relationship of instructional time to the reading performance of elementary school children. *Economics of Education Review, 3*(4), 341–350.

Kurth, M. M. (1987). Teachers' unions and excellence in education: An analysis of the decline in SAT scores. *Journal of Labor Research, 8*(4), 351–367.

Levin, H. M. (1970). A new model of school effectiveness. In U.S. Office of Education (Ed.), *Do teachers make a difference?* (pp. 55–78). Washington, DC: U.S. Government Printing Office.

Levin, H. M. (1976). Concepts of economic efficiency and educational production. In J. T. Froomkin, D. T. Jamison, & R. Radner (Eds.), *Education as an industry* (pp. 149–190). Cambridge, MA: Ballinger.

Link, C. R., & Mulligan, J. G. (1986). The merits of a longer school day. *Economics of Education Review, 5*(4), 373–381.

Link, C. R., & Mulligan, J. G. (1991). Classmates' effects on black student achievement in public school classrooms. *Economics of Education Review, 10*(4), 297–310.

Link, C. R., & Ratledge, E. C. (1975). The influence of the quantity and quality of education on black-white earnings differentials: Some new evidence. *Review of Economics and Statistics, 57*(3), 346–350.

Link, C. R., & Ratledge, E. C. (1979). Student perceptions, I.Q., and achievement. *Journal of Human Resources, 14*(1), 98–111.

Lopus, J. S. (1990). Do additional expenditures increase achievement in the high school economics class? *Journal of Economic Education, 21*(3), 277–286.

Maynard, R., & Crawford, D. (1976). School performance. *Rural income maintenance experiment: Final report.* Madison, WI: University of Wisconsin.

Michelson, S. (1970). The association of teacher resources with children's characteristics. In U.S. Office of Education (Ed.), *Do teachers make a difference?* (pp. 120–168). Washington, DC: U.S. Government Printing Office.

Michelson, S. (1972). For the plaintiffs—equal school resource allocation. *Journal of Human Resources, 7*(3), 283–306.

Montmarquette, C., & Mahseredjian, S. (1989). Does school matter for educational achievement? A two-way nested-error components analysis. *Journal of Applied Econometrics, 4,* 181–193.

Morgenstern, R. D. (1973). Direct and indirect effects on earnings of schooling and socio-economic background. *Review of Economics and Statistics, 55*(2), 225–233.

Murnane, R. J. (1975). *Impact of school resources on the learning of inner city children.* Cambridge, MA: Ballinger.

Murnane, R. J., & Phillips, B. (1981). What do effective teachers of inner-city children have in common? *Social Science Research, 10*(1), 83–100.

Namboodiri, K., Corwin, R. G., & Dorsten, L. E. (1966, October). Analyzing distributions in school effects research: An empirical illustration. *Sociology of Education, 66,* 278–294.

Pallas, A. M., Entwisle, D. R., Alexander, K. L., & Cadigan, D. (1987, October). Children who do exceptionally well in first grade. *Sociology of Education, 60,* 257–271.

Perl, L. J. (1973). Family background, secondary school expenditure, and student ability. *Journal of Human Resources, 8*(2), 156–180.

Raymond, R. (1968). Determinants of the quality of primary and secondary public education in West Virginia. *Journal of Human Resources, 3*(4), 450–470.

Ribich, T. I., & Murphy, J. L. (1975). The economic returns to increased educational spending. *Journal of Human Resources, 10*(1), 56–77.

Sander, W. (1993). Expenditure and student achievement in Illinois. *Journal of Public Economics, 52,* 403–416.

Sander, W., & Krautmann, A. C. (1991). Local taxes, schooling, and jobs in Illinois. *Economics of Education Review, 10*(2), 111–121.

Sebold, F. D., & Dato, W. (1981). School funding and student achievement: An empirical analysis. *Public Finance Quarterly, 9*(1), 91–105.

Sengupta, J. K., & Sfeir, R. E. (1986). Production frontier estimates of scale in public schools in California. *Economics of Education Review, 5*(3), 297–307.

Smith, M. (1972). Equality of educational opportunity: The basic findings reconsidered. In F. Mosteller & D. P. Moynihan (Eds.), *On equality of educational opportunity* (pp. 230–342). New York: Random House.

Stern, D. (1989). Educational cost factors and student achievement in grades 3 and 6: Some new evidence. *Economics of Education Review, 8*(2), 149–158.

Strauss, R. P., & Sawyer, E. A. (1986). Some new evidence on teacher and student competencies. *Economics of Education Review, 5*(1), 41–48.

Summers, A., & Wolfe, B. (1977). Do schools make a difference? *American Economic Review, 67*(4), 639–652.

Tuckman, H. P. (1971). High school inputs and their contribution to school performance. *Journal of Human Resources, 6*(4), 490–509.

Wachtel, P. (1975). The effect of school quality on achievement, attainment levels, and lifetime income. *Explorations in Economic Research, 2,* 502–536. (Occasional papers of the National Bureau of Economic Research)

Wachtel, P. (1976). The effect on earnings of school and college investment expenditures. *Review of Economics and Statistics, 58*(3), 326–331.

Walberg, H. J., & Fowler, W. J, Jr. (1987). Expenditure and size efficiencies of public school districts. *Educational Researcher, 16*(7), 5–13.

Walberg, H. J., & Rasher, S. P. (1974, September). Public school effectiveness and equality: New evidence and its implications. *Phi Beta Kappan,* 3–9.

Walberg, H. J., & Walberg, H. J, III. (1994). Losing local control. *Educational Researcher, 23*(5), 19–26.

Watts, M. (1985, Fall). School district inputs and biased estimation of educational production functions. *Journal of Economic Education, 16*(4), 281–286.

Wendling, W., & Cohen, J. (1981, Summer). Education resources and student achievement: Good news for schools. *Journal of Education Finance, 7,* 44–63.

Winkler, D. (1975). Educational achievement and school peer group composition. *Journal of Human Resources, 10*(2), 189–204.

References

Armor, D., Conry–Oseguera, P., Cox, M., King, N., McDonnell, L., Pascal, A., Pauly, E., & Zellman, G. (1976). *Analysis of the school preferred reading program in selected Los Angeles minority schools.* Santa Monica, CA: Rand Corp.

Betts, J. R. (1995). Does school quality matter? Evidence from the National Longitudinal Survey of Youth. *Review of Economics and Statistics, 77*(2), 231–247.

Betts, J. R. (1996). Is there a link between school inputs and earnings? Fresh scrutiny of an old literature. In G. Burtless (Ed.), *Does money matter? The effect of school resources on student achievement and adult success* (pp. 141–191). Washington, DC: Brookings.

Bishop, J. (1991). Achievement, test scores, and relative wages. In M. H. Kosters (Ed.), *Workers and their wages* (pp. 146–186). Washington, DC: The AEI Press.

Borland, M. V., & Howsen, R. M. (1992). Student academic achievement and the degree of market concentration in education. *Economics of Education Review, 11*(1), 31–39.

Bowles, S., & Levin, H. M. (1968). The determinants of scholastic achievement—an appraisal of some recent evidence. *Journal of Human Resources, 3*(1), 3–24.

Burtless, G. (1996). Introduction and summary. In G. Burtless (Ed.), *Does money matter? The effect of school resources on student achievement and adult success* (pp. 1–42). Washington, DC: Brookings.

Cain, G. G., & Watts, H. W. (1970). Problems in making policy inferences from the Coleman Report. *American Sociological Review, 35*(2), 328–352.

Card, D., & Krueger, A. B. (1992a). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy, 100*(1), 1–40.

Card, D., & Krueger, A. B. (1992b). School quality and black-white relative earnings: A direct assessment. *Quarterly Journal of Economics, 107*(1), 151–200.

Card, D., & Krueger, A. B. (1996). Labor market effects of school quality: Theory and evidence. In G. Burtless (Ed.), *Does money matter? The effect of school resources on student achievement and adult success* (pp. 97–140). Washington, DC: Brookings.

Coleman, J. S., Campbell, E. Q., Hobson, C. J, McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1996). *Equality of educational opportunity*. Washington, DC: U.S. Government Printing Office.

Ehrenberg, R. G., & Brewer, D. J. (1995). Did teachers' verbal ability and race matter in the 1960s? Coleman revisited. *Economics of Education Review, 14*(1), 1–21.

Ferguson, R. F., & Ladd, H. F. (1996). How and why money matters: An analysis of Alabama schools. In H. F. Ladd (Ed.), *Holding schools accountable: Performance-based reform in education* (pp. 265–298). Washington, DC: Brookings.

Glass, G. V., & Smith, M. L. (1979). Meta-analysis of research on class size and achievement. *Educational Evaluation and Policy Analysis, 1*(1), 2–16.

Greenberg, D., & McCall, J. (1974). Teacher mobility and allocation. *Journal of Human Resources, 9*(4), 480–502.

Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research, 66*(3), 361–396.

Grogger, J. T. (1996). Does school quality explain the recent black/white wage trend? *Journal of Labor Economics, 14*(2), 231–253.

Grogger, J. T., & Eide, E. (1993). Changes in college skills and the rise in the college wage premium. *Journal of Human Resources, 30*(2), 280–310.

Hanushek, E. A. (1971). Teacher characteristics and gains in student achievement: Estimation using micro data. *American Economic Review, 60*(2), 280–288.

Hanushek, E. A. (1979). Conceptual and empirical issues in the estimation of educational production functions. *Journal of Human Resources, 14*(3), 351–388.

Hanushek, E. A. (1981). Throwing money at schools. *Journal of Policy Analysis and Management, 1*(1), 19–41.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature, 24*(3), 1141–1177.

Hanushek, E. A. (1989). The impact of differential expenditures on school performance. *Educational Researcher, 18*(4), 45–51.

Hanushek, E. A. (1992). The trade-off between child quantity and quality. *Journal of Political Economy, 100*(1), 84–117.

Hanushek, E. A. (1995). Interpreting recent research on schooling in developing countries. *World Bank Research Observer, 10*(2), 227–246.

Hanushek, E. A. (1996a). A more complete picture of school resource policies. *Review of Educational Research, 66*(3), 397–409.

Hanushek, E. A. (1996b). School resources and student performance. In G. Burtless (Ed.), *Does money matter? The effect of school resources on student achievement and adult success* (pp. 43–73). Washington, DC: Brookings.

Hanushek, E. A., & Kain, J. F. (1972). On the value of "Equality of Educational Opportunity" as a guide to public policy. In F. Mosteller & D. P. Moynihan (Eds.), *On equality of educational opportunity* (pp. 116–145). New York: Random House.

Hanushek, E. A., & Kim, D. (1996, December). *Schooling, labor force quality, and the growth of nations*. Rochester, NY: Department of Economics, University of Rochester.

Hanushek, E. A., Rivkin, S. G., & Taylor, L. L. (1996). Aggregation and the estimated effects of school resources. *Review of Economics and Statistics, 78*(4), 611–627.

Hanushek, E. A., with others. (1994). *Making schools work: Improving performance and controlling costs*. Washington, DC: Brookings.

Heckman, J. S., Layne–Farrar, A., & Todd, P. (1996a). Does measured school quality really matter? An examination of the earnings-quality relationship. In G. Burtless (Ed.), *Does money matter? The effect of school resources on student achievement and adult success* (pp. 192–289). Washington, DC: Brookings.

Heckman, J. S., Layne–Farrar, A., & Todd, P. (1996b). Human capital pricing equations with an application to estimating the effect of schooling quality on earnings. *Review of Economics and Statistics, 78*(4), 562–610.

Hedges, L. V. (1990). Directions for future methodology. In K. W. Wachter & M. L. Straf (Eds.), *The future of meta-analysis* (pp. 11–26). New York: Russell Sage.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23*(3), 5–14.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis.* San Diego, CA: Academic Press.

Hoxby, C. M. (1996). How teachers' unions affect education production. *Quarterly Journal of Economics, 111*(3), 671–718.

Johnson, G. E., & Stafford, F. P. (1973). Social returns to quantity and quality of schooling. *Journal of Human Resources, 8*(2), 139–155.

Lamdin, D. J. (1995).Testing for the effect of school size on student achievement within a school district. *Education Economics, 3*(1), 33–42.

Mosteller, F. (1995). The Tennessee study of class size in the early school grades. *The Future of Children, 5*(2), 113–127.

Murnane, R. J. (1975). *Impact of school resources on the learning of inner city children.* Cambridge, MA: Ballinger.

Murnane, R. J. (1981). Teacher mobility revisited. *Journal of Human Resources, 16*(1), 3–19.

Murnane, R. J., & Phillips, B. (1981). What do effective teachers of inner-city children have in common? *Social Science Research, 10*(1), 83–100.

Murnane, R. J., Willett, J. B., & Levy, F. (1995). The growing importance of cognitive skills in wage determination. *Review of Economics and Statistics, 77*(2), 251–266.

Neal, D. A., & Johnson, W. R. (1996). The role of premarket factors in Black-White differences. *Journal of Political Economy, 104*(5), 869–895.

O'Neill, J. (1990). The role of human capital in earnings differences between Black and White men. *Journal of Economic Perspectives, 4*(4), 25–46.

Peltzman, S. (1993, April). The political economy of the decline of American public education. *Journal of Law and Economics, 36,* 331–370.

Sebold, F. D., & Dato, W. (1981). School funding and student achievement: An empirical analysis. *Public Finance Quarterly, 9*(1), 91–105.

Smith, M. S., Scoll, B. W., & Link, J. (1996). Research-based school reform: The Clinton administration's agenda. In E. A. Hanushek & D. W. Jorgenson (Eds.), *Improving America's schools: The role of incentives* (pp. 9–27). Washington, DC: National Academy Press.

Staley, S. R., & Blair, J. P. (1995). Institutions, quality competition and public service provision: The case of public education. *Constitutional Political Economy, 6,* 21–33.

Summers, A. A., & Johnson, A. W. (1996). The effects of school-based management plans. In E. A. Hanushek & D. W. Jorgenson (Eds.), *Improving America's schools: The role of incentives* (pp. 75–96). Washington, DC: National Academy Press.

U.S. Department of Education. (1990). *Digest of education statistics, 1994.* Washington, DC: National Center for Education Statistics.

Wachtel, P. (1976). The effect on earnings of school and college investment expenditures. *Review of Economics and Statistics, 58*(3), 326–331.

Welch, F. (1966). Measurement of the quality of schooling. *American Economic Review, 56*(2), 379–392.

Word, E., Johnston, J., Bain, H. P., Fulton, B. D., Zaharies, J. B., Lintz, M. N., Achilles, C. M., Folger, J., & Breda, C. (1990). *Student/teacher achievement ratio (STAR), Tennessee's K–3 class size study: Final summary report, 1985–1990.* Nashville, TN: Tennessee State Department of Education.

Author

ERIC A. HANUSHEK is professor of economics and public policy at the Wallis Institute of Political Economy at the University of Rochester, Harkness Hall 107, Rochester, NY 14627-0158. His areas of specialization are public finance and education policy.

Received September 15, 1996
Revision received January 15, 1997
Accepted January 30, 1997

10

ILLINOIS EDUCATION **RESEARCH** COUNCIL

Public School Funding and Postsecondary Outcomes in Illinois: What is Reasonable to Expect from Illinois' School Funding Reforms?

Derek A. Houston

POLICY RESEARCH

ISSUE 01 | 2018

ABOUT THE AUTHORS

Derek A. Houston, PhD, is an Assistant Professor of Educational Leadership and Policy Studies at University of Oklahoma. He earned his doctorate at the University of Illinois at Urbana-Champaign in the Department of Educational Leadership and Policy Studies. Dr. Houston is specialized in multi-level modeling and quasi-experimental methods to address systemic issues that influence post-secondary readiness, entrance, and matriculation, particularly for minoritized and low-income populations. Dr. Houston's areas of specialization and interest include quantitative methods, equity in intercollegiate athletics, equity and access relative to the P-20 educational pipeline, education finance policy, and sociology of education.

ACKNOWLEDGMENTS

The author would like to thank the Illinois Education Research Council, Dr. Eric Lichtenberger, and the Illinois Board of Higher Education for allowing him to access the data for this report. Furthermore, the author offers sincere thanks to Bradford White and Carol Colaninno for their editorial guidance and efforts in keeping this project moving forward. Additional thanks to Ralph Martire, Dr. Michelle Turner Mangan, and Dr. Janet Holt for much-needed comments, suggestions, and critical questions. Jennifer Barnhart designed and laid out this report. Any opinions expressed in this report are those of the author. This study was not financially supported.

SUGGESTED CITATION:

Houston, D. A. (2018). *Public school funding and postsecondary outcomes in Illinois: What is reasonable to expect from Illinois' school funding report?* (IERC 2018-1). Edwardsville, IL: Illinois Education Research Council at Southern Illinois University Edwardsville.

Table of Contents

"Equality of educational opportunity has been accepted as a normative goal of educational policy in the United States since colonial time. It has proven to be as elusive, however, as the proverbial pot of gold at the end of the rainbow. By virtually any standard, there has been a great deal of progress toward achieving equality of educational opportunity in the United States since 1790, but few will argue that it has been accomplished."
(Rossmiller, 1987, p. 562).

Introduction

For over forty years, Illinois' school funding policies remained mostly unchanged. Over this time, these policies led to large disparities in per-pupil revenues between the wealthiest and poorest districts. As an attempt to address the disparities in per-pupil revenues, state lawmakers signed a revised school-funding policy in 2017. The revised school funding formula incorporates an evidence-based model that allocates 99% of new state appropriations, which exceed FY2017 levels, to those districts that are the least adequately funded that also serve a disproportionately high share of the state's low-income student population (Martire, Otter, & Hertz, 2017). There is a need to examine how the previous funding system may have affected student outcomes in light of Illinois' recent school funding reforms and to better understand what we may expect for schools and students given this new system.

Literature Review

School Funding

School funding is a product of the public school governance structure. Unlike most industrialized countries, public education systems in the United States remain decentralized (Gamoran, 2001), allowing local management (Greene, Huerta, & Richards, 2007). A by-product of decentralization is that in all states (excluding Hawaii) public schools rely on a combination of local property taxes, state education distributions, and a small proportion of federal financial support.[1] Because communities vary widely in their property tax wealth and many state funding systems do not sufficiently account for these variations, this decentralized funding structure has led to "considerable regional disparities" in public school funding levels (Greene et al., 2007) and has created a stratified system of education in which the schools that need the most financial support typically receive the least (Lewis & Nakagawa, 1995).

Regional disparities in public school funding have been a persistent issue for Illinois' schools, and legislation passed in 2017 as Senate Bill 1947 (SB1947) attempts to alleviate those inequalities. Based on funding data collected in 2009, Illinois public schools received approximately 60% of their revenue from local sources, 28% from the state, and the remaining 12% from the federal government under the previous funding structure (Fritts, 2012). For comparison, between 2003-04 and 2013-14, national averages indicate that public schools received between 44% and 46% from local sources and between 46% and 47% of their revenue from state sources (McFarland et al., 2017). Fritts (2012) noted that "Illinois ranked lowest among states in

[1] See http://www.schoolfundingfairness.org

the percentage of revenues from state sources" (p. 1). The General State Aid (GSA) grant program that funded Illinois schools "represent[ed] 66% of all state general funds expenditures on PreK-12 education in Illinois and consist[ed] of two funding streams" (Education Funding Advisory Board, 2016, p. 2). The first stream was the Formula Grant, which placed districts into three formula categories (Foundation Level, Alternative, or Flat Grant) based on their ability to meet the minimum per-pupil funding level through local resources. If a district was unable to meet the minimum per-pupil funding level using local resources, it was the state's responsibility to provide all or a portion of the difference. From FY2010 to FY2016, the state prorated the Foundation level, providing up to a percentage of the state minimum[2] which, according to the Illinois School Funding Reform Commission (ISFRC), along with delayed transportation payments, "caused significant distress to school districts, especially rural districts" (ISFRC, 2017). The second stream was distributed through the Poverty Grant, which allocated funds to districts based on their levels of low-income students. On average over the past five years (FY2013-17), the Formula Grant represented approximately 62% of allocated GSA funds and the Poverty Grant accounted for the remaining 38% (ISBE, 2016).

Like other states, Illinois has faced shortcomings in its attempts to provide equitable educational opportunities within a decentralized system that grants local control to each of its 869 districts. Verstegen and Driscoll (2008) suggested that Illinois' previous school finance systems were "obsolete and antiquated; they have failed to achieve equity or to incorporate adequacy" (p. 332). Baker, Farrie, Luhm, and Sciarra (2017)[3] noted that Illinois had a funding fairness ratio of 0.84 in 2007 and 0.77 in 2014, indicating both that wealthier districts received more funding per student than poorer districts, and that the funding formula that existed at the time did not improve fairness. For reference, the national average is 1.00 in each year, suggesting that, on average, funding is flat between wealthier and poorer districts. For additional comparisons, funding fairness ratios for Iowa, Minnesota, and Wisconsin were 1.01, 1.34, and 0.98 for 2007 and 0.95, 1.33, and 1.06 for 2015 (Baker et al., 2017).

School Funding and Student Outcomes

Expenditures towards public elementary and secondary education have steadily increased since 1966 (Snyder, de Brey, & Dillow, 2016), but gaps in educational outcomes between marginalized and non-marginalized populations remain (McFarland et al., 2017). Numerous scholars have examined the relationship between school funding and educational outcomes (see Hanushek, 1989, 1994; Hedges, Laine, & Greenwald, 1994), with the most notable being the 1966 Equality of Educational Opportunity Report, commonly known as the Coleman Report (Coleman et al., 1966). Initially, this research produced mixed results regarding whether funding levels mattered in educational outcomes. An updated analysis of the data used in the Coleman Report suggests that school resources impact student achievement more so than family background, specifically finding that school mean family resources and average teacher salary, both proxies for school funding, were positively related to student achievement (Borman & Dowling, 2010).

Research by Hanushek (1989) and Hedges et al. (1994) highlight the contrasting results of scholars who have examined the relationships between school funding and educational outcomes. Both Hanushek (1989) and Hedges et al. (1994) conducted meta-analyses that examined prior studies addressing the impacts of differential school funding on educational outcomes. Hanushek (1989) reaffirmed the strong, positive correlation between school funding and educational outcomes but concluded that "the strength

[2] The proration ranged from 87.1% to 99.9% of the Foundation Level. Between FY2013 and FY2015, the proration was less than 90% (ISBE, 2016).

[3] The data for the Is School funding Fair? A National Report Card reports are lagged by three years. As such the data reported in 2017 uses up to and includes 2014 information. Trend data in each report is limited to five years. The 2007 data for each state can be found at http://www.schoolfundingfairness.org/is-school-funding-fair/interactive-data.

of the relationship disappears when one controls for differences in family background" (p. 49). In a follow-up, Hedges et al. (1994) concluded that there was "strong support for at least some positive effects of resource inputs and little support for the existence of negative effects," and, moreover, that "the question of whether more resources are needed to produce real improvement in our nation's schools can no longer be ignored" (p. 13). In response to Hedges et al. (1994), Hanushek (1994) surmised that funding levels matter but "throwing money at schools is not a second-best approach but may be a 20th best approach" to school reform (p. 8). More recent work, however, has moved beyond the question of "Does money matter?" to the question of "How much money matters in education?" (see Baker, 2016; Baker & Welner, 2011).

Additional research has found that school funding, as measured by total per-pupil expenditures, is related to the ability of schools to improve educational quality (Card & Krueger, 1992). A number of studies suggest that an increase in funding is positively related to an increase in mathematics achievement (Payne & Biddle, 1999), while lower levels of funding were associated with greater within-school mathematics achievement gaps (Wenglinsky, 1998), suggesting that higher per-pupil spending levels might reduce these gaps. Condron and Roscigno (2003) found similar results using school-level data, concluding that an increase in per-pupil expenditures resulted in improved student proficiency in reading, mathematics, science, and citizenship. In evaluating a targeted school funding program in North Carolina that gave extra money to districts with high proportions of economically disadvantaged students, Henry, Fortner, and Thompson (2010) concluded that students attending a targeted school scored 0.13 standard deviations higher on statewide standardized exams than students attending schools that did not receive extra funds. Henry et al. (2010) also noted a reduction in the achievement gap between academically disadvantaged students in the pilot districts and similar students in other districts.

Regarding postsecondary outcomes, the socioeconomic composition of high schools has been shown to be a predictor of both college enrollment (Engberg & Wolniak, 2010) and persistence (Niu & Tienda, 2013). Engberg and Wolniak (2010) used nationally representative data, the Educational Longitudinal Study of 2002, to examine the effects of the average socioeconomic status (SES) for families of students attending the school, defined as the high school's SES, on the likelihood of both two- and four-year postsecondary enrollment. Employing multilevel modeling and accounting for multiple student- and school-level variables, they found that students from high SES high schools were considerably more likely to enroll in two- and four-year institutions than students from average SES high schools. Niu and Tienda (2013) also utilized multivariate analyses controlling for both student- and school-level variables, and found similar results pertaining to the relationship between the economic composition of schools and student postsecondary persistence. Using longitudinal data from Texas, the researchers concluded that students from affluent high schools were twice as likely to graduate from a four-year institution relative to similar students that attended economically average high schools. Both of these studies suggest that the socioeconomic composition of high schools relates to postsecondary outcomes of students, where the measure of a school's socioeconomic composition can be considered an indicator of the school's per-pupil funding (Condron & Roscigno, 2003).

Purpose

This study examines the relationships between school funding and students' college preparation, postsecondary enrollment, and postsecondary degree attainment, adding to the literature on how money matters in education. I address how past school funding levels among Illinois public high schools may have been associated with students' postsecondary outcomes. The following research questions guide this study:

- To what extent did public high school funding[4] relate to educational achievement, as measured by ACT (American College Testing) composite and subject test scores, of Illinois public high school students?;
- To what extent did public high school funding relate to the likelihood of enrollment in a four-year postsecondary institution for Illinois students?; and
- To what extent did public high school funding relate to the likelihood of graduation from a four-year postsecondary institution for Illinois students that enrolled in a four-year postsecondary institution at any time?

These questions may help inform a better understanding of the likely impacts of the state's recent school funding policy reforms. Illinois' new school funding policy still relies heavily on local property wealth. However, new state appropriations to K-12 education will be based on an evidence-based model that will try to make per-pupil revenue more equitable. The evidence-based model relies on one core calculation, the Adequacy Target. The Adequacy Target is a dollar amount of resources, unique to each district, that represents the estimated minimum level of school funding that a district will need to implement 27 statutorily defined evidence-based practices.[5]

The revenue to fund each district's unique Adequacy Target will come from three sources: (i) the "Base Funding Minimum," representing all grant funding the district received from the state in the prior year; (ii) the "The Local Capacity Target" of the district, which is the estimated amount of the Adequacy Target that the district should cover based on its local property wealth; and (iii) new state funding over and above the prior year's Base Funding Minimum. By design, this new funding matrix is intended to shift more of the obligation to the state and away from resources based on local property tax-based resources. It is also important to note here that the Adequacy Target relies solely on the calculation of the 27 research-based elements, and that the Local Capacity Target is purely a distributional factor and has no impact on the Adequacy Target itself.

Thus, the Adequacy Target is adjustable based on both total student enrollment and the enrollment of students from low-income households, with special needs, and who are English language learners. Compared to the previous formula, the Adequacy Target (adjustable and evidence-based) replaces the Foundation Level (neither adjustable nor evidence-based). Furthermore, the estimated Local Capacity Target may provide tax relief for residents of low-wealth, high-taxed districts. As noted by Martire et al. (2017), "low property wealth districts, which often have high property tax rates, are not expected to contribute as much towards the cost of covering their respective Adequacy Targets as are higher wealth districts" (p. 5).

Taken together, the evidence suggests that increasing school funding, specifically for schools with higher populations of low-income students as directed by Illinois' new funding policy, should positively affect both educational achievement (test scores) and educational attainment (postsecondary enrollment and degree attainment).

[4] Average per-pupil revenue measured at the district level.

[5] The Illinois State Board of Education interprets these 27 inputs as 34 discrete elements. In addition, a small number of the inputs are based on average state costs and cover items like school supplies and technology upgrades.

Data

For my analyses of these relationships, I draw on cohort data from the Illinois public high school junior class of 2002. In 2001, as part of the required Prairie State Achievement Examination (PSAE), Illinois mandated that all high school juniors take the ACT examination. The junior class of 2002 was the second cohort to sit for the exam, providing a near census of the class unlike examination data prior to 2001 (Lichtenberger & Dietrich, 2012). Many scholars (with the exceptions of Henry et al., 2010, and Jackson, Johnson, & Persico, 2015) have examined the impact of school funding on student outcomes by aggregating data at the school or district level. However, student-specific outcomes can be more nuanced, and are often masked with aggregated data (Monk, 1992). Therefore, I examine the relationship between school funding and student outcomes (achievement and attainment) using nested longitudinal student-level data for the Illinois public high school junior class of 2002. Although the dataset includes student information from both private and public schools, the sample is restricted to the 63,732[6] students attending public high schools that have non-missing data for the variables used.

The data were accessed through shared data agreements with the Illinois Board of Higher Education (IBHE) and ACT, and compiled by the Illinois Education Research Council (IERC). Additional higher education enrollment data from the National Student Clearinghouse (NSC) were merged by the IERC with IBHE and ACT data to create a comprehensive statewide longitudinal dataset that tracked the Illinois high school junior class of 2002 from high school through the spring 2010 semester, or seven years beyond high school graduation (Lichtenberger & Dietrich, 2014). See Appendix A for a complete list of all variables and response categories used in this study, as well as aggregated and racially disaggregated summaries of the independent and dependent variables.

This study also uses student data obtained from the optional ACT Student Interest Profiler survey administered during the examination. The ACT student survey contains self-reported demographic information, course-taking information, and information related to the student's post-high school academic plans. Data from the NSC contain enrollment and degree attainment information on the postsecondary institutions attended, if any, and institutional characteristics. Finally, the study uses data associated with each student's high school. The high school data are from the 2001-02 academic year ISBE state report card and consist of information regarding the school's enrollment, district funding and expenditure levels, standardized test (PSAE) scores (% proficient and advanced in math and reading) and ranges, and school-level teacher characteristics.

Student Outcomes

To mitigate problems associated with using aggregated or single outcomes to assess the effects of school funding on educational outcomes (Figlio, 2004), I used multiple measures and types of student-level outcomes. To address the research questions, I analyzed six student outcomes. As measures of academic achievement and college readiness, I used ACT composite scores and math subject test scores, separately. The ACT is a nationally, norm-referenced exam used in postsecondary admissions decisions, and the ACT composite score is predictive of a student's first-year postsecondary GPA (Noble & Sawyer, 2002).[7] Additionally, ACT math subject test scores are predictive of early interest in STEM[8] degree

[6] The population of the Illinois public high school junior class of 2002 includes 94,216 cases. The sample represents 68% of the population.

[7] Noble and Sawyer (2002) compared the predictability of ACT composite score and high school GPA on first-year GPA. The evidence that high school GPA is more predictive than ACT scores is not questioned here. The ACT scores used here are for comparisons and not validating the use of ACT scores in postsecondary admissions.

[8] Science, technology, engineering, and mathematics

programs (Lichtenberger & George-Jackson, 2013). To measure academic attainment, I used NSC data indicating any postsecondary enrollment (either two- or four-year), four-year postsecondary enrollment, any postsecondary credential attainment (either two- or four-year), and four-year postsecondary degree attainment. These six outcomes – ACT composite, ACT math, any postsecondary enrollment, four-year postsecondary enrollment, any credential attainment, and four-year credential attainment – each signify points in the pathway to postsecondary degree attainment (Haveman & Smeeding, 2006), and thus understanding structural factors that influence these outcomes is warranted.

Independent and Control Variables

As part of the ACT Student Interest Profile survey, students were asked a number of questions related to their demographics, family background, and academic achievements and expectations. I used student responses to questions on demographics and academic backgrounds, along with school-level data from ISBE, NCES, and IERC as independent and control variables in this study. Variable selection was guided by the conceptual framework in Figure 1, which is a modified version of the model used by Palardy (2013).

School Funding. Public high school funding is operationalized by using the average per-pupil revenue for each district. District-level state and local revenue data from the Illinois state report card was combined and then divided by the district enrollment to calculate the average per-pupil revenue available for each student in the district. The use of district-level revenue assumes that the within-district per-pupil revenue allocation is based on school enrollment and enrollment demographics (e.g. school poverty level). Furthermore, only state and local sources were used to isolate the effect of the state's funding policy.

Student Demographics. The ACT asked students to identify their gender and race/ethnicity as African-American, American Indian/Alaskan Native, Latino, Asian/Pacific Islander, or non-Hispanic White. Students were also asked to categorize their parent's annual income in one of ten income range groups from less than $18,000 to more than $100,000. Because the ten categories were not proportionally spaced, the ten categories were reduced to four ranges, less than $30,000, $30,000 to $50,000, $50,000 to $80,000, and $80,000 and above. Parent income is treated as a categorical variable, with the lowest range treated as the comparison group. This method was used by Taylor (2015) in analyzing the same data.

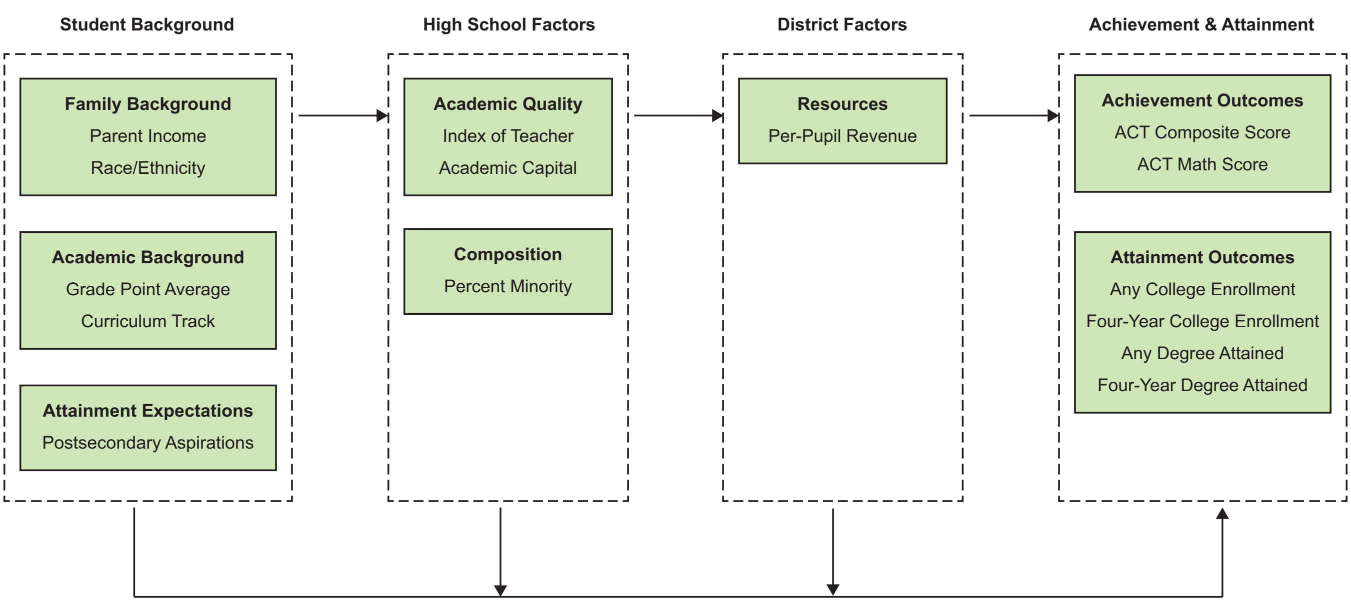


Figure 1. Conceptual framework of how per-pupil revenue relates to academic achievement and attainment.

Of note, the accuracy of the parent-income data is a limitation to the study. Analyzing similar ACT data, Anderson and Holt (2017) concluded that there are likely to be discrepancies between self-reported parental income and actual income, specifically noting that only 24% of students chose the correct income range. The authors did note that over half of the student responses were within one income range category compared to actual income. This provides additional reasoning to reduce the variable from ten categories to four.

Student Academics. Students were also asked to identify their overall high-school GPA on a 7-item response scale from 0.5-0.9 (D- to D) to 3.5-4.0 (A- to A). Although categorical by survey design, GPA is treated as continuous for analyses, which is consistent with the suggestions of Rhemtulla, Brosseau-Liard, and Savalei (2012). The survey also asked respondents to report the type of coursework they were taking in high school, with options including college preparatory, general, or career and technical. The general and career & technical education categories were grouped and were the reference group for analyses. Students were asked about their expected highest postsecondary degree, which I coded as four-year degree or higher and less than four-year degree. Less than a four-year degree was the reference group.

School Characteristics. The percentage of minority students was calculated for each school using data from the Common Core of Data. I also used a school-level measure of average teacher qualifications within each school: the Index of Teacher Academic Capital (ITAC; White, Presley, & DeAngelis, 2008). The ITAC is a weighted combination of five school level attributes that research suggests are related to student achievement, including teacher ACT English and composite scores, Basic Skills Test pass rates, emergency certification rates, and teacher undergraduate college competitiveness (White et al., 2008).

Methods

The structure of these data nests students within schools and schools within districts. To account for this, I use hierarchical linear modeling and hierarchical logistic regression modeling. The nested structure of the data lends itself well to the use of multilevel modeling techniques and the analyses follow the examples of previous literature relating school factors to longitudinal student outcomes (Engberg & Wolniak, 2010). A three-level hierarchical linear model was used to address the research questions. Because financial data were limited to the district level, the student data are clustered within schools which are clustered within districts. Similar to prior school funding research (Flaherty, 2013; Mensah, Schoderbek, & Saha, 2013), the funding measure of interest is at the district level.

My first set of analyses addresses the predictive relationship between per-pupil revenue and the six outcome variables. The second set of analyses focuses on how the relationship between per-pupil revenue and the six outcome variables changes when the student demographic variables are introduced to the hierarchical models. The third analysis introduces the student variables (GPA, curriculum type, and postsecondary expectations), and the final models add school-level variables to each of the analyses.

Limitations

There are several limitations to this study. First, the school finance data are district level and not school level, and lack specificity regarding how schools allocate their funds. Specific data on the allocation of revenue within schools could help address the concerns of aggregation bias found in prior school funding research (see Hanushek, Rivkin, & Taylor, 1996). Additionally, the data are cross-sectional which limits the ability to understand the long-term impacts of funding disparities (see Jackson et al., 2015). The data do not account for all of students' prior educational inputs in high school or any educational preparation before high school, nor does it account for the possibility of students changing high schools between their junior and senior years. The sample of the data, restricted to the 2002 junior class of Illinois public high school students, limits the generalizability of the findings to Illinois. Also, drop-out information for students in the cohort, both before 2002 and, more importantly after, is unavailable. Finally, parental education and occupation was not available.

Results

District Per-Pupil Revenue and Student Outcomes

Tables are presented in two sets based on model complexity, with higher numbered tables representing more complex models. The first set are the ACT models and the second set are the postsecondary outcome models. The outcome variables for the ACT models are continuous and the outcome variables are dichotomous for the postsecondary outcomes. The coefficients for the ACT models represent the predicted change of the ACT scores. The coefficients for the postsecondary outcome models represent the predicted increase or decrease in the likelihood of the outcome happening relative. Independent continuous variables are standardized and categorical variables are dichotomous, unless otherwise noted.

Analysis of the relationship between funding and student outcomes with no control variables reveals that district per-pupil revenue is positively and statistically significantly related to each of the six outcomes (Table 1). For the ACT composite and math scores, a one standard deviation change in the per-pupil revenue is related to 0.83 and 0.97 point increases, respectively. A standard deviation increase in per-pupil revenue predicts an increase in the odds of enrolling in any institution by 25% and enrolling in a four-year institution by 39%. Finally, a standard deviation increase in per-pupil revenue predicts an increase in the odds of receiving any degree by 35%, which is similar to the 38% increase in the probability of receiving a four-year degree.

Accounting for Student Demographics

After controlling for student demographics (see Table 2), the relationships between per-pupil revenue and each outcome remained positive and statistically significant with a slightly weaker relationships between per-pupil revenue and the outcomes. Parent income strongly predicts increases in ACT composite and math scores. Students with parent incomes of over \$80,000 are predicted to have ACT composite and math scores more than three points higher than students with parent incomes of less than \$30,000. Female students have, on average, higher ACT composite scores but lower ACT math scores compared to male students. Relative to students identifying as White, students identifying as Asian tend to have higher ACT composite and math scores, and students identifying as Black, Latino, or American Indian/Alaskan Native have ACT composite and math scores that are over two points lower on average.

Table 1.
Predicted Relationships between School Funding & Outcomes without Covariates

	Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
	ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable	β	β	O. R.	O. R.	O. R.	O. R.
District Per Pupil Revenue	0.83***	0.97***	1.25***	1.39***	1.35***	1.38***
Constant	20.50***	20.42***	1.80***	0.89***	0.46***	0.42***

** p< .05; **p <.01; ***p <.001*

Table 2.
Predicted Relationships between School Funding & Outcomes Student Demographic Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.56***	0.66***	1.14***	1.27***	1.25***	1.29***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.13***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-3.09***	-2.68***	0.44***	0.42***	0.26***	0.27***
	Black	-3.25***	-3.14***	0.86***	0.92*	0.58***	0.57***
	Latino	-2.57***	-2.27***	0.59***	0.55***	0.46***	0.45***
	Asian	0.31***	1.53***	1.31***	1.43***	1.42***	1.42***
	White	—	—	—	—	—	—
	$30k - $50k	1.20***	1.04***	1.45***	1.47***	1.62***	1.65***
	$50k - $80k	2.25***	2.14***	2.02***	2.18***	2.47***	2.58***
	Over $80k	3.36***	3.32***	2.57***	3.31***	3.81***	2.58***
	Under $40k	—	—	—	—	—	—
Constant		19.21***	19.62***	1.00	0.46***	0.20***	0.18***

** p< .05; **p <.01; ***p <.001*

Increases in parental income were also related to increased odds of achieving any of the four postsecondary outcomes. Compared to students with parent incomes of less than $30,000, students with parent incomes of over $80,000 were over twice as likely to have any postsecondary enrollment, over three times as likely to enroll in a four-year institution, just under four times as likely to obtain any degree, and over four times as likely to obtain at least a four-year degree. For female students relative to male students, the odds of enrollment was about 35% higher for both outcomes and the odds of degree attainment was over 50% higher for both outcomes. Compared to White students, Asian students had higher relative odds of any enrollment, four-year enrollment, any degree attainment, and four-year degree attainment. The opposite was the case for students identifying as Black, Latino, or Native American/Alaskan Native. Black, Latino, and Native American/Alaskan Native students had lower relative odds of both enrollment and degree attainment outcomes compared to White students.

Accounting for Student Academics

The next set of models (see Table 3) included control variables related to students' academic backgrounds. Compared to the models in Table 2, after controlling for student academics, the effect of per-pupil revenue was slightly lower but still statistically significant for all six outcomes. This suggests that the student academic variables accounted for some of the relevant variance in the relationship between per-pupil revenue and the outcomes.

The analyses revealed that the type of high school curriculum (college preparatory or not), a student's GPA, and their postsecondary expectations were all positively related to some postsecondary outcomes. A standard deviation increase in a student's indicated GPA predicts an increase of over two points for both the ACT composite and math scores, an increase in the odds of any enrollment by 66% and of four-year enrollment by 122%, and an increase in the odds of any degree attainment by 173% and four-year degree attainment by nearly 200%. Expectation of a bachelor's degree or higher predicts over a one-point increase in ACT composite score and nearly a one-point increase in ACT math score. Additionally, relative to students without expectations of obtaining a bachelor's degree, students with bachelor's degree expectations were predicted to be 1.97 times more likely to have any enrollment, 2.66 times more likely enroll in a four-year institution, 2.32 times more likely to earn any degree, and 2.71 times more likely to earn a four-year degree. Finally, students that enrolled in a college-prep curriculum were predicted to be 1.43 times more likely to have any enrollment, 1.69 times more likely to enroll in a four-year institution, 1.57 times more likely to obtain a degree, and 1.63 times more likely to obtain a four-year degree.

Accounting for School Factors

The next set of models (see Table 4) accounted for school attributes in addition to student academics. For these models, I added two school-level variables, the percentage of minority students and the average quality of teachers, measured by the ITAC. Relative to the previous models, the predicted effect of per-pupil revenue was lower but still positive and statistically significant. The coefficients of the student-level variables changed slightly after controlling for these school-level variables.

The results show that a standard deviation increase in the percentage of minority students predicts a 0.16 point decrease in ACT composite scores and a 9.89% decrease in the odds of each of the postsecondary outcomes except for four-year enrollment. Further, a standard deviation increase in the school ITAC score predicts a 0.51 point increase in ACT composite and a 0.49 point increase in ACT math. Regarding the postsecondary outcomes, a standard deviation increase in the school ITAC score predicts an increase in the odds of any enrollment by 9%, four-year enrollment by 14%, any degree attainment by 17%, and four-year degree attainment by 22%.

Table 3.
Predicted Relationships between School Funding & Outcomes with Student Demographic and Academic Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	**ACT Math**	**Any Enrollment**	**Four-Year Enrollment**	**Any Degree**	**Four-Year Degree**
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.56***	0.66***	1.14***	1.27***	1.25***	1.29***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.13***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-1.13***	-0.65**	0.66**	0.72*	0.41***	0.44***
	Black	-2.07***	-1.86***	1.06	1.33***	0.86***	0.85***
	Latino	-1.52***	-1.17***	0.72***	0.72***	0.61***	0.60***
	Asian	-0.52***	0.66***	1.08	1.10	1.06	1.04
	White	—	—	—	—	—	—
	$30k - $50k	0.57***	0.40***	1.27***	1.25***	1.38***	1.40***
	$50k - $80k	0.88***	0.75***	1.51***	1.52***	1.73***	1.78***
	Over $80k	1.45***	1.36***	1.70***	2.00***	2.32***	2.43***
	Under $30k	—	—	—	—	—	—
	High School GPA	2.43***	2.64***	1.66***	2.22***	2.73***	2.98***
	College Prep Curriculum	1.49***	1.48***	1.43***	1.69***	1.57***	1.63***
	Not College Prep	—	—	—	—	—	—
	Bachelor's Degree or Higher	1.31***	0.96***	1.97***	2.66***	2.32***	2.71***
	Less than Bachelors	—	—	—	—	—	—
Constant		18.53***	19.21***	0.65***	0.20***	0.09***	0.06***

** p< .05; **p <.01; ***p <.001*

Table 4.
Predicted Relationships between School Funding & Outcomes with Student- and School-level Covariates

		Predicted Effect of School Funding on ACT Outcomes		Predicted Likelihood of Postsecondary Outcomes Relative to Per-Pupil Revenue			
		ACT Composite	ACT Math	Any Enrollment	Four-Year Enrollment	Any Degree	Four-Year Degree
Variable		β	β	O. R.	O. R.	O. R.	O. R.
District	Per Pupil Revenue	0.38***	0.50***	1.11***	1.21***	1.19***	1.20***
Student	Female	-0.76***	-1.70***	1.11***	1.01	1.18***	1.14***
	Male	—	—	—	—	—	—
	American Indian/ Alaskan Native	-1.11***	-0.64***	0.67**	0.73*	0.42***	0.45***
	Black	-1.98***	-1.79***	1.16***	1.39***	0.94	0.94
	Latino	-1.50***	-1.17***	0.74***	0.73***	0.62***	0.61***
	Asian	-0.52***	0.66***	1.08	1.09	1.06	1.04
	White	—	—	—	—	—	—
	$30k - $50k	0.56***	0.39***	1.26***	1.25***	1.37***	1.39***
	$50k - $80k	0.87***	0.74***	1.50***	1.51***	1.71***	1.76***
	Over $80k	1.44***	1.35***	1.68***	1.98***	2.29***	2.40***
	Under $30k	—	—	—	—	—	—
	High School GPA	2.43***	2.64***	1.66***	2.22***	2.73***	2.98***
	College Prep Curriculum	1.49***	1.47***	1.42***	1.68***	1.56***	1.62***
	Not College Prep	—	—	—	—	—	—
	Bachelor's Degree or Higher	1.31***	0.96***	1.97***	2.66***	2.32***	2.70***
	Less than Bachelors	—	—	—	—	—	—
School	Percent Minority	-0.16*	-0.16	0.91***	0.97	0.91**	0.91**
	ITAC	0.51***	0.49***	.09***	1.14***	1.17***	1.22***
Constant		18.47***	19.15***	0.63***	0.20***	0.08***	0.06***

** p< .05; **p <.01; ***p <.001*

Summary of Findings

The results of these six models indicate that district per-pupil revenue is a significant explanatory and predictive factor in educational outcomes for Illinois public high school students. After accounting for both student- and school-level predictor variables, per-pupil revenue is positively and significantly related to each of the six postsecondary-related outcomes. A one standard deviation increase in per-pupil revenue predicts 0.42 and 0.55 point increases in ACT composite and math scores, respectively, and increases in the likelihood of postsecondary enrollment (11%), four-year postsecondary enrollment (21%), two- or four-year degree attainment (19%), and four-year degree attainment (20%). These findings are consistent with prior research regarding the relationships among student factors (parental income, high school GPA, high school curriculum, and student aspirations), school-level factors, and both educational achievement (Dixon-Roman, Everson, & McArdle, 2013) and attainment (Palardy, 2013). Unique to this study was the use of statewide, student-level cohort data to examine the effects of state funding policy on postsecondary-related outcomes. This study also bridges the gap between K-12 and postsecondary research, providing evidence that differences in high school resources are likely to impact postsecondary outcomes.

Implications for Policy and Practice

School Funding and Social Mobility

The positive relationship between ACT exam scores and school funding should not be surprising. Socioeconomic status, as a proxy for wealth, is strongly correlated with results on standardized tests, like the ACT (Orr, 2003; Zwick, 2002). And, as noted by Martire (2013), Illinois public schools have historically had one of the highest rates of between-district economic segregation in the country. This, in combination with a regressive school-funding policy (Baker et al., 2017) in which more dollars are spent in schools with wealthier student populations, may partially explain the statistically significant relationships among per-pupil revenue and ACT measures. It could also help explain, to some extent, the relationship between per-pupil revenue and postsecondary enrollment, specifically at four-year institutions. Because standardized tests like the ACT are often a criterion in the college admissions process, students that score higher on the ACT are, to an extent, more likely to enroll in a four-year institution.

The positive relationships between school funding and both college entrance and completion are not surprising. After controlling for factors associated with positive postsecondary outcomes, like students aspirations and high school preparation, findings suggest that increases in per-pupil revenue significantly increase the likelihood of postsecondary enrollment and degree attainment. Engberg and Wolniak (2010), using nationally representative data, concluded that the average socioeconomic composition of a school's student population was related to both two- and four-year college enrollment. Additionally, Niu and Tienda (2013), using data from Texas, found that the average economic composition of students attending a high school was related to a student's college persistence. In both cases, the average economic composition of the school's student populations can be considered a proxy for school funding. As with ACT scores, college entrance and degree completion is usually necessary for upward social mobility (Venator & Reeves, 2015), particularly in the day of credentialism (see Cottom, 2017). Furthermore, college entrance and matriculation have workforce implications for the state. Students who are more likely to enter college and eventually obtain a postsecondary credential are more likely to be of greater benefit to the state through a number of economic and social means (Bloom, Hartley, & Rosovsky, 2007).

Teachers as School Resources

In each of the six models in this study, the coefficients for per-pupil revenue decrease when average teacher academic capital is introduced. This should not be surprising given prior research indicating that increases in school funding correlate with an increase in the quality of instruction in the district (Hedges et al., 1994) and increases in the quality of teachers within schools (Darling-Hammond, 2000). Further, the continued significance of per-pupil revenue after the introduction of average teacher characteristics suggests there are school characteristics related to revenue—beyond teacher quality—that also influence student academic outcomes (Hanushek, 1989). For these reasons, it is important that further research on Illinois' school funding system examines how funds are allocated within schools and across districts (Hanushek, 1994). Future studies, especially any assessment of the new Illinois school-funding bill, should include some measure of classroom- or school-level teacher quality to fully understand how the increases in funds are related to student outcomes.

SB 1947

If there is to be equity in resource allocation to public schools, continuing to base the bulk of resource generation on local wealth seems to be a flawed approach. From an equity perspective, Illinois policymakers should aim to reduce the effect of per-pupil revenue on these educational outcomes. Prior to 2017, multiple attempts to redistribute the state's share of school funding failed to garner the bipartisan support needed to pass. On August 31, 2017, the Illinois' governor signed SB 1947 into law, marking a needed change to one of the most regressive school funding policies in the country. Under the old school funding formula, less than 50% of the state's allocation was based on the poverty level of a district, which limited the local district's ability to pay for schools (Advance Illinois, 2016; Funding Illinois' Future, 2016). According to analysis by the Center for Tax and Budget Accountability, the new funding formula under SB 1947 will allocate "99 percent of the new funding for education to those districts that are least adequately funded" (Martire, et al., 2017, p. 6). This new allocation will ultimately direct the majority of new state school funding revenues to those schools that educate the poorest students. Such redistribution would increase the per-pupil revenue of low-income schools, which over time, could result in similar student outcomes as seen among student population in states that have undergone similar funding reforms like in Michigan (Hyman, 2017; Papke, 2005) and New Jersey (Mensah et al., 2013). Parents and students residing in higher funded schools may have concerns over the loss of benefits; however, prior research suggests that redistribution based on school funding policies reduces vertical equity (unequal treatment of unequals) across schools but does not impact horizontal equity (equal treatment of equals; Mahoney, 2013).

Discussion: Funding Reform and Changes in Student Outcomes

The findings in this study suggest that, in Illinois, money does matter for educational upward mobility. Per-pupil funding was positively related to three key points in the upward mobility path: the measure of college readiness, college enrollment, and college completion. That is, school funding matters to educational outcomes, and differential school funding matters even more in Illinois.

In light of the recent school funding legislative reform, a discussion on how the findings of this study could change, grounded in recent school funding reform literature, is warranted. Regarding the gaps in college entrance exam scores, we should expect the average differences between those students attending wealthier schools and those at poorer schools to decrease. Card and Payne (2002) estimated that a reduction in the spending distribution between schools would reduce average SAT scores test-score gaps "between children with highly-educated and poorly-educated parents by about 8 points" (p. 80). Papke (2005) studied the effects of school-funding reforms in Michigan in 1994 and concluded that there were increases in the percentage of students with satisfactory performance on the fourth grade state math test and that the effects of increased spending were larger in previously low-performing schools. Additional studies found that changes in school funding had positive effects on standardized test scores in Vermont (Sherlock, 2011), Pennsylvania (Flaherty, 2013), and New Jersey (Mensah et al., 2013). Chung (2015) examined changes in Maryland's school funding formula and concluded that reforms did increase spending in lower-wealth districts but did not reduce gaps in dropout rates. Thus, standardized test scores at the primary levels are likely to increase in schools that receive additional funding.

Regarding postsecondary matriculation, the likelihood of students enrolling in postsecondary education should also improve over time as more students are affected by continued increases in per-pupil expenditures. In examining the results of school funding equalization in Kansas between 1989 and 1995, Deke (2003) estimated that a 20% increase in spending increased the likelihood of students enrolling in postsecondary institutions by 5%.

Although Illinois' school funding reforms may not produce large gains in the outcome measures used in this study in the short term, evidence does suggest that important systemic changes can produce significant impacts in the long-term. Specifically, Jackson et al. (2015) examined the longitudinal impacts of state school finance reforms across a nationally representative sample of students born between 1955 and 1985. Focusing only on school funding changes linked to state school finance reforms, they found that students who experienced increases in per-pupil spending each year for 12 years had higher levels of educational attainment, higher wages, and a lower likelihood of adult poverty, noting that the effects were more pronounced for students from low-income families.

A more recent study sheds light on the cautions that need to be taken when new monies are introduced to districts. Hyman (2017) studied the long-term effects of school funding changes in Michigan from 1994 and found that spending increases were related to improved likelihood of postsecondary enrollment and degree attainment. However, unlike Jackson et al. (2015) where the gains were seen at higher-poverty schools, the gains were "concentrated among districts that were urban and suburban, lower-poverty, and higher-achieving" at the onset of the policy changes. Hyman (2017) further noted that extra monies received under the funding reform by the districts were directed toward lower-poverty schools. Thus, it is important for the Illinois legislature to continue decreasing the gaps in school funding by adding new monies to the education fund, of which 99% will be directed to districts with less than adequate funding. Further, additional measures should be taken to ensure that the distribution of new monies within districts is also equitable

Conclusion

Lewis and Nakagawa (1995) note the following regarding decentralization and school reforms:

Whereas reformers purport to represent minority parents and communities, the actual politics of the decentralization effort end up as an interplay between reform organizations and conventional political groups, rather than representation of class interests (p. 169).

The long-term deniability of both the Illinois judicial and legislative government branches in addressing the disparate impact of the school funding system has helped shape the Illinois public school system into one of the most regressive in the country, allocating less monies, on average, to those schools charged with educating the state's poorest students. Forty-plus years of providing "an efficient system of high quality public educational institutions and services" (IL Const. art. X, sect. 1) has effectively maintained a stratified educational system that lacks equity, let alone equality, for all. With the passage of SB 1947, Illinois lawmakers took a laudatory first step toward providing an adequate school funding mechanism and equitable opportunities for all students, specifically to the growing numbers of low-income and minority students in Illinois. To continue providing support for the state's most marginalized students, steps should be taken to regularly and systematically monitor, assess, and evaluate the implementation and overall impact of SB 1947. Furthermore, the state legislature should make concerted efforts to provide additional revenue towards public PreK-12 education, as the impact of SB 1947 is dependent solely on newly allocated state funds.

Taken together, the findings from this study suggest that, if fully funded, the recent school funding reforms in Illinois are likely to improve postsecondary readiness, enrollment, and completion for public school students, particularly those in low-wealth districts. However, prior research suggests it will likely take years to see the full impact of these reforms.

References

Advance Illinois. (2016). *School funding in Illinois: An overview*. Chicago, IL. Retrieved from http://www.advanceillinois.org/wp-content/uploads/2016/03/An-Overview.pdf (accessed January 3, 2018).

Anderson, D. M., & Holt, J. K. (2017). *Research brief: Do high school students know their parents' income?* (2017-4). Edwardsville, IL: Illinois Education Research Council at Southern Illinois University Edwardsville. https://ierc.education/ierc_publications/research-brief-high-school-students-know-parents-income/ (accessed April 27, 2018).

Baker, B. D. (2016). *Does money matter in education?* Albert Shanker Institute. Retrieved from http://www.shankerinstitute.org/resource/does-money-matter-second-edition (accessed October 6, 2016).

Baker, B. D., Farrie, D., Luhm, T., & Sciarra, D. G. (2017). *Is school funding fair? A national report card*. Education Law Center. Retrieved from http://http://www.edlawcenter.org/assets/files/pdfs/publications/National_Report_Card_2017.pdf (accessed April 30, 2018).

Baker, B., & Welner, K. (2011). School finance and courts: Does reform matter, and how can we tell? *Teachers College Record 113(*11), 2374–2414. Retrieved from http://www.tcrecord.org/library/abstract.asp?contentid=16106 (accessed August 2, 2016).

Bloom, D. E., Hartley, M., & Rosovsky, H. (2007). Beyond private gain: The public benefits of higher education. In J. J. F. Forest & P.G. Altbach (Eds.), *International handbook of higher education, 18*, 293–308. Springer Netherlands. Retrieved from https://link.springer.com/chapter/10.1007/978-1-4020-4012-2_15 (accessed January 9, 2017).

Borman, G., & Dowling, M. (2010). Schools and inequality: A multilevel analysis of Coleman's equality of educational opportunity data. *Teachers College Record, 112*(5), 1201-1246.

Card, D., & Krueger, A. B. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *The Journal of Political Economy, 100*(1), 1–40. Retrieved from http://www.jstor.org/stable/2138804 (accessed May 15, 2016).

Card, D., & Payne, A. A. (2002). School finance reform, the distribution of school spending, and the distribution of student test scores. *Journal of Public Economics, 83*(1), 49-82. doi.org/10.1016/S0047-2727(00)00177-8 (accessed August 10, 2016).

Chung, I. H. (2015). Education finance reform, education spending, and student performance: Evidence from Maryland's bridge to excellence in public schools act. *Education and Urban Society, 47*(4), 412–432. doi.org/10.1177/0013124513498413 (accessed August 1, 2016).

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity: Summary report* (Vol. 2). U.S. Department of Health, Education, and Welfare, Office of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED012275.pdf (accessed May 14, 2014).

Condron, D. J., & Roscigno, V. J. (2003). Disparities within: Unequal spending and achievement in an urban school district. *Sociology of Education, 76*(1), 18–36. Retrieved from http://www.jstor.org/stable/3090259 (accessed August 18, 2016).

Cottom, T. M. (2017). *Lower ed: The troubling rise of for-profit colleges in the new economy*. New York: New Press.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, 8(1), 1–44. http://dx.doi.org/10.14507/epaa.v8n1.2000 (accessed May 18, 2015).

Deke, J. (2003). A study of the impact of public school spending on postsecondary educational attainment using statewide school district refinancing in Kansas. *Economics of Education Review, 22*(3), 275–284. https://doi.org/10.1016/S0272-7757(02)00025-0 (accessed August 12, 2016).

Dixon-Roman, E. J., Everson, H. T., & McArdle, J. (2013). Race, poverty, and SAT scores: Modeling the influences of family income on Black and white high school students' SAT performance. *Teachers College Record, 115*(4), 1–33. Retrieved from http://www.tcrecord.org/library/Content.asp?ContentId=16925 (accessed July 21, 2016).

Education Funding Advisory Board. (2016). *Illinois education funding recommendations: A report submitted to the Illinois General Assembly*. Retrieved from https://www.isbe.net/Documents/EFAB%202017_Final%20Letter%20%26%20Report.pdf (accessed August 15, 2016).

Engberg, M. E., & Wolniak, G. (2010). Examining the effects of high school contexts on postsecondary enrollment. *Research in Higher Education, 51*(2), 132–153. DOI: 10.1007/s11162-009-9150-y (accessed June 1, 2014).

Figlio, D. N. (2004). Funding and accountability: Some conceptual and technical issues in state aid reform. In J. Yinger (Ed.), *Helping children left behind: State aid and the pursuit of educational equity*, pp. 87–111. Cambridge: MIT Press.

Flaherty, S. (2013). Does money matter in Pennsylvania? School district spending and student proficiency since No Child Left Behind. *Eastern Economic Journal, 39*(2), 145–171. doi:10.1057/eej.2012.7 (accessed June 5, 2015).

Fritts, J. B. (2012). *Essentials of Illinois school finance: A guide to techniques, issues and resources*. Springfield, IL: Illinois Association of School Boards.

Funding Illinois' Future. (2016). *Senate Bill 231 frequently asked questions*. Retrieved from http://fundingilfuture.org/wp-content/uploads/2014/10/BFBS-FAQ-as-of-051216-1.pdf (accessed January 3, 2018).

Gamoran, A. (2001). American schooling and educational inequality: A forecast for the 21st century. *Sociology of Education 74*, 135–153. Retrieved from http://www.jstor.org/stable/2673258 (accessed August 18, 2016).

Greene, G. K., Huerta, L. A., & Richards, C. (2007). Getting real: A different perspective on the relationship between school resources and student outcomes. *Journal of Education Finance, 33*(1), 49–68. Retrieved from http://www.jstor.org/stable/40704314 (accessed February 13, 2015).

Hanushek, E. A. (1989). The impact of differential expenditures on school performance. *Educational Researcher, 18*(4), 45–62. Retrieved from http://journals.sagepub.com/doi/pdf/10.3102/0013189X018004045 (accessed June 15, 2014).

Hanushek, E. A. (1994). Money might matter somewhere: A response to Hedges, Laine, and Greenwald. *Educational Researcher, 23*(4), 5–9. Retrieved from journals.sagepub.com/doi/pdf/10.3102/0013189X023004005 (accessed June 15, 2014).

Hanushek, E. A, Rivkin, S. G., & Taylor, L. L. (1996). The identification of school resource effects. *Education Economics, 4*(2), 105–125. http://dx.doi.org/10.1080/09645299600000012 (accessed January 6, 2015).

Haveman, R. H., & Smeeding, T. M. (2006). The role of higher education in social mobility. *The Future of Children, 16*(2), 125–150. Retrieved from http://muse.jhu.edu/journals/foc/summary/v016/16.2haveman.html (accessed April 29, 2015).

Hedges, L. V., Laine, R., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23*(3), 5–14. Retrieved from http://www.jstor.org/stable/1177220 (accessed June 15, 2014).

Henry, G. T., Fortner, C. K., & Thompson, C. L. (2010). Targeted funding for educationally disadvantaged students: A regression discontinuity. *Educational Evaluation and Policy Analysis, 32*(2), 183–204. Retrieved from http://www.jstor.org/stable/40732417 (accessed January 12, 2016).

Hyman, J. (2017). Does money matter in the long run? Effects of school spending on educational attainment. *American Economic Journal: Economic Policy, 9*(4), 256–80.

Illinois Constitution. *Article X, Section 1*. Retrieved from http://ilga.gov/commission/lrb/conmain.htm (accessed June 8, 2015).

Illinois School Funding Reform Commission. (2017). *Report to the General Assembly and Governor Rauner* (ISFRC Report 2.1.17). Retrieved from https://www.isbe.net/Documents_ISFRC/FINAL_Commission_Framework_Report_2017_02_01.pdf (accessed April 30, 2018).

Illinois State Board of Education (ISBE). (2016). *General state aid: An Introduction to the basics* [PDF document]. Retrieved from https://www.isbe.net/Documents/GSA%20Basics%20101_Fall%202016_Final.pdf

Jackson, C. K., Johnson, R. C., & Persico, C. (2016). The effects of school spending on educational and economic outcomes: Evidence from school finance reforms. *The Quarterly Journal of Economics, 131*(1), 157–218. doi: 10.1093/qje/qjv036 (accessed August 12, 2016).

Lewis, D. A., & Nakagawa, K. (1995). *Race and educational reform in the American metropolis: A study of school decentralization*. Albany, NY: SUNY Press.

Lichtenberger, E. J., & Dietrich, C. (2012). *College readiness and the postsecondary outcomes of Illinois high school students* (2012-1). Edwardsville, IL: Illinois Education Research Council at Southern Illinois University Edwardsville. Retrieved from http://ierc.education/ierc_publications/college-readiness-and-the-postsecondary-outcomes-of-illinois-high-school-students-2012-1/ (accessed July 8, 2014).

Lichtenberger, E., & Dietrich, C. (2014). *Outmigration and human capital: Homeward bound or gone for good?* (2014-1) Edwardsville, IL: Illinois Education Research Council at Southern Illinois University Edwardsville. https://ierc.education/wp-content/uploads/2014/10/2014-1-Outmigration-and-Human-Capital.pdf (accessed April 23, 2018).

Lichtenberger, E., & George-Jackson, C. (2013). Predicting high school students' interest in majoring in a STEM field: Insight into high school students' postsecondary plans. *Journal of Career and Technical Education, 28*(1), 19-38.

Mahoney, M. H. (2013). Inequity in American schools: A new perspective on the distributional effects of school expenditures on economic well-being. *The Review of Income and Wealth, 59*(4). DOI: 10.1111/roiw.12055 (accessed February 1, 2015).

Martire, R. (2013). *Equity and education funding in Illinois and America*. Center for Tax and Budget Accountability. http://www.ctbaonline.org/

Martire, R., Otter, B., & Hertz, D. (2017). *Analysis of SB 1947 (Public Act 100-0465): The evidence-based funding for student success act*. Center for Tax and Budget Accountability. Retrieved from http://www.ctbaonline.org/reports/analysis-sb-1947-public-act-100-0465-evidence-based-funding-student-success-act (accessed February 14, 2018).

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., Gebrekristos, S., Zhang, J., Rathbun, A., Barmer, A., Bullock Mann, F., & Hinz, S. (2017). *The condition of education 2017* (NCES 2017- 144). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017144 (accessed November 3, 2017).

Mensah, Y. M., Schoderbek, M. P., & Saha, S. P. (2013). The effect of administrative pay and local property tax on student achievement scores: Evidence from New Jersey public schools. *Economics of Education Review, 34*, 1–16. https://doi.org/10.1016/j.econedurev.2013.01.005 (accessed January 18, 2015).

Monk, D. H. (1992). Education productivity research, An update and assessment of its role in education finance reform. *Educational Evaluation and Policy Analysis, 14*(4), 307–332. Retrieved from http://www.jstor.org/stable/1164278 (accessed August 18, 2016).

Niu, S. X., & Tienda, M. (2013). High school economic composition and college persistence. *Research in Higher Education, 54*(1), 30–62. Retrieved from https://link.springer.com/sharelink/10.1007/s11162-012-9265-4 (accessed May 23, 2015).

Noble, J., & Sawyer, R. (2002). *Predicting different levels of academic success in college using high school GPA and ACT composite score*. ACT Research Report Series. Retrieved from http://files.eric.ed.gov/fulltext/ED469746.pdf (accessed October 4, 2016).

Orr, A. J. (2003). Black-white differences in achievement: The importance of wealth. *Sociology of Education, 76*(4), 281–304. Retrieved from http://www.jstor.org/stable/1519867 (accessed March 30, 2017).

Palardy, G. J. (2013). High school socioeconomic segregation and student attainment. *American Education Research Journal, 50*(4), 714–754. DOI: 10.3102/0002831213481240 (accessed June 25, 2015).

Papke, L. (2005). The effects of spending on test pass rates: evidence from Michigan. *Journal of Public Economics, 89*(5-6), 821–839. doi:10.1016/j.jpubeco.2004.05.008 (accessed July 20, 2016).

Payne, K. J., & Biddle, B. J. (1999). Poor school funding, child poverty, and mathematics achievement. *Educational Researcher, 28*(6), 4–13. doi: 10.3102/0013189X028006004 (accessed July 8, 2014).

Rhemtulla, M., Brosseau-Liard, P. É., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods, 17*(3), 354.

Rossmiller, R. A. (1987). Achieving equity and effectiveness in schooling. *Journal of Education Finance, 12*(4), 561–577. Retrieved from http://www.jstor.org/stable/40703574 (accessed June 21, 2014).

Sherlock, M. (2011). The effects of financial resources on test pass rates: Evidence from Vermont's equal education opportunity act. *Public Finance Review, 39*(3), 331–364. doi: 10.1177/1091142110396500 (accessed August 1, 2016).

Snyder, T. D., de Brey, C., & Dillow, S. A. (2016). *Digest of education statistics 2015* (NCES 2016-014). Washington, DC: U. S. Department of Education, National Center for Education Statistics, Institute of Education Sciences.

Taylor, J. L. (2015). Accelerating pathways to college: The (in) equitable effects of community college dual credit. *Community College Review, 43*(4), 355-379.

Venator, J., & Reeves, R. (2015). *Three reasons college matters for social mobility*. Social Mobility Memos, Brookings.

Verstegen, D. A. & Driscoll, L. G. (2008). Educational opportunity: The Illinois dilemma. *Journal of Education Finance, 33*(4), 331–351. Retrieved from http://www.jstor.org/stable/40704335 (accessed July 8, 2014).

Wenglinsky, H. (1998). Finance equalization and within-school equity: The relationship between education spending and the social distribution of achievement. *Educational Evaluation and Policy Analysis, 20*(4), 269–283. Retrieved from http://www.jstor.org/stable/1164325 (accessed June 18, 2013).

White, B. R., Presley, J. B., & DeAngelis, K. J. (2008). *Leveling up: Narrowing the teacher academic capital gap in Illinois* (IERC 2008-1). Edwardsville, IL: Illinois Education Research Council. http://ierc.education/ierc_publications/leveling-up-narrowing-the-teacher-academic-capital-gap-in-illinois-ierc-2008-1/ (accessed April 28, 2015).

Zwick, R. (2002). Is the SAT a 'wealth test'? *Phi Delta Kappan, 84*(4), 307–311. Retrieved from http://journals.sagepub.com/doi/pdf/10.1177/003172170208400411 (accessed March 30, 2017).

Appendix A

Descriptive Statistics of Analysis Samples by Racial Classification

			White, Non-Hispanic	American Indian/ Alaskan Native	Black/ African American	Latina/o/ Hispanic	Asian/ Pacific Islander	Total
N			47,456	317	7,016	5,861	3,082	63,732
%			74.5%	0.5%	11.0%	9.2%	4.8%	100.0%
District-level	Mean Per Pupil Revenue, state & Local sources (SD)		$9,896	$9,433	$9,292	$9,690	$11,604	$9,891
			($3,329)	($3,103)	($2,901)	($3,015)	($3,578)	($3,297)
Student-level	Mean Parent Income	Less than $30,000	17.3%	38.5%	54.5%	47.9%	28.6%	24.9%
		$30,000 - $50,000	26.7%	26.5%	26.6%	30.3%	26.1%	27.0%
		$50,000 - $80,000	27.4%	19.9%	11.3%	14.8%	23.1%	24.2%
		More than $80,000	28.58%	15.14%	7.58%	7.06%	22.29%	23.92%
	Mean HS GPA (SD) 1 = (D- to D) 0.5 - 0.9 2 = (D to C-) 1.0 - 1.4 3 = (C- to C) 1.5 - 1.9 4 = (C to B-) 2.0 - 2.4 5 = (B- to B) 2.5 - 2.9 6 = (B to B+) 3.0 - 3.4 7 = (A- to A) 3.5 - 4.0		5.5	4.4	4.7	4.7	5.9	5.4
			(1.4)	(1.6)	(1.4)	(1.5)	(1.3)	(1.4)
	Gender	Female	51.2%	45.7%	58.4%	53.4%	49.1%	52.1%
		Male	48.8%	54.3%	41.6%	46.6%	50.9%	47.9%
	HS Curriculum	College Prep	53.2%	29.7%	41.1%	35.2%	58.1%	50.3%
		Other	46.8%	70.4%	58.9%	64.8%	41.9%	49.7%
	Postsecondary Degree Expectations	≥ BA/BS	83.9%	65.0%	81.5%	73.7%	91.8%	83.0%
		< BA/BS	16.1%	35.0%	18.5%	26.3%	8.2%	17.0%
School-level	School Percent Minority		12.9%	20.8%	70.1%	49.9%	22.9%	23.1%
	(SD)		15.4%	27.9%	32.3%	32.5%	22.2%	28.3%
	Mean ACT Math Score		0.8	0.6	0	0.5	1.1	0.7
	(SD)		0.6	0.7	0.9	0.7	0.5	0.7
Student-level Outcomes	Mean ACT Composite Score		21.5	17.5	16.8	17.5	22.4	20.7
	(SD)		5.0	4.7	3.9	4.2	5.4	5.2
	Mean ACT Math Score		21.5	17.9	16.7	17.8	23.7	20.7
	(SD)		5.4	4.6	3.7	4.1	6.0	5.5
	Enrolled in Any Post-Secondary	Yes	62.3%	39.4%	48.0%	41.5%	70.0%	59.1%
		No	37.7%	60.6%	52.0%	58.5%	30.0%	41.0%
	Enrolled in Four-year Postsecondary	Yes	53.1%	28.1%	43.6%	31.8%	65.7%	50.6%
		No	46.9%	71.9%	56.4%	68.2%	34.3%	49.4%
	Any Postsecondary Degree	Yes	39.2%	12.0%	20.0%	16.4%	50.0%	35.4%
		No	60.8%	88.0%	80.0%	83.6%	50.0%	64.6%
	Bachelor's Degree or Higher	Yes	37.9%	11.7%	18.3%	15.2%	49.0%	34.1%
		No	62.1%	88.3%	81.7%	84.8%	51.0%	65.9%

NOTE: Sample restricted to the 63,732 cases with complete data. Full public-school data file consists of 94,763 cases.

Contact the IERC toll-free at 1-866-799-IERC (4372)
or by email at ierc@siue.edu
http://ierc.education

ILLINOIS EDUCATION RESEARCH COUNCIL

11

Reflections on Equity, Adequacy, and Weighted Student Funding
Author(s): Helen F. Ladd
Source: *Education Finance and Policy*, Vol. 3, No. 4, Philosophical and Normative Issues in Education Finance (Fall 2008), pp. 402-423
Published by: The MIT Press
Stable URL: http://www.jstor.org/stable/educfinapoli.3.4.402
Accessed: 27-02-2018 17:21 UTC

REFLECTIONS ON EQUITY, ADEQUACY, AND WEIGHTED STUDENT FUNDING

Helen F. Ladd
Sanford Institute of Public Policy
Box 90245
Duke University
Durham, NC 27708
hladd@duke.edu

Abstract

Within the context of the school finance literature, the concepts of equity and adequacy raise a number of complex definitional and pragmatic issues. The purpose of this article is to clarify those issues and to use those concepts to evaluate the recent policy proposal called weighted student funding (WSF). Though WSF contains some equity-enhancing elements, it could fall short of its equity goals because of imperfect weights. This approach also fails to take full account of the concentrations of challenging-to-educate students and their effects on the distribution of teachers. In addition, the WSF proposal can be faulted for paying no attention to adequacy, potentially stigmatizing individual students, and placing so much focus on individual schools. A more complete evaluation of WSF would require a broader institutional perspective that extends beyond the equity and adequacy considerations of this article.

1. INTRODUCTION

In this article, I reflect on some of the issues that arise in implementing either an equitable or an adequate education finance system and discuss their implications for the weighted student funding (WSF) approach to the financing of schools. This approach to funding has recently received the public endorsement of the Thomas B. Fordham Institute and the support of a long list of signatories, including three former U.S. secretaries of education (Fordham Institute 2006). WSF has three main elements. Funding would follow students to the specific schools they attend, the per student amount of funding would vary with the educational needs of the student, and the schools would have the flexibility to use the money in whatever way they wished.

I draw on examples from the United States, South Africa, and New Zealand, the three countries I know best. Though it may seem strange to bring South Africa and New Zealand into this discussion of funding schools in the United States, there are several reasons for doing so. After fifty years of egregious race-based inequities in its education system and the rest of society, South Africa now has one of the most progressive constitutions in the world, one that identifies education as a basic human right. The country has faced major challenges while moving in the direction of a more equitable and adequate education system. Hence equity—specifically racial equity—has been high on the country's policy agenda (Fiske and Ladd 2004). The stark contrast between the inequities of the past and the country's postapartheid aspirations can provide perspective on a much murkier U.S. situation. The New Zealand experience is relevant because of that country's dramatic movement in the direction of self-governing schools, parental choice, and competition in the early 1990s. Its focus on school-level funding and autonomy can provide insight into the school-level dimensions of the WSF approach (Fiske and Ladd 2000).[1]

2. DEFINING THE TERMS

In the following discussion I use either the district or the school as the relevant unit for discussing equity or adequacy. The district is standard in the U.S. school finance literature because of the large role that districts have typically played in raising revenue and implementing education policy. Increasingly, schools have garnered more attention largely because of school-based accountability programs, including the 2001 federal No Child Left Behind Act, which holds individual schools throughout the country accountable for

1. In 1989, New Zealand shifted from a bureaucratic, centralized education system to one in which parent-dominated school-specific boards operate each school. Subsequently, in 1991 families were empowered to choose schools for their children. Resources are allocated generally in line with the number of students in each school.

raising student achievement. Moreover, schools are the object of the weighted per pupil funding approach. Along with such funding, schools would be given more operational autonomy than they currently have and would be encouraged to compete for students.

Throughout this article, the term *equity* should be understood as a relational or distributional concept; that is, it involves a comparison across schools (or districts). Equity can be defined in terms of inputs or outcomes. If defined in terms of inputs, an equitable education finance system would be one in which all schools have equal—or equivalent—packages of educational inputs. This standard is often referred to in the literature as *horizontal equity*, a term borrowed from the public finance literature to denote equal treatment of equals (Berne and Stiefel 1984; Baker and Green 2008). Equality of inputs need not require that every school be the same. For example, one school might offer small classes with no teacher aides and another larger classes with more teacher aides. Hence even the relatively straightforward concept of equal input packages is a bit elusive.

When equity is defined in terms of the equality of outcomes, a distributionally equitable education system would, in theory, be one in which all schools have sufficient resources to achieve similar educational outcomes. In this case, some schools or districts would need more resources than others because of their greater proportions of challenging-to-educate students. Thus equality of outcomes requires inequality of inputs. As discussed further below, this outcome approach to equity provides one justification for the concept of "vertical" equity introduced by Berne and Stiefel (1984), which requires unequal treatment of unequals.[2]

Adequacy, in contrast, should be understood as applying to an absolute threshold and can be interpreted in terms of either inputs or outcomes, with the outcome definition currently more common.[3] According to the outcome perspective, an education system meets an adequacy standard if all schools have sufficient resources to achieve a specified outcome standard, given the particular set of students they serve. This outcome standard might be defined in terms of an average test score or a given percentage of students at a proficient level. As long as all districts or schools have sufficient resources to provide such an education, under this standard any disparities above the standard are not cause for concern. In the philosophical literature, the comparable terms for equity and adequacy are equality and sufficiency.

2. See Baker and Green 2008, pp. 210–12, for further discussion of vertical equity.
3. See Grubb 2007 for examples of adequacy applied to resources.

In some of the education finance literature, equity is defined to encompass adequacy as well as distributional equity.[4] To avoid confusion, in this article I use the term *equity* in the narrow distributional sense defined above as applied to either inputs or outcomes. By that definition, an adequate system would be judged inequitable if some schools (or districts) were allowed to exceed the level deemed adequate. Similarly, an equitable funding system would be deemed inadequate unless it achieved equality at or above the threshold required for adequacy. Another area of potential semantic confusion arises with respect to the term *equal educational opportunity*. Though this term can be and has been used in a number of different ways, I introduce it below in connection with the discussion of equal educational outcomes.[5]

3. DISTRIBUTIONAL EQUITY

Underlying this discussion is the following basic relationship between educational outcomes and school inputs defined at the school or district level, denoted by the subscript i:

$$\text{Outcomes}_i = f(\text{school inputs}_i, X_i),$$

where educational outcomes could refer either to subsequent success in the labor market as measured by earnings or to more immediate outcomes such as student achievement; inputs refer to the quantity and quality of resources used in the provision of education such as teachers, facilities, and materials; and X is a vector of family and student background characteristics that influence student outcomes. These characteristics, such as family poverty, affect the average outcomes at the school or district level in two distinct ways. First, to the extent that individual students from impoverished backgrounds, for example, come to school less ready to learn than their more advantaged counterparts, they may well require additional support from the school. Second, schools with greater concentrations of impoverished students tend to be associated with harsher working conditions for teachers and school environments that may be less favorable for student learning. Thus what matters is not only the characteristics of the individual students but also their concentration within a school.

4. See, for example, Ladd and Hansen 1999, chapters 3 and 4. In that volume, distributional equity as defined above is labeled "Equity 1" and adequacy as "Equity II." Fiske and Ladd (2004) also use a broader concept of equity.
5. In their classic discussion of school finance equity, Berne and Stiefel (1984) use the term to refer to what is more commonly called fiscal neutrality. In a fiscally neutral system, all school districts within a state have an equal opportunity to attain a given level of per student spending with a given tax rate. Note in addition that in their evaluation of the movement toward racial equity in South Africa, Fiske and Ladd (2004) use the term *equal educational opportunity* to refer to the equality of inputs.

Because schools are likely to differ in the types of students they serve, any program that equalizes inputs is not likely to equalize outcomes at the school level. To equalize outcomes, the inputs would have to differ across schools to offset the effects of family background. Thus an equity standard defined in terms of outcomes is far more ambitious than one defined in terms of school inputs. I argue in the following discussion that even the relatively weak input standard may be difficult to achieve in practice.

Equality of Inputs

If there were only one school input, such as teachers, input equality might initially be interpreted as requiring every school to have a similar ratio of teachers to students. Yet as shown by the experience of South Africa, such a policy will not lead to equality in the ratio of quality-adjusted teachers to students across schools. In its quest for equity in the postapartheid period, South African policy makers moved aggressively to equalize staffing ratios by reducing teaching slots in schools that had previously served only white students and raising the number in schools that had previously served black students.[6] Though the staffing ratios became much more equal, as of 2002 the former white schools still boasted a far more qualified teaching force than the former black schools (Fiske and Ladd 2004, chapter 6).

To generalize beyond a single input, per pupil spending is typically used as a proxy measure for the whole package of school inputs available in a school. Such spending represents the weighted sum of inputs such as the number of teachers or the amount of supplies per pupil, where the weights are the prices of each input. To the extent that the prices of inputs differ across regions—perhaps because of differences in the cost of living—spending levels would need to be adjusted. In the following discussion, I ignore these price differences and simply assume either that spending has been adjusted for them or that they are inconsequential. I also assume away any economies of scale in production that could complicate the translation of spending into inputs.

Even if per student operating spending were equal across districts or schools, schools are likely to differ in the quality of their educational inputs. Inequalities could well arise for at least three reasons: teacher preferences and the nonrandom sorting of teachers across schools, the greater ability and willingness to pay of some parents relative to others, and the legacy of history.

6. The details of this policy, which led to large-scale teacher strikes in some areas, are described in Fiske and Ladd 2004, pp. 105–12.

Teacher Preferences and Teacher Labor Markets

Teachers are not like textbooks or other materials that can simply be allocated to one school or another. Instead teachers have free will to accept or reject teaching positions in particular schools, based on their preferences. Consider, for example, the following situation:

> Teachers differ in terms of their effectiveness.
>
> Teachers prefer to teach in schools with more advantaged students, all other factors held constant.
>
> All teachers are paid the same salary.

In this situation, even with uniform spending per pupil, the schools with the least advantaged students would be at a competitive disadvantage relative to other schools in their ability to attract teachers. That is true because the higher quality teachers will gravitate to the schools with the more advantaged students and those schools will be happy to hire them. Hence the schools serving disadvantaged students will end up with teachers of lower quality than those in schools serving more affluent students. A number of descriptive studies, including those based on data for New York, California, and North Carolina, are consistent with this outcome, albeit in the context of a more complex world in which salary schedules and spending may differ across districts.[7]

The basic point is that to the extent that schools have different student profiles, the voluntary decisions of teachers are likely to interfere with efforts to promote equality in terms of the provision of equal teacher positions or equal per pupil spending across schools. What matters here are differences across schools (or districts) in the concentrations of challenging-to-educate students.

Parental Preferences and Willingness to Spend for Education

A second reason that equal public spending need not translate into equal school inputs relates to the preferences of families and their willingness to pay for education. For example, given that a policy of equal per pupil spending would typically apply to public funding alone, inequities in access to educational inputs would arise to the extent that some families choose to put their children in better resourced private schools. Because private schools are not funded publicly, reasonable people could disagree about whether such resource disparities between public and private schools should be deemed

---

7. See Lankford, Loeb, and Wyckoff 2002 for the distribution of teacher credentials across districts in New York State. Betts, Rueben, and Danenberg (2000) and Clotfelter et al. (2007) discuss distribution of teacher credentials across schools in California and in North Carolina, respectively. Though salary differentials across districts are a significant part of the story in New York, such differences play a smaller role in the California and North Carolina outcomes. Also see Boyd, Lankford, and Wyckoff 2008.

outside any equity discussion related to public funding for schools. But private schools are simply the extreme of a continuum between full public and full private funding of education. The point is that parents with strong willingness and ability to pay for education will typically find some way to meet their preferences for a higher quality education.

This continuum emerges clearly in the South African context (Fiske and Ladd 2004). In the early postapartheid period, South African policy makers moved quickly to equalize educational resources across schools within each of the nine new provinces. With limited public resources, the only way to do so was to level down, that is, to take resources—most notably teacher slots—away from the former white schools that had benefited from far greater publicly provided resources under apartheid than the former black schools. The political compromise that allowed this to happen was that the parent-dominated governing bodies of each school were given the authority to levy school fees to supplement the resources provided by the state. This policy was justified largely on the ground that if schools were not allowed to charge fees, many middle-class students, both black and white, would opt out of the public school system in favor of private schools. That, in turn, was deemed undesirable, both because it would have converted an education system previously divided by race into one bifurcated by income and because policy makers deemed it important to keep as many middle-class voters, regardless of their color, in the public sector so that they would continue to have a stake in the quality of the public schools.

Not surprisingly, the former white schools (which in the postapartheid period serve both black and white students, but mainly from the middle and upper income classes) were more willing and able to raise school fees than were most of the former black schools that continue to serve a black, and typically low-income, student population. The result of the fee policy is that each province has ended up with a continuum of public schools. At one end are the schools that operate solely based on their public funding. At the other end are schools serving similar numbers of students that are able to collect sufficient fee revenue from parents to hire large numbers of additional teachers. In such a situation, equal public funding for education clearly does not translate into equal school inputs.

One might question the relevance of this example from South Africa to the situation in the United States, where public schools are prohibited from levying school fees or charging tuition. In fact, though, there are similarities. California provides a prime example. As a result of the *Serrano* cases in the early 1970s, school districts are required to spend essentially equal amounts on public schools. That policy in California has led to significant private fundraising activities that generate funds to supplement the public funding for local schools. Because such fundraising is easier in some areas than others, that activity generates disparities across districts and schools in the resources available to students (Brunner and Sonstelie 1997; Brunner and Imazeki 2005).

Moreover, even in a situation in which the additional funding comes in the form of property taxes raised through a collective choice, the political process bears some striking similarities to the South African story. Consider, for example, efforts in the 1970s to equalize spending on education in response to the *Doran* court ruling in Washington State. As part of its effort to move toward more equal spending, the state legislature tried to cap the amount of school revenue that districts could raise as a supplement to the state funding at 10 percent of the funding. In fact, the legislature was not successful in doing so, given the opposition of many wealthy school districts, and the cap was subsequently raised to 24 percent (Mertens and Freund 2005, p. 4). Stated differently, the wealthy districts were not willing to let the quality of their schools decline for the sake of equality. The result was similar to that in South Africa, namely that despite equal government state funding for education, children living in districts with a high willingness to pay for schooling continued to have access to schools with greater resources than children in other districts.

History Matters, Especially with Respect to School Facilities

A third reason that equal public spending may not translate into equal inputs is that history matters, especially with respect to the quality of school facilities. Because equal spending policies typically apply to current operating spending alone, any differences in the quality of school facilities that reflect differential investments in the past translate into differences in current school quality. The effect of history emerges starkly in the South African case because of the enormity of the underinvestment in schools for black students relative to the white schools during the apartheid period. Hence, despite the relatively even distribution of operating resources in the postapartheid period, some students have access to modern school facilities with media centers and playing fields, while other students are in schools with insufficient classrooms, no electricity, no running water, and in some cases no roof.

Once again, although the situation in South Africa may be starker than that in the United States, it is not irrelevant. Long periods of underinvestment in inner-city U.S. schools, for example, generate similar disparities.

The bottom line is that even the relatively straightforward equity standard that all students should have access to equal quality schools as measured by school inputs is likely to be difficult to achieve in practice. To achieve that standard, the education finance system would have to account for the fact that high-quality teachers would need to be compensated—by either higher salaries or improved working conditions—to induce them to teach in high-poverty schools. In addition, policy makers would have to take very strong measures to counter the natural pressure for wealthier parents to make sure their children have access to high-quality schools. Finally, policy makers would have to level the current playing field by compensating for any historical shortfalls in the investments in some schools relative to others. Hence simply equalizing current spending per student will not assure that all students have access to an equal quality education, even when that quality is defined solely in terms of inputs.

Equal Educational Outcomes (or Opportunities) and Vertical Equity

An equity standard defined as equal educational outcomes is more ambitious than a standard defined as equal inputs or quality of schooling. For the reasons discussed above, the focus on outcomes means that schools or districts with large proportions of challenging-to-educate students would require even more resources than other schools to achieve the same outcome goals and might well need to compensate its teachers for the harsh working conditions with higher salaries or other perks.

The philosopher Amy Gutmann has argued that such an equity standard, interpreted at the level of the individual student, is far too difficult to achieve. In particular, it would require that the school system offset not only all the characteristics of the student's family background and environment that make it difficult for the student to achieve, but also the student's chosen level of effort. Not only would equal outcomes be difficult to achieve in practice, but in some situations the goal itself might be inappropriate. In the extreme, for example, such a goal would inject the state education system so far into family matters related to the education of children that it could violate the liberal ideal of family autonomy (Gutmann 1987).

An alternative concept of equal educational opportunity developed by Roemer (1998) provides a middle ground by focusing on the average behavior of groups. The concept of equal opportunity—which Roemer has applied to a variety of policy arenas, not just education—is that outcomes (defined by him in the education context as subsequent earning capacity as an adult but that also could be measured by student achievement) should not be permitted to differ because of factors, or circumstances, outside the child's control. Such a standard would require policy makers to provide districts or schools with additional resources to compensate them for the circumstances of students that are outside the control of the students but not for things under their control, such as their effort. For example, one might take as a relevant circumstance the income level of the child's parents because evidence shows that children of poor parents typically find it more difficult to succeed in school, and ultimately in the labor market as adults, than other children.

Given the goal of equal outcomes, the policy implication is that more of the scarce schooling resources should be made available to students from poor families in order to compensate them for this educational disadvantage. Moreover, the additional resources required for each group are well defined, at least at a conceptual level. They are the additional resources needed so that the average outcomes for each group of students will be equal. It should be noted, though, that within each group, outcomes would differ because of differences in factors under the control of students, such as their level of effort.

This approach provides one possible theoretical underpinning for what Berne and Stiefel (1984) call vertical equity, or the unequal treatment of unequals. As they note, the first task in measuring or promoting vertical equity is to define the characteristics used to classify "unequals," such as whether a child has disabilities or comes from an economically disadvantaged family. These classifications are comparable to the special "circumstances" in the Roemer model. The second task is to assign additional weights for each of the relevant classifications, such as 1.0 for students with disabilities and 0.5 for low-income students, meaning that a disabled student would be equivalent to two regular students and a low-income student would be equivalent to 1.5 regular students. These weights can then be used to convert the actual number of students in a district to a weighted number. Equality in this context would require equality of spending per weighted pupil across districts.

The linking of the Berne and Stiefel construct of vertical equity to the concept of equal opportunity as developed by Roemer provides a conceptual basis for interpreting and measuring the weights required to implement a vertically equitable finance system. The weights for each group, at least in theory, should reflect the average differential costs required to get pupils in that particular classification (i.e., those in the same circumstances) to any specific level of educational outcome. Interpreted in this way, a vertically equitable financing system would be one that generated equal average outcomes for various policy-relevant groups of students, though not for individual students within each group.

Though appealing in theory, a vertically equitable education system raises some thorny problems of implementation. One is that the appropriate weights should in principle vary with the outcome standard. If, for example, the desired level of educational outcomes, as measured by student achievement, was very low, then the weights could conceivably all be close to 1. In contrast, high outcome standards—for example, those that require complex thinking—could well require quite high weights for some groups of students relative to the average. An even thornier issue, and one to which I return below in the context of the adequacy discussion, relates to whether enough is known about the "education production function" to determine the weights in any meaningful way. Finally, in principle, the weights should take into account not only the characteristics of the students themselves but also the extent to which students whose characteristics make them hard to teach are concentrated in particular schools or districts.

4. ADEQUACY

In 1989, a historic education summit in Charlottesville, Virginia, that included President George H. W. Bush and the state governors called for standards-based reform of education. A main thrust of this new consensus was to focus on the goal of ambitious achievement standards. In that same year, the Kentucky Supreme Court ruled that Kentucky's overall education system was inadequate. Ever since, adequacy has increasingly become the standard to which the courts are holding state education funding systems. Like the vertical equity or equal opportunity standard, adequacy typically focuses on outcomes and hence on the observation that some students require greater educational resources than others to compensate them for the greater learning challenges they face. It differs from those equity standards and also from an input-based equity standard in its focus on the attainment of an absolute level of education, one deemed to be sufficient or adequate given the goals of education.

Defining Adequacy

Of course defining what is adequate is not straightforward either at a conceptual level or in practice.

The central question is: adequate for what? One answer might lie in the Rawlsian concept of primary goods and the notion that every student should attain a minimum set of educational outcomes connected to his or her long-term life chances (Rawls 2001). Another might draw on Gutmann's concept of a democratic threshold. In her view, the primary role of education is to promote a democratic society, characterized by deliberative and collective decision making; hence the threshold is that level at which a person has the ability to participate effectively in the political process (Gutmann 1987; see also discussion in Ladd and Hansen 1999, pp. 102–6). Combining these two views, an adequate education may be conceived as one that is sufficient for someone to participate fully in both the economic and the political life of the country.

In general the definition would allow for disparities above the adequate level. To the extent that education is viewed as a "positional good," however, adequacy may in fact require that educational outcomes be equalized. A positional good is a good in which one's position in the queue matters for one's outcome. In other words, "The absolute value of the good one holds, to the extent it is positional, can only be determined by referring to one's standing in the distribution of that good" (Koski and Reich 2007, p. 596). Hence if education is viewed as a positional good, the only way to assure that everyone gets an adequate education is to make sure that educational outcomes are similar. If education is not viewed as a positional good, the adequate level of education could well be far lower than the maximum outcomes achieved by some students. Adequacy has typically been interpreted in this latter manner in the U.S. context.

In any case, the concept of an adequate or sufficient education is specific to a particular context and era. Consider as an extreme example the situation in South Africa under the apartheid government. During that oppressive and racist period, blacks were not allowed to vote and were not expected to play any role in the political life of the country. In addition, their economic role was limited to that of manual laborer. Hence the impoverished education provided to blacks at the time—one that included very little math and no critical thinking and one delivered in overcrowded schools with poorly trained teachers—was viewed by the white rulers as adequate. The situation is very different in the postapartheid period. For one thing, all citizens, regardless of color, are now entitled to participate fully in the new democracy and thus need the skills necessary for critical and independent thinking. Moreover, because the country's economic vitality depends crucially on its ability to compete in the global knowledge-based economy, a typical worker must now have a much higher level of education than in the past. Hence, though the term is not used in that country, what may have been deemed adequate fifty years ago is far from adequate today. Consistent with the current situation, the country's new constitution identifies education as a basic right available to all people regardless of their color and independent of the resource costs of providing it.

The determination of what is adequate ultimately must be made through the political process but in line with the requirements of the relevant constitution, which in the United States is typically the state constitution. The role for the courts, then, is twofold: first to determine what the constitution requires and second to assure that states are meeting their responsibility of providing sufficient resources for educational adequacy to be attained in practice. A further analytical issue is how adequacy and equity are likely to play out in the political process. The question here is whether the presence of large disparities in spending above the threshold level are consistent with the attainment of an ambitious adequacy standard.

Measuring the Resource Costs of an Adequate System

Once adequacy has been defined by some interaction of the courts and the state legislature, the next step is to determine what an adequate system would require in terms of resources. Given the current focus on adequacy in court cases, a small industry of researchers and consultants is now engaged in "costing out" studies. Such studies rely on a variety of methods that range from professional judgment to sophisticated empirical models. This is not the place to review the strengths and weaknesses of those studies (see Rebell 2006; Downes and Stiefel 2008). Instead, I simply want to highlight the two interrelated questions that are part of this effort. The first is what level of spending would be required for students with no special needs or circumstances to meet the achievement standard. The second is how much additional spending per student would be needed to compensate for the special circumstances of challenging-to-educate students.

The first question is challenging for two reasons. One is that researchers and policy makers may not know enough about the education production function to determine what resources would be needed to achieve the outcome standard. The second is that it raises issues about the efficiency with which resources are being used. Eric Hanushek, a major critic of the costing-out studies, highlights that the standard methods rule out discussions of reforms that might make the school system more efficient, in the sense of obtaining higher levels of achievement for a given level of educational inputs (Hanushek 2005). Although the issue of efficiency continues to bedevil the costing-out studies in a variety of ways, the Hanushek criticism is too strong. While it is reasonable to call for the use of best practices in estimating the costs of an adequate education, it seems unreasonable to calculate the required level of resources based on an assumption that there will be dramatic gains in the efficiency with which those resources will be used.

The second question related to the differential costs of educating students who come to school less ready to learn than others is an essential part of the adequacy discussion. At least two methods have been used to estimate the additional spending required to educate such students. The first relies on the empirical method of cost functions and on data at the district level. Such studies use the incidence of student poverty as one of the key measures of student circumstances, typically measured by the proportion of the student population eligible for a free or reduced price lunch under the federal food lunch program. These studies generate cost indices for poor students in the range of 1.0–1.5 for states with large urban areas such as Texas, New York, and Wisconsin and between 0.6 and 1.0 for rural states (Duncombe and Yinger 2008). An index of 1 in this context means that the district would have to spend 100 percent more on the education of a poor child than on a typical child to bring them both, on average, to the specified achievement standard. Of importance for the discussion of the WSF formula below is that these weights emerge from district-level studies, not from analyses of the needs of individual students. Thus they incorporate any effects on costs related to the concentrations of poor children within a district.

The second method relies on professional panels to estimate the additional costs of educating at-risk students. The results from these studies are sensitive to the specific questions asked of the panels and the ability of the panels to identify specific programs that would bring the identified group of students up to the performance standard. Emerging from that approach are cost indices that are somewhat smaller than those that emerge from the cost function studies (Downes and Stiefel 2008).

Political Economy Considerations

A key implication of the adequacy standard is that spending in excess of the adequacy standard by some districts or schools is of no concern. As I noted earlier, only if one viewed education as a positional good would there be no distinction between an adequate system and an equitable system defined in terms of outcomes. In that case, an adequate system would also be vertically equitable. Under the more typical interpretation of adequacy, some districts or schools are likely to spend far more than others, with the consequence that the average educational outcomes of some schools or districts are likely to exceed the adequate level.

A central issue, however, is what happens to the politically determined level of educational adequacy within a framework in which some groups have access to a higher quality education than others. Research by Loeb (2001) on school finance reform in the context of a federal system sheds light on this issue. She considers three models: one in which districts receive a uniform per pupil grant from the state and are not allowed to raise additional funds; one in which districts are allowed to raise unlimited additional funds; and one in which the additional funds are capped. Her conceptual model and related policy simulations generate the following conclusions. The system with no local supplementation is politically difficult to sustain because it forces many voters from their preferred spending levels. The system with unlimited local supplementation, which is attractive in the sense that it assures an adequate level of spending while allowing local control over funding decisions at the margin, may not be sustainable because the high-wealth districts lose their incentive to support state funding. In the context of Loeb's simulations for Michigan, this system generates greater variation in spending across districts and a lower level of state spending than the other two systems. She concludes that the system with capped supplements provides the best balance between local control and adequacy of funding.

Loeb's analysis is directly relevant to the equity versus adequacy debate. Given that full equality may not be attainable, either because of its high cost or because of the efforts of some families to maintain their relative position, and also because full equality may have undesirable incentive effects, some compromise between equity and adequacy is needed. One such compromise is to focus on adequacy as the primary goal, to permit some disparities above the adequate level, but to limit the magnitude of those disparities, particularly those funded from public revenue.

5. APPLICATION TO WEIGHTED STUDENT FUNDING

I turn now to the implications of this discussion for the WSF proposal. As noted earlier, the central aspects of that approach are that funding follows the children to the public schools they attend, per student funding is weighted to provide more resources based on a student's specific needs and circumstances, and schools have significant autonomy to use the funds as they see fit. As far as I can tell from the proposal, individual schools would not have the authority to negotiate salary levels, although they would have greater authority than they do presently to fire teachers (but whether teacher tenure would remain is unclear) and to compete for students. In terms of the previous discussion, this funding approach is most consistent with an outcomes-based equity standard in that it is concerned only with distribution and more funding is attached to students with greater educational needs. The weights are an essential part of the proposal.

Weighted Student Funding and Equity

The WSF approach is intended to promote equity through its distribution to schools of money, rather than teaching slots or programs, and by the addition of the need-based student weights. If well implemented, such an approach has some clear advantages over the current approach to school funding. Despite the claims of its proponents, however, it falls short of achieving full equity in at least two ways, and also raises an additional concern.

One clear benefit of the approach is that by distributing money rather than teaching slots, the approach forces schools to recognize the full costs of hiring expensive teachers. That recognition is particularly relevant for the schools serving advantaged students that typically are able to attract more experienced and higher paid teachers but at no cost in terms of other inputs forgone. Under the WSF formula, a school that spends money on expensive teachers would have less money for other inputs. Thus this approach is well designed to help level the playing field across schools. A second equity-enhancing component of the approach is the need-based weights. Provided the weights correctly reflect differential needs (see more on that issue below), the approach enhances equity defined in terms of outcomes. Finally, in theory the approach could reduce the concentration of needy students by making such students more financially attractive to schools serving larger concentrations of advantaged students.

At the same time, the approach is not the "100 percent solution" to school finance equity claimed by its advocates. One reason is that the weights are based only on the needs of individual students rather than on their concentrations in particular schools. As long as some schools have higher proportions of hard-to-educate students than others, teachers at any given salary level are still likely to prefer to teach in the more advantaged school, with the result that some disparities in the distribution of teacher quality will remain. The addition of the need-based weights helps, but it does not fully eliminate the inequity associated with concentrations of needy students. To be sure, the schools with more hard-to-educate students will have more money to spend than schools serving more advantaged students and could spend more either to hire more teachers or to hire more expensive, highly qualified teachers. If the former, the teacher quality issue remains; if the latter, the money is not available for additional services such as smaller classes or more support services that the incremental funding was intended to make possible.

A second equity-related shortcoming of the WSF approach is its inattention to historical investments or disinvestments in the school. Thus school facilities that are currently in poor shape due to past investment decisions or that have higher operating costs because of their outdated infrastructure will be at a disadvantage relative to newer schools. Though both these shortcomings could be addressed through add-ons or adjustments to the funding formula, the point is that the simple WSF formula alone does not produce the 100 percent solution claimed by its supporters.

Finally, the approach raises an additional issue that I believe should be of serious concern. The WSF approach is based on the premise that it makes sense to publicly identify individual students as being in a needy category. Evidence about the reluctance of many middle and high school students to enroll in the federal free and reduced price lunch program suggests that some students would prefer not to be identified as being poor (Gleason 1995). For this and other reasons, attaching weights to individual students may be morally dubious because of the potential for stigma.

Establishing the Weights

The theory of equal educational outcomes discussed earlier provides a firm conceptual foundation for the need-based weights. In particular, the weights should be set to compensate schools for the differentially higher average costs of educating students with particular characteristics that make them more challenging to educate than other students. Translating this theory into specific weights is not easy. One reason is that much of the work to date on the development of weights draws on district-level rather than school-level data. Another reason is that, as noted earlier, the appropriate weights may vary with the outcome level, and there is no specific outcome standard within the WSF framework.

Given the absence of an established "industry standard" system of weights, the WSF supporters propose two alternative methods of determining the weights. The first is an open process of discussion and negotiation among stakeholders, and the second is a market-driven process. Though the first approach has some clear merit, there is reason to believe that over time political pressures would lead to an expansion in the number of categories or to a reduction in the weights or some combination of both so as to spread funding in a less targeted way. Evidence for this prediction emerges from New Zealand's experience with a weighted funding formula. In contrast to the WSF approach, New Zealand took account of concentrations of needy students within schools and designed an aid program that would give additional money to schools with larger proportions of such students. Similar to the WSF approach, the goal of its targeted funding for educational achievement program was to offset the higher educational costs associated with such students. For this purpose schools were divided into deciles based on six factors related to student need. The original plan, which had received buy-in from many of the key stakeholders, was to target the additional funding to the schools in the lowest three deciles. By the time the plan was implemented, however, political pressures had been brought to bear and the funding was distributed among the bottom six deciles, albeit still in a sharply declining manner. Within a few more years, the distribution was expanded even further up the decile ranking to include schools in all deciles except for the highest (Fiske and Ladd 2000).

The alternative approach of using a market test to determine the weights raises even more concerns. The idea here is that the weights should be set so that hard-to-educate students become desirable for the schools. "Knowing that student performance standards must be reached, principals should find the weight for an at-risk child sufficient to make that child an asset to the school" (Fordham Institute 2006, p. 35). If that is not the case, then the state or district should change the weights. Implicit in this model is the notion that public schools should have full authority to choose the students they accept. That by itself is cause for concern. Even if that issue is set aside, there are other reasons to be skeptical of this approach. One major concern arises because the weights are based on the average characteristics of a group and not on the characteristics of individual students. Within each group, student outcomes are likely to vary because of differences in student motivation or effort. Thus, for any given category of student, some students are likely to be easier to educate than others. It is hard to imagine how these patterns could then be used to determine whether the average weight is appropriate. For some students within a particular category, any given weight will be too high, and for others it will be too low. Perhaps of even greater concern is that, from the school's perspective, the less motivated, harder-to-educate students in any at-risk category are likely to be less attractive than the more motivated students and may well end up concentrated in schools in which the additional funding is insufficient to compensate for their adverse circumstances.

Ultimately, the weights will be determined through a political process. For those policy makers who believe that additional funding for hard-to-educate students is necessary and appropriate, the policy question then becomes whether such students are likely to be better off with a funding system based on politically determined weights or with a more indirect approach that focuses on additional programs for them. The answer to that question is not clear but is central to the policy debate and deserves attention.

Focus on Equity to the Exclusion of Adequacy

The WSF approach to school funding focuses on equity alone and makes no reference to adequacy.[8] Presumably the idea would be to start with existing levels of funding and redistribute the funding among schools in line with the number of (weighted) students in each school. Given the magnitude of the redistributions that might be necessary, such a funding approach might be phased in over several years. Yet it remains a policy aimed at distributional equity with no attention to whether the funding is sufficient.

However, adequacy matters, especially in the current standards-based policy environment in which schools are explicitly being held accountable for the performance of their students. If the amount of funding to be distributed is not sufficient for schools to achieve the level of education necessary to meet the outcome standards, state or district policy makers are falling short on their part of the accountability bargain.

Once again, the New Zealand experience with a system that approximates student-based funding provides some insight. As operating authority was shifted in that country from the Department of Education to the schools in 1989, resources (in the form of both teacher allocations and grants for non-personnel spending) were distributed among the schools in an "equitable" way, but with little attention to whether the funding was adequate. Whether the initial amount of funding was adequate is hard to say. Over time, however, inflation-adjusted overall spending on education declined, and it became

8. In recent commentaries, Baker and Rebell (2006) and Rubinstein, Schwartz, and Stiefel (2006) also make this point.

increasingly clear that spending was far from adequate. Evidence for that conclusion comes in part from the fact that most schools responded by raising school fees (something not technically allowed in the United States but that was encouraged in New Zealand) and generating funds from other private or nonprofit donors (something that is permitted in the United States). Interviews with school personnel and perusals of school budgets made it clear that most of the revenue from the fees was going not to frills but rather to pay for basic education programs (Fiske and Ladd 2000).

A few years into the program, the new Ministry of Education called for an adequacy study. The contractor was not able to complete the study in part because it did not have the detailed data on staffing at the school level or outcome measures that the consultants thought necessary to determine adequacy. Another consideration had to do with the politics of the situation. As one ministry official explained, discussions about the adequacy of overall funding can be politically explosive and were often taken off the table (Fiske and Ladd 2000). Such was the case, for example, with respect to the new technology guidelines from the government, which, if adequately funded, would have required the ministry to increase its spending by the total amount it was then distributing to schools for all their nonpersonnel spending. Thus the political concern was that if the adequacy question were taken seriously, it would break the bank.

Though one might be tempted to discount the New Zealand experience because the slowdown in its economy during the mid-1990s made it difficult for the country to maintain its spending on education, a more fundamental incentive issue emerges from this experience. "In a decentralized system—one in which the funder differs from the spender—the government funder has an incentive to limit the rate of growth of funding because it bears the political costs of higher taxes while garnering few of the political gains from higher spending" (Fiske and Ladd 2000, p. 153). Moreover, when funding appears to be inadequate, the funder has an incentive to blame the recipients for not using the money as effectively as possible. This experience suggests that in the context of a highly decentralized system, equal funding may make it difficult to achieve adequate funding.

6. CONCLUSION

Though potentially appealing from an equity perspective, WSF deserves far more analysis and public debate before it is widely adopted. From the equity and adequacy perspectives presented in this article, the most important shortcomings of the approach are that it fails to account for the adverse effects of large concentrations of disadvantaged students, it pays no attention to the adequacy of funding, and the weights likely to emerge from the political process may well fall short of those suggested by the theory. Of course, existing approaches to school funding are also far from perfect. Thus the relevant policy question is not whether the WSF proposal is perfect but rather whether it would generate a more desirable pattern of education funding across schools than the current system, without also creating large undesirable side effects.

I have already highlighted one such side effect, namely that the approach may stigmatize individual students. A second potential side effect arises because the approach reinforces the current policy trend toward locating accountability, management authority, and decision making at the level of the individual school. Reasonable people may disagree about the desirability of this trend, which is evident not only in the United States but also in many other countries. A review of the literature on the benefits and costs of moving in this direction is beyond the scope of this article. Suffice it to say that there is mounting evidence that individual schools, especially schools serving low-performing students, are not able to succeed on their own. Instead, they need substantial support from intermediary institutions such as districts or networks of schools, and from the state in the form of technical assistance and support for capacity building (Fiske and Ladd 2000; Plank and Smith 2008). Hence a new education financing system that privileges the individual school over these other institutions should be evaluated not only in terms of the equity and adequacy considerations that are the topic of this article but also from a broader institutional perspective.

This article was initially prepared for the Twenty-Eighth Annual Association for Public Policy Analysis and Management Research Conference, Madison, WI, November 2006. The author thanks Charles Clotfelter and other members of the symposium for their comments.

REFERENCES

Baker, Bruce D., and Preston C. Green. 2008. Conceptions of equity and adequacy in school finance. In *Handbook of research in education finance and policy*, edited by H. F. Ladd and E. B. Fiske, pp. 203–21. New York: Routledge.

Baker, Bruce D., and Michael A. Rebell. 2006. Robbing Peter to pay Paul: Weighted student funding is not the "100 percent solution." *Education Week* 26(13): 30–31.

Berne, Robert, and Leanna Stiefel. 1984. *The measurement of equity in school finance*. Baltimore, MD: Johns Hopkins University Press.

Betts, Julian R., Kim S. Rueben, and Anne Danenberg. 2000. *Equal resources, equal outcomes? The distribution of school resources and student achievement in California*. San Francisco: Public Policy Institute of California.

Boyd, Donald, Hamilton Lankford, and James Wyckoff. 2008. Increasing the effectiveness of teachers in low-performing schools. In *Handbook of research in education finance and policy*, edited by H. F. Ladd and E. B. Fiske, pp. 535–50. New York: Routledge.

Brunner, Eric J., and Jennifer Imazeki. 2005. Fiscal stress and voluntary contributions to public schools. In *Developments in school finance: 2004*, edited by W. J. Fowler, pp. 39–54. Washington, DC: National Center for Education Statistics.

Brunner, Eric J., and Jon Sonstelie. 1997. Coping with *Serrano*: Private contributions to California's public schools. Proceedings of the Eighty-Ninth Annual Conference on Taxation, Washington, DC, pp. 372–81. Boston: National Tax Association.

Clotfelter, Charles, Helen F. Ladd, Jacob Vigdor, and Justin Wheeler. 2007. High poverty schools and the distribution of teachers and principals. *North Carolina Law Review* 85(5): 1345–79.

Downes, Thomas, and Leanna Stiefel. 2008. Measuring equity and adequacy in school finance. In *Handbook of research on education finance and policy*, edited by H. F. Ladd and E. B. Fiske, pp. 222–37. New York: Routledge.

Duncombe, William, and John Yinger. 2008. Measurement of cost differentials. In *Handbook of research in education finance and policy*, edited by H. F. Ladd and E. B. Fiske, pp. 238–56. New York: Routledge.

Fiske, Edward B., and Helen F. Ladd. 2000. *When schools compete: A cautionary tale*. Washington, DC: Brookings Institution Press.

Fiske, Edward B., and Helen F. Ladd. 2004. *Elusive equity: Education reform in post-apartheid South Africa*. Washington, DC: Brookings Institution Press.

Fordham Institute. 2006. *Fund the child: Tackling inequity and antiquity in school finance*. Washington, DC: Thomas B. Fordham Institute.

Gleason, Phillip M. 1995. Participation in the national school lunch program and the school breakfast program. *American Journal of Clinical Nutrition* 61(supplement): 213S–15S.

Grubb, Norton. 2007. The elusiveness of educational equity: From revenues to resources to results. In *The state of education policy research*, edited by S. H. Fuhrman, D. K. Cohen, and F. Mosher, pp. 157–78. Mahwah, NJ: Lawrence Erlbaum Associates.

Gutmann, Amy. 1987. *Democratic education*. Princeton, NJ: Princeton University Press.

Hanushek, Eric A. 2005. The alchemy of "costing out" an adequate education. Paper presented at the conference Adequacy Lawsuits: Their Growing Impact on American Education, Harvard University, October. Available www.ksg.harvard.edu/pepg/PDF/events/Adequacy/PEPG-05-28hanushek.pdf. Accessed 25 March 2008.

Koski, William S., and Rob Reich. 2007. When "adequate" isn't: The retreat from equity in educational law and policy and why it matters. *Emory Law Journal* 56(3): 545–615.

Ladd, Helen F., and Janet S. Hansen. 1999. *Making money matter: Financing America's schools*. Washington, DC: National Research Council.

Lankford, H., S. Loeb, and J. Wyckoff. 2002. Teacher sorting and the plight of urban schools: A descriptive analysis. *Education Evaluation and Policy Analysis* 24(1): 37–42.

Loeb, Susanna. 2001. Estimating the effects of school finance reform: A framework for a federalist system. *Journal of Public Economics* 80: 225–47.

Mertens, Barbara L., and Bill Freund. 2005. The Washington State ample school funding project. *Leadership Information* 4(2): 3–11. Available www.wasa-oly.org/asfp/asfp-0605-li.pdf. Accessed 25 March 2008.

Plank, David, and BetsAnn Smith. 2008. Autonomous schools: Theory, evidence, and reality. In *Handbook of research in education finance and policy*, edited by H. F. Ladd and E. B. Fiske, pp. 402–24. New York: Routledge.

Rawls, John. 2001. *Justice as fairness: A restatement*. Cambridge, MA: Harvard University Press.

Rebell, Michael A. 2006. Adequacy cost studies: Perspectives on the state of the art. *Education Finance and Policy* 1: 465–83.

Roemer, John E. 1998. *Equality of opportunity*. Cambridge, MA: Harvard University Press.

Rubinstein, Ross, Amy Ellen Schwartz, and Leanna Stiefel. 2006. Weighting for adequacy. *Education Week* 25(44): 33.

12

Weighted Student Funding in the Netherlands: A Model for the U.S.?

Author(s): Helen F. Ladd and Edward B. Fiske

Source: *Journal of Policy Analysis and Management*, Vol. 30, No. 3 (SUMMER 2011), pp. 470-498
Published by: Wiley on behalf of Association for Public Policy Analysis and Management
Stable URL: http://www.jstor.org/stable/23018961

Weighted Student Funding in the Netherlands: A Model for the U.S.?

Helen F. Ladd
Edward B. Fiske

Abstract

Although a relatively new idea in the U.S., weighted student funding (WSF) for individual schools has a long history in the Netherlands. This country of about 16.5 million people has been using a version of WSF for all its primary schools (serving children from age 4 to 12) for 25 years. In this article we describe and evaluate the Dutch system and explore what insights there might be for the U.S., taking into account the very different cultural and normative contexts of the two countries. We find that, compared to those with few weighted students, Dutch schools with high proportions of weighted students have almost 60 percent more teachers per pupil as well as more support staff per teacher. Even these large resource advantages, however, are not sufficient by themselves to eliminate all quality shortfalls in the high-weight schools, where quality is measured by school policies and practices. We conclude that weighted student funding for schools within districts in the U.S. is not likely to deliver the same highly progressive funding patterns as in the Netherlands because of the complex, multilayered U.S. education system and the absence of a political consensus in favor of generous weights. © 2011 by the Association for Public Policy Analysis and Management.

For more than 40 years, school funding has been the subject of intense legal and policy debate in the United States. Although legal challenges to state school finance systems initially centered on interdistrict disparities in per pupil spending and tax burdens, they now often address the adequacy of funding, where adequacy refers to whether the level of funding is sufficient to achieve a state's goals for student outcomes. Adequacy requires that policymakers pay attention not only to the sufficiency of resources for the typical student but also to their sufficiency for students who are more challenging, and hence more costly, to educate than others (Baker & Green, 2008; Downes & Stiefel, 2008; Ladd, 2008). This recognition has generated extensive research and lively debate about the best technical method for determining the cost differentials, and many states now incorporate weights—applied to categories of students, such as English language learners, special education students, or low income students—into their formulas for distributing aid to their local school districts (Duncombe & Yinger, 2008).

In addition to this traditional focus on districts, U.S. policymakers are now turning attention to individual schools. As a case in point, since 2002 the accountability provisions of the federal No Child Left Behind Act have applied to individual schools, and the Obama administration is currently focusing national attention directly on the failures of individual schools across the country. The growth of charter schools also

Journal of Policy Analysis and Management, Vol. 30, No. 3, 470–498 (2011)

Published by Wiley Periodicals, Inc. View this article online at wileyonlinelibrary.com/journal/pam
DOI: 10.1002/pam.20589

exemplifies this new focus. Charter schools operate independently of districts, are the direct recipients of relatively unrestricted public funding, and have significant operational autonomy.

It is within this policy context of debates over interdistrict funding and greater attention to individual schools as the unit of accountability and managerial autonomy that U.S. policymakers and researchers show increasing interest in the concept of "weighted student funding" (WSF). As this term is generally understood in the U.S., WSF has three main elements: Money follows students on a per student basis to the schools they attend, the amount of the funding differs with the educational needs of the student, and schools are empowered to use the money as they deem appropriate. Several major cities have adopted variations of this policy, including Seattle, San Francisco, and Houston.[1] Moreover, in 2006 a conservative think tank released a proposal to implement WSF on a broad scale with a long list of signatories, including three former U.S. secretaries of education (Fordham Institute, 2006). Such an approach in the U.S. appeals both to conservatives, who see it as a way to promote parental choice and school autonomy, and to progressives, who are attracted by the call for differentially more money for challenging-to-educate students. Significantly, the WSF approach says nothing about whether the average level of funding is adequate for a typical student.

Although a relatively new idea in the U.S., weighted student funding for individual schools has a long history in the Netherlands. As we describe in the first section, this country of about 16.5 million people has been using a version of weighted student funding for all its primary schools (serving children from age 4 to 12) for 25 years. Prior to 2006, the Dutch funding system was implemented primarily by the allocation of personnel slots to each school, with the central government directly paying the salaries. Since 2006, the funding has been implemented through lump sum grants.

The Dutch program is impressive not only because many disadvantaged students bring with them almost twice as much funding as regular students, which, as we document below, translates into large resource advantages for the schools they attend, but also because the system has enjoyed consistent political support over a long period of time. Despite the highly progressive distribution of resources across schools, however, we show in the third section that the Dutch funding system does not fully achieve its main goal of assuring equal school quality, as measured by internal school policies and practices. In the final section, we explore what insights there might be for the U.S., taking into account the very different cultural and normative contexts of the two countries.[2]

THE DUTCH EDUCATION SYSTEM AND WEIGHTED STUDENT FUNDING

The Netherlands differs from most other developed countries, including the United States, in its long history of letting parents choose schools for their children and providing full public funding for all schools, including religious schools.[3] This system was an accommodation to the central fact of Dutch life until the middle of the 20th century, namely that society was separated, or "pillarized," into three groups:

[1] The only state that has adopted WSF is Hawaii, but that state is unique in having a single school district.
[2] Excluded from our analysis is attention to the many schools that serve children with special needs and to the secondary school sector. In contrast to the situation in the United States, the Dutch are only now attempting to move significant numbers of students with special needs into regular schools. At the secondary level, students are tracked starting at age 12 into different types of programs or schools. This early tracking, along with the complexity of the Dutch system of secondary schools, renders it difficult to compare the system at that level.
[3] For general background on the Dutch system, see Ritzen, Dommelen, and Vijlder (1997); Ministry of Education, Culture and Science (2007a, 2007b). Also see Ladd and Fiske (2009).

Protestants, Roman Catholics, and secularists, each of which had its own schools, newspapers, hospitals, and other social institutions. After a century-long political struggle over school funding, a 1917 change in the constitution called for the central government to fund Catholic and Protestant schools on a par with the publicly operated public schools, with parents free to choose among the different types of schools. Since then, money has followed students to the schools they choose, with no differentiation by type of school.

Moreover, the Netherlands is strongly committed to the concept of "freedom of education." For parents, this concept has been interpreted as a constitutionally protected right to enroll their child in a publicly funded school that matches their family's values, even if that means joining with other parents to start a new school. For schools, it translates into significant operating autonomy. As a result of these policies, only 30 percent of students now attend what in the U.S. we would call traditional public schools. The other 70 percent attend schools operated privately with an orientation toward a specific religion or based on an educational philosophy such as Dalton or Montessori. In return for their public funding, these privately operated schools are subject to the same accountability procedures as the regular public schools. Accountability in the Dutch context is based on a school inspectorate system, the procedures of which we explain further as follows.

By international standards the Dutch education system appears to be quite effective. Although the country devotes a relatively small share of its GDP to education, its students outperform students in many other developed countries, including the U.S., on international tests such as PISA and TIMMS. Moreover, Dutch students whose mothers have limited education do better on PISA tests than comparable students in other OECD countries.[4]

As is true in all developed countries, however, some groups of students in the Netherlands lag behind other groups in terms of their educational achievement and attainment. The Dutch put a high value on equality in many areas of life and, in particular, on not letting identifiable groups lag behind other groups. For many years, the main group about which Dutch policymakers were concerned was native Dutch students whose parents have limited schooling and work in low-skilled occupations. With the influx of immigrants to the Netherlands in the 1960s and 1970s, concern expanded to include the children of immigrants. The largest immigrant groups are guest workers from Morocco and Turkey, who were initially invited to the Netherlands with the expectation they would not stay but who subsequently brought their families; and immigrants from the former Dutch colonies of Surinam and Antilles. These groups have been augmented in recent years by the arrival of asylum seekers from countries such as Somalia, Iran, and the former Yugoslavia.

For the past 25 years, the Dutch have been addressing educational disadvantage with three strategies. The first strategy is the system of weighted student funding, by which the central government provides resources to primary schools on a per pupil basis but with the amount per pupil differing by the educational disadvantage of the group to which the student belongs. The second focuses on the social context of the students and operates largely through the municipalities. Because the municipalities have responsibility for a broad set of social services related to youth development, they are considered to be in a better position than the central government to address some of the out-of-school challenges facing disadvantaged youth. Among the programs they support are preschool programs for children aged 2.5 to 4 years and "extended" or "community schools" that provide enrichment activities for disadvantaged pupils.[5] These programs build in turn on a strong health care system in

[4] http://nces/ed/gov/timss/results03_fourth03.asp and http://pisa2006.acer.edu.au.

[5] Legally, compulsory schooling starts at age 5, but any child may start school on his or her 4th birthday and most do.

which the health of children is monitored in a systematic way as they progress through primary school. The third strategy focuses specifically on language development and multiculturalism and is a response to policy concerns related to immigrants. The nature and size of the latter two strategies have varied over time depending on the political landscape, with the progressive parties typically supporting a stronger role for the municipalities than the conservative parties. In contrast, the system of weighted student funding has maintained consistently strong support, at least in principle, from all the major political parties over time.

Student Funding Weights

Student weights were added to the school funding system for primary schools as part of the Educational Priorities Policy of 1985, which also included a program component that addressed contextual issues. About 90 percent of the operational funding for the country's 7,000 primary schools is now provided by the central government on a weighted per pupil basis. Between 1985 and 2006, four categories of students were identified as deserving of additional weights. The two major categories were native Dutch students whose parents have little education and disadvantaged immigrant children from non-Western countries, including, but not limited to, Moroccans, Turks, Surinamese, and Antilleans whose parents have limited education or work in low-skilled occupations. The additional weight attached to the low-educated Dutch was 0.25 and that to the immigrants was 0.9. The other two categories are small and receive little attention in our analysis.[6]

The only change during that period was the 1993 tightening of the definition of low parental education for native Dutch pupils to make it apply to both parents, not just to one, a change that was intended to bring the proportion of students identified as disadvantaged more in line with that in other OECD countries.[7] In 2006, the funding system was changed in more fundamental ways that are described later. Because of those changes, much of the data presented below refers to the school year 2005–2006, the last year before the phase-in of new weights. In addition, we focus the analysis on the country's four biggest cities, Amsterdam, Rotterdam, The Hague, and Utrecht, where the presence of immigrants poses educational challenges more similar to those faced by U.S. cities than is the case in much of the rest of the country.

The top part of Table 1 provides information on primary schools, students, and students by weight for the four big cities, the rest of the country, and the country as a whole. It shows that the big cities account for slightly less than 10 percent of all schools and slightly more than 10 percent of all pupils. The next panel shows that the big cities have both a much lower percentage of students with no (that is, zero) additional weight than the rest of the country (50.4 vs. 80.8 percent) and a far higher percentage of the highly weighted students (42.9 vs. 8 percent). In addition, native Dutch students whose parents have low education (those with the 0.25 weight) are underrepresented in the big cities compared to the rest of the country (6.6 vs. 10.7 percent). The rest of the table provides background information on the distribution of students by school type and schools by board size, about which we say more later. Appendix Table A1[8] provides comparable information for each of the four big cities.

[6] During the period of our analysis, the 0.25 students are those for whom both parents (or the single parent if there is only one) have a maximum education of lower vocational education. Disadvantaged immigrants are first and second generation non-Western immigrants from a non-Dutch cultural background who meet one of the following criteria: The mother or the father has a maximum education of lower vocational school, or the parent with the highest salary has a job in which he or she does manual or unskilled work, or neither parent has a job. Additional weights of 0.4 and 0.7 apply to the children of shippers who live away from their families and to children who live in caravans.
[7] J. Groos, Ministry of Education, Culture and Science (pers. comm., February 2009).
[8] All appendices are available at the end of this article as it appears in JPAM online. See the complete article at wileyonlinelibrary.com.

Table 1. Primary schools and students by student weight, school type, and board type, 2005–2006.

	Big 4 Cities	Rest of Country	Whole Country
I. Schools and students			
Total schools	596	6,360	6,956
Total students	169,864	1,379,224	1,549,088
II. Students by weight (percent)			
0.0	50.4	80.8	77.45
0.25	6.6	10.7	10.2
0.9	42.9	8.3	12.1
Other (0.4, 0.7)	0.1	0.3	0.3
III. Students by school type (percent)			
Public	39.1	29.7	30.8
Catholic	22.4	35.6	34.2
Protestant	25.0	24.3	24.4
Special program	6.6	4.7	4.9
Other	6.9	5.7	5.8
IV. Schools by board type (percent)			
1 school	7.0	6.9	6.9
2–14 schools	26.5	48.3	46.4
>15 schools	66.4	44.7	46.7

Notes: Distribution of students by type of school is based on the 6,842 schools for which we can identify the type of school, of which 581 of these schools are in the big four cities. Calculations by authors based on data from the Central Agency for the Financing of Schools (CFI).

As shown there, Rotterdam has the highest percentage of weighted students (58.7 percent) and Utrecht has the lowest percentage (36.9 percent).

Goals of the System of Weighted Student Funding

As we have noted, the Dutch system of weighted student funding is one part of a larger policy strategy designed to combat the educational disadvantage of identifiable groups of students. Despite the relative clarity of this overall goal, the objective for the WSF component per se is less clear.[9]

Main Goal

We interpret the main goal of weighted student funding to be the promotion of equal-quality schooling across schools. Such an objective is the logical extension of the earlier Dutch commitment to equal funding of public and religious schools that was added to the constitution in 1917. Under the social system of pillarization, rich and poor students often went to the same schools, albeit typically in schools serving families of their own particular religious persuasion. The secularization of the Dutch society during the 1950s and 1960s gradually reduced the role of religion in school choice. That trend, combined with the influx of uneducated immigrants in the 1970s into the country's cities, over time created schools in the country's largest

[9] This ambiguity has been pointed out not only by academic research on the Education Priorities Policy (Mulder, 1996) but by official reports. In 2001, at the request of the lower house of Parliament, the Netherlands Court of Audit reviewed 35 studies evaluating the effectiveness of the policies designed to combat educational disadvantage. The court concluded that the studies, though technically sound, generated little information about the effectiveness of the policy, in part because the objectives of specific components were unclear (Rekenkamer, 2001).

cities that were clearly segregated by educational disadvantage (Ladd, Fiske, & Ruijs, 2011). With segregation of that type, equal funding no longer translated into equal-quality schooling. Only with additional resources would the schools serving large numbers of disadvantaged students be able to offer the same quality education as other schools.[10]

This goal raises the thorny question of how to measure school quality. At a conceptual level, a high-quality school is one that generates high educational benefits, where benefits can be characterized along multiple dimensions: consumption and returns on investment, intrinsic or extrinsic, private or public. The complexity and richness of these potential benefits means that any measure of school quality is at best a proxy, an observation that is sometimes underappreciated in the U.S. context (Ladd & Loeb, in press). The approach for measuring school quality currently preferred in the U.S.—namely one based heavily on student test scores, either in level or gains form—falls short of a true measure of school quality for at least two reasons. First, by focusing attention primarily on the core subjects of math and reading, it ignores a school's contribution to learning in other academic subjects and to student development in noncognitive areas that generate returns in the future, in the form of either private or public benefits. The second is the difficulty of attributing the measured test score outcomes to the school rather than to other factors that influence test scores, including the background characteristics of the students. Even the more sophisticated gain or growth score measures are subject to this attribution problem.

An alternative proxy for school quality is observational measures of internal school processes and practices, captured through systematic observations of all schools. The major advantages of this approach to school quality are that it avoids the attribution problem of the outcome approach (Ladd & Loeb, in press) and that it can incorporate a broad concept of educational benefits, including, for example, the consumption benefits that accrue to children from being in a safe and supportive environment. The validity and reliability of the observational approach as a measure of school quality depends largely on how well it is implemented and the extent to which is picks up differences across schools that are predictive of the outcomes of policy interest.

As discussed in more detail below, we use an observational measure of school quality in this study. In particular, our measures are based on reports by the Dutch School Inspectorate, the organization that is charged with evaluating school quality.

Reducing Achievement Gaps

We know from our interviews that some Dutch policymakers and researchers view closing achievement gaps, rather than equalizing school quality, as the main goal of weighted student funding. From that perspective, the justification for giving schools with many educationally disadvantaged students additional funding is that it would enable the schools to devote more resources to those students and thereby to raise their achievement. Consistent with that view is the fact that both the initial weights and the subsequent policy discussions to change them in 2006 were based on studies examining the relationship between various family background characteristics and pupil achievement. Because the achievement of disadvantaged immigrants was substantially lower than that for other groups, for example, policymakers believed it made sense to give them the highest weights.[11]

[10] This approach differs from the related discussions of vertical equity and adequacy in the U.S. (see Baker & Green, 2008; Downes & Stiefel, 2008; Ladd, 2008), in that the focus here is on equal school quality, rather than outcomes.
[11] G. Driessen (personal communications about his early 1980s study, March 3, 2009); Bosker, Mulder, and Glas (2001).

Nevertheless, we do not interpret the narrowing of achievement gaps as the central goal of the Dutch program for two reasons. The first is that nothing in the design and implementation of the Dutch program suggests that the extra resources occasioned by the student weights are to be used exclusively for the students to whom the weights are attached. This approach differs significantly from compensatory programs in other countries, including the United States, where the Title I compensatory education program historically was directed, by law, to the eligible students, and not generally to the school as a whole.[12] Moreover, the inclusion of a threshold provision in the Dutch program (see below) means that in practice there are no additional resources for a significant proportion of students who have weights associated with them.

A second reason for downplaying this goal is that, as we mentioned, the Dutch do not rely on the program of weighted student funding alone to address achievement gaps (Driessen & Dekkers, 2008). Other programs, such as preschool programs for 2.5- to 4-year-olds, language programs, and various out-of-school enrichment programs, are designed to address the well-known facts that achievement gaps emerge well before children enter formal schooling, such gaps reflect differential family situations and access to preschool opportunities, opportunities outside school differ as children progress through school, and children of low socioeconomic status and non-Dutch backgrounds enter school with less command than other students of the Dutch language. Thus, Dutch policymakers implicitly acknowledge that their system of weighted student funding must be combined with a variety of other social interventions related to youth development to address the challenge of educational disadvantage.[13]

RESOURCE PATTERNS ACROSS SCHOOLS

The starting point for any analysis of WSF is what it means for the distribution of resources across schools.[14] We begin this section by defining a weighting index for each school, which we then use as the basis of our analysis of the resource patterns. The overall picture is very clear: The high-weight schools have access to substantially more resources than the low-weight schools.

Weighting Index for Schools

For each primary school, we use the student weights to construct the following weighting index (WI):

$$\mathrm{WI}_i = [N_i + \textstyle\sum_j (n_{ij} w_j)]/N_i$$

where N_i is the total students in the school, n_{ij} is the number of students in school i with additional weight j, and w_j is the jth weight. This weighting index ranges from 1

[12] Under the Title I program of the U.S. Federal Elementary and Secondary Education Act, money is directed to districts and schools based on child poverty rates. The money has traditionally been targeted to specific groups of students within a school (but school-wide use of funds is permitted in schools meeting various poverty thresholds); this has been reduced in recent years (Gordon, 2008).

[13] To the extent that the program of WSF does indeed promote equal school quality, of course, it would also narrow achievement gaps between advantaged and disadvantaged students. But that outcome would reflect the improvement of overall school quality in schools serving disproportionate shares of disadvantaged students relative to other schools, not necessarily the improvement of disadvantaged students relative to advantaged students within a particular school.

[14] Somewhat surprisingly (to us at least), there appears to be almost no research on the extent to which resources—as measured either by personnel or by money—in the high-weight schools exceed those in the low-weight schools. Our analysis is based almost exclusively on data provided to us by the Central Agency for the Financing of Schools (CFI), all of which at some point has been publicly available on the Web for individual schools.

Journal of Policy Analysis and Management DOI: 10.1002/pam
Published on behalf of the Association for Public Policy Analysis and Management

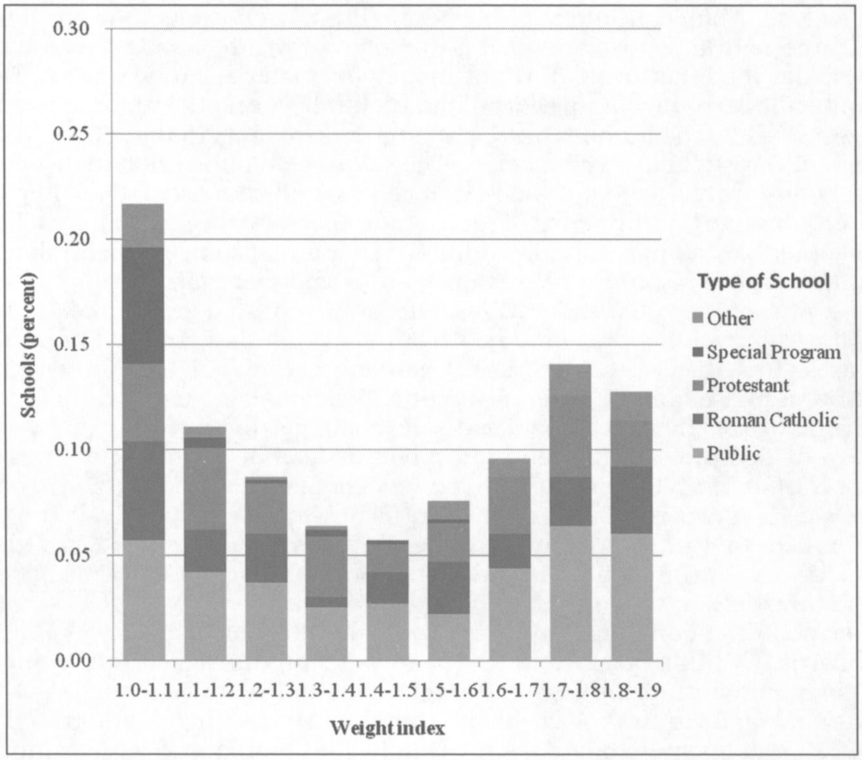


Figure 1. Distribution of schools by weighting index and school type (big four cities).

for a school with no students with extra weight up to a maximum of 1.9 for a school in which all pupils have an extra weight of 0.9. Thus, this school weighting index is simply 1 plus the average additional weight of the school's students. In the absence of any program complications, the school weighting index would also be an index of funding. A school with an index of 1.45 in that case, for example, could expect to receive 45 percent more funding per pupil than a school with an index of 1.

Figure 1 shows how primary schools in the four big cities are distributed across categories of schools grouped into categories by their weighting index, where the categories are in 0.1 increments that range from 1.0 to 1.1 to 1.8 to 1.9. The heights of the bars indicate the percentages of schools in each category. Within each bar, the schools are divided by type: public, Catholic, Protestant, special program, and other. Of interest is that publicly operated schools are represented throughout the distribution. Schools offering special programs, in contrast, are found predominantly at the low end, meaning that they serve very few disadvantaged students.

Complexities of the Funding System

In practice, the funding system is more complex than would be suggested by the per pupil funding and the weights alone.[15] For one thing, until 2006, the national

[15] We thank Joop Gross at the Dutch Ministry of Education for his detailed explanation of how the system works (pers. comm., February 20, 2009, and May 20, 2010). We note that some schools have multiple locations (which in some cases are quite different schools), but the funding calculations are done at the level of the school, not that of the location. For more information, see Ladd and Fiske (2009).

government distributed resources to schools through two pots, one for personnel units with the central government paying all salaries directly based on national salary schedules, and the other in the form of money for materials and supplies. Both the total number of personnel units allocated to each school and the funding for supplies were determined by the number of weight-adjusted students in the school, subject to the 9 percent threshold described below. The schools were then free to distribute the personnel units among school principals, teachers, and support staff as they wished, taking into account that principals require more personnel units than teachers and teachers more than support staff. In addition, schools had some flexibility, but only at the margin, to move resources between personnel and materials.

Because of budgetary considerations, the only way that policymakers in 1985 could afford the weights that emerged from the commissioned study of achievement was to introduce a threshold of 9 percent, below which schools receive no extra resources based on the student weights. Policymakers justified this threshold on the ground that schools can cope with the challenge of educating disadvantaged students provided they are limited in number. Instead of defining the threshold as the proportion of a school's students who have nonzero weights attached to them, however, the new provision was defined in terms of full-time equivalent students, which worked to the disadvantage of schools serving students with the 0.25 weight.[16] Moreover, the additional funding applies only to the number of students above the threshold, not to all the weighted students.

Another potential complication arises from the fact that all schools are run by school boards, with the boards, not the schools, being the legal entities entitled to receive government funds. Although it might be tempting to view the Dutch school boards as analogous to the boards of U.S. school districts, that would be a mistake. First, there are many more boards in the Dutch cities than in U.S. cities. Amsterdam alone, for example, has 43 separate boards operating anywhere from 1 to 16 schools. Instead, it is more appropriate to think of the Dutch system as comparable to a whole system of charter schools in which funds flow to the schools through their governing bodies, which in many cases are Charter Management Organizations (CMOs) operating multiple schools. In the U.S. context, such CMOs receive funding for each of their schools and, after taking a small percentage off the top to cover management costs, typically pass the funds through to the individual schools for which it was intended. This analogy to CMOs is clearest for the privately operated Dutch schools that serve 70 percent of the students, but it applies as well to the publicly operated schools. The boards that run the publicly operated schools vary in size and structure across the four cities.[17] In Rotterdam, for example, a single board is responsible for all 66 primary schools, while several smaller regional boards operate the publicly operated schools in Amsterdam.

The fact that resources flow through the boards raises the possibility that some of the resources may not make it to the schools. According to figures from the national government, however, only about 1.7 percent of the personnel units allocated for specific schools in 2006–2007 were not passed through to the schools. As we point out below, with the recent shift to lump sum financing, that proportion could increase. More importantly, it is no longer possible for the national government to monitor resources at the school level.

[16] Consider a school with 200 students. While the school would need only 18 students with 0.9 weights to meet the threshold and hence to be eligible for additional funding, it would need 72 students with weights of 0.25 to meet the threshold.

[17] Prior to 2006, these municipal boards were part of the local government. Since 2006, they have been established as separate boards to make them more comparable to the boards for the privately operated schools.

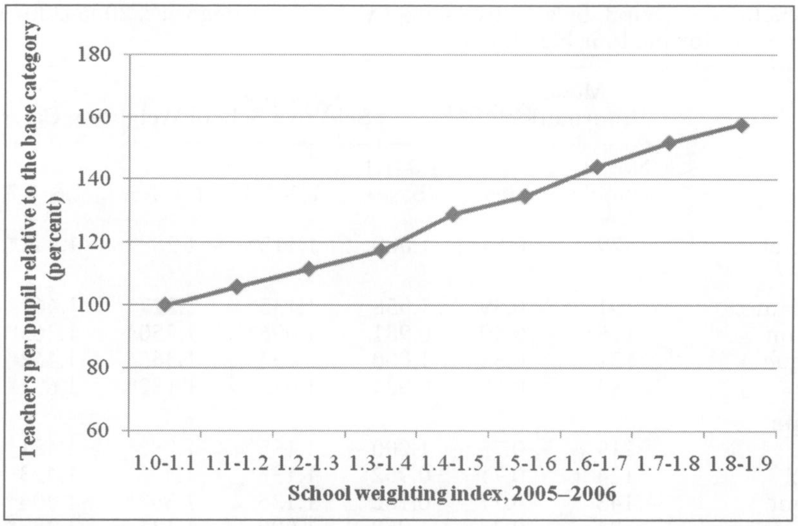


Figure 2. Teachers per pupil, 2006–2007, by school weighting index.

Personnel Patterns Across Schools

We focus in this section on the personnel component of resources. Our analysis is based on two measures, both denoted in full-time equivalents for the 2006–2007 school year, which is the last year before the phase-in of the new weights.[18] The first measure is the number of teachers per pupil, where teachers include not only regular classroom teachers but also those who work across classrooms in a school, such as remedial teachers and academic coaches. The second measure is the total support staff per teacher. Support staff includes all the adult employees other than the principal, assistant principal, and teachers in the school. Included in this group are assistant teachers, administrative support, and caretakers of the building.[19] As we document below, different types of schools made different trade-offs between teachers and the use of support staff.

Figure 2 depicts average teacher–pupil ratios by school weight category, expressed as percentages of the average ratio in the base WI category for all schools in the four big cities.[20] Emerging from the figure is that the schools in the highest weight index category have on average about 58 percent more teachers per pupil than do the schools in the lowest weight category. If the different types of schools made similar use of remedial and other teachers, that would imply class sizes in the low-weight

[18] Many Dutch workers, including teachers and support staff in schools, work only part time. Hence, the use of full-time equivalents is essential for this analysis.

[19] Our data set identifies two categories of support staff, OOP and OPB, with the former referring more specifically to the academic support staff. Because our initial analysis of the two categories indicated that some schools may have defined the two categories in different ways, we report here only the results for the total support staff.

[20] This figure and Table 4 are both based on the weighting indices for 2005–2006, which determined the basic funding for the 2006–2007 school year. We note, however, that some additional funding is provided to schools that experience a large increase in students during the year, which could potentially justify using the weighting indices for 2007–2008. The major advantage of using the 2005–2006 weights is that they are not contaminated by the 2006 change in weights. Note that the patterns are similar for the two sets of weights, with the explanatory power slightly higher for the 2005–2006 weights. Excluded from the analysis are four schools with student populations under 50 students, because technically they are too small to be operating legally and are subject to being shut down.

Table 2. Teachers per pupil, by selective school weighting categories, 2006–2007 (relative to the base category for the four big cities).

	Model Information		Selective School Weighting Categories				
	No. of Schools	R^2	1.0–1.1 (base)	1.2–1.3	1.4–1.5	1.6–1.7	1.8–1.9
Big four total	579	0.64	1.000	1.115*	1.288*	1.442*	1.577*
City							
Amsterdam	191	0.39	1.058	1.135*	1.327*	1.462*	1.558*
Rotterdam	175	0.49	0.981	1.096*	1.250*	1.365*	1.577*
The Hague	131	0.33	1.000	1.154*	1.365*	1.462*	1.635*
Utrecht	82	0.75	0.924	1.015	1.182*	1.697*	1.561*
School type							
Public	219	0.73	1.000	1.135*	1.288*	1.481*	1.635*
Catholic	124	0.71	0.962	1.135*	1.308*	1.423*	1.692*
Protestant	143	0.77	0.962	1.135*	1.308*	1.404*	1.596*
Special program and other	84	0.36	1.058	1.000	1.135	1.288*	1.135
Size of board							
Small (1 school)	62	0.46	1.038	0.981	1.135	1.288*	1.173
Average (2–14)	211	0.66	1.019	1.115*	1.288*	1.442*	1.558*
Large (>14)	306	0.68	0.981	1.154*	1.308*	1.481*	1.635*

Note: Each entry for the selective school weighting categories is the average teacher–pupil ratio expressed relative to the average teacher–pupil ratio in the base WI for the four cities. The weighting index groups are based on data for 2005–2006. * denotes that the average in the specified school weight category differs from the average in the lowest weight category for the specified group of schools at the 5 percent level. R^2 refers to the explanatory power of a regression that includes all the weighting index categories, not just the ones reported in the table.

schools are 58 percent larger than those in the high-weight schools serving immigrants. Table 2 provides additional evidence on the patterns of teacher–pupil ratios across the four cities, by type of school and by size of board. The first two columns report the number of schools in each subcategory and the R^2 of school-level regressions of the form

$$(T/P)_i = a + \textstyle\sum_j b_j \mathrm{WI}_{ij} + e_i$$

where $(T/P)_i$ is the teacher pupil ratio in school i, WI_j refers to the jth weighting index where j goes from the second to the top weighting index, a is a constant, and e_i is an error term. The entries in the table correspond to selective coefficients from that regression for different subsamples of schools, but in all cases we transformed them in order to highlight the average in the specified category relative to that in the lowest weight category (that is, the estimated value of a) for all schools in the big four cities. Consistent with Figure 2, the entry for the highest weight category for all schools in the big four cities is 1.58. Note that the variation in the school weighting categories accounts for 64 percent of the variation in the teacher–pupil ratio across the 579 schools in this analysis.

Although the city-specific entries in Table 2 show some differences across cities, most of the differences are not very large. More interesting are some of the differences in the patterns by school type and size of board in the bottom half of the table. The patterns for the three major types—public, Catholic, and Protestant—are almost identical. Quite different, however, is the pattern for the 84 schools in the

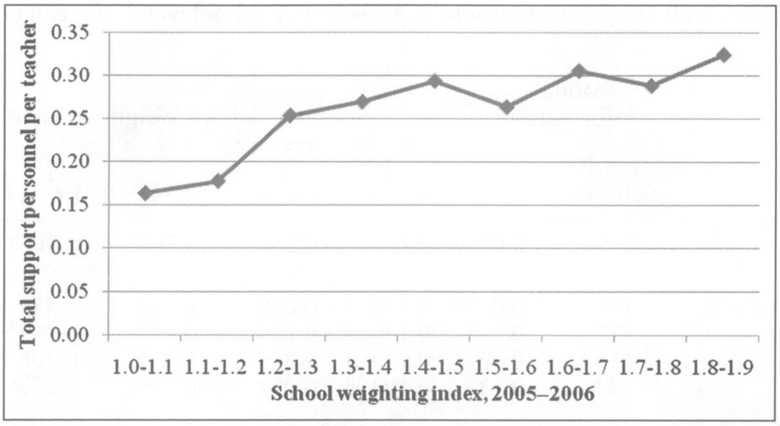


Figure 3. Support personnel per teacher, 2006–2007, by school weighting index.

special program and "other" category. For that group, which ranges from Islamic schools serving immigrant children to elite schools offering quite specialized programs, the low-weight schools have about 6 percent more teachers per pupil than the average for the big four cities for that category, and there is far less evidence that the schools with high weights use large proportions of their additional funding for teachers. A similar pattern emerges for the schools in boards that operate only one school board—about half of which overlap with the schools in the special program and "other" category.

In addition to having more teachers per pupil than the low-weight schools, the high-weight schools also have more staff support per teacher. As shown in Figure 3 and the top row of Table 3, the high-weight schools have about one full-time support staff person for every three teachers, which is about twice the ratio in the low-weight schools. The low R^2 of 0.052 indicates, however, that the school weight categories explain only a small proportion of the variation in support staff ratio across schools. That emerges as well from the less consistent patterns by weight index across the subsamples of schools. Most striking among the subsample patterns are the very large ratios for the special program and "other" schools in the high-weight schools. Schools in the two highest weight categories reported in Table 3 for that subsample have the equivalent of more than one support staff person for every two teachers. Thus, the evidence suggests that schools in those categories make different decisions about teachers and support staff than do other types of schools.

Nonetheless, the data provide clear evidence that under the Dutch funding system as it operated through 2006, high-weight schools on average were able to hire far more personnel than the low-weight schools. Moreover, we have no reason to believe that the pattern would change if we had information on actual personnel funding amounts rather than the quantity of personnel. We make this assertion based on a separate analysis of the average age of teachers across school weight categories (not shown), which is of potential interest because teachers with more experience earn higher salaries than those with less experience. Contrary to what might be expected in the U.S. context, the average age of teachers does not vary significantly across school weight categories.

Other Funding Sources

In addition to the weighted student funding from the central government, school boards also receive some funding from their local municipalities or related agencies

Table 3. Support staff as a share of teachers, by selective school weighting categories, 2006–2007.

	Model Information		Selective School Weighting Categories				
	No. of Schools	R^2	1.0–1.1 (base)	1.2–1.3	1.4–1.5	1.6–1.7	1.8–1.9
Big four total	579	0.052	0.163	0.253*	0.293*	0.305*	0.324*
City							
Amsterdam	191	0.077	0.254	0.200	0.284	0.355	0.376*
Rotterdam	175	0.111	0.180	0.250	0.432*	0.312*	0.341*
The Hague	131	0.081	0.119	0.479*	0.232	0.206	0.305*
Utrecht	82	0.134	0.104	0.083	0.119	0.229*	0.189*
School type							
Public	219	0.120	0.149	0.189	0.246*	0.229*	0.254*
Catholic	124	0.076	0.106	0.443*	0.257	0.358**	0.294
Protestant	143	0.158	0.125	0.167	0.433	0.283*	0.348*
Special program and other	84	0.268	0.225	0.188	0.235	0.554*	0.592*
Size of board							
Small (1 school)	62	0.280	0.211	0.202	0.235	0.537**	0.480
Average (2–14)	211	0.141	0.190	0.187	0.369	0.373	0.377
Large (>14)	306	0.061	0.102	0.310*	0.252*	0.224**	0.295*

Note: Each entry for the selective school weighting categories is the average total support staff in the school as a fraction of the number of teachers in the school (both in terms of FTEs) for the specified group of schools. The weighting index categories are based on data for 2005–2006. * denotes that the average in the specified school weight category differs from the average in the lowest weight category for the specified group of schools at the 5 percent level, and ** at the 10 percent level. R^2 refers to the explanatory power of a regression that includes all the weighting index categories, not just the ones reported in the table.

as subsidies for specific programs and from other miscellaneous sources. Such funding accounts for only about 10 percent of all funding. The money from the local municipality is sometimes given to boards on behalf of all schools, and sometimes it is based on applications and reflects the aggressiveness of a school board in obtaining it. Municipalities are specifically required to treat all schools the same and hence cannot discriminate against the privately operated schools. Funded with such money are activities such Dutch language programs, gymnastics teachers, and enrichment activities for disadvantaged students. Miscellaneous other revenue includes fees from parents, gifts, rental income for facilities such as gymnasiums, and private sponsorships.

Such revenue is of interest here mainly to the extent that it either reinforces or counters the resource patterns shown in Figures 2 and 3. Unfortunately, no data are available either from the boards themselves or from the central government on how the money is distributed among a board's schools. Hence, in Figure 4, we show funding patterns at the board level, where the boards are characterized by the average weights of their schools. The figure depicts the two types of additional funding, that from municipal governments and that from miscellaneous sources. We conclude that additional support from the municipal governments on average favors the schools run by boards with high-weight schools.[21] The miscellaneous revenue, in contrast, favors the boards operating very low-weight schools. Because some of

[21] More detailed analysis and discussion is available in Ladd and Fiske (2009).

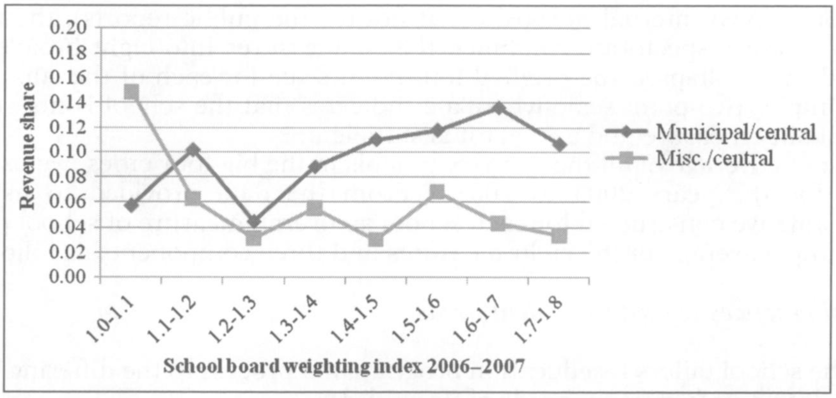


Figure 4. Municipal revenue and miscellaneous revenue as shares of central revenue, 2006, by school board weighting index.

this additional revenue brings with it additional costs not directly related to the central mission of the school—such as special activities for pupils and maintenance for revenue-generating facilities such as gymnasiums—its net effect is unclear. A select few low-weight schools that charge very high school fees, however, do undoubtedly have more resources than other schools.[22]

DOES WEIGHTED STUDENT FUNDING LEVEL THE PLAYING FIELD?

The central question in this section is whether the greater resources of the high-weight schools are sufficient to meet the Dutch goal of leveling the playing field, as measured by the quality of internal school processes and practices. A secondary question is whether WSF narrowed the achievement gap between educationally advantaged and disadvantaged students.

Measuring Internal School Processes and Practices

As we noted earlier, we rely on information on school practices and processes from the Dutch Inspectorate as our proxy of school quality. During the relevant period for this study, each school was inspected every four years (with return visits to weak schools as deemed necessary).[23] Included in the public report for each school are more than 20 submeasures based on a scale of 1, 2, 3, and 4. Because the practices and policies were each evaluated on a common standard across all schools, they are suitable for the current purpose.[24] All of the reports are publicly available on the

[22] In general, public schools are allowed to charge fees only for extracurricular activities. Nonpublic schools are allowed to charge fees, but most use the fee revenue for nonessential extras. Based on data provided by the Onderwijs Consumenten Organisatie (OCO), a government-funded organization in Amsterdam that provides information to parents on schools and school policies, most of the primary schools in that city charge some fees, but the yearly fee is generally low and in the range of €25 to €60. In a few schools the fees exceed €500.

[23] The Inspectorate is currently developing a risk-based approach for school evaluations in which schools that show evidence of adequate self-monitoring will be inspected less frequently. For additional information on the Dutch inspection system during the period of this study, see Ladd (2010). Luginbuhl, Webbink, and de Wolf (2009) describe and evaluate a somewhat earlier version of the system.

[24] The Inspectorate also evaluates the achievement levels of students, but that part of the evaluation is not useful here because individual schools are compared not to all schools but only to schools with similar types of students.

Web. For its own internal purposes (but not for the public reports), the research division of the Inspectorate combined the submeasures into eight broader measures and then collapsed the original four-point scale for each of the submeasures into a simpler two-point scale where a 2 indicates that the school is not sufficient on the quality measure and a 3 that it is sufficient.[25]

To assure coverage of all the primary schools in the big four cities, we use school reports for the years 2003 to 2007.[26] From the data provided to us by the Inspectorate we constructed for each school an overall measure of school practices as the simple average of the eight measures and three components as follows:[27]

School practices related to student needs

1. The school tailors its education program and process to the differing learning styles and educational needs of its students.

2. The school collects data on the developmental needs of lagging students in a systematic way, has a plan to meet them, and monitors the effectiveness of that plan.

School-wide practices

3. The school gives attention to quality control in a systematic way.

4. The curriculum meets the core requirements and progresses appropriately from grade to grade.

5. The school has robust procedures for assuring the well-being and safety of pupils and teachers, and promotes respect among pupils.

6. The school systematically monitors student progress and has a comprehensive system of tools and processes for doing so.

Teacher practices

7. Teachers make efficient use of instruction time.

8. Teachers are task oriented and clear, with students actively engaged in their learning.

The resulting patterns across school weighting categories are reported in Table 4, with the basic patterns displayed in Figures 5 to 8.[28] The table reports two models

[25] They collapsed the scale because of their concern that some inspectors may be more willing to use the extreme scores of 1 and 4 than others. That concern notwithstanding, the Inspectorate appears to have confidence in the validity and reliability of the average scores that comprise the eight measures. This confidence is based on the quality of the training provided to the inspectors, the discussions within inspectorate offices that lead to common understandings of the various measures, and the results of formal reliability tests. We thank Inge de Wolf, research director at the Inspectorate for making this data set available to us and for helping us to work with the data.

[26] Actually, a few of the reports are from the year 2002–2003, so that in fact the data are from that year to the year 2006–2007.

[27] Given that each of the eight measures is based on two or more submeasures, the definitions simply indicate the nature of each of the component measures and do not provide a complete account of the specific components, a task that is made difficult in any case because they are in Dutch and not always amenable to easy translation. We based the groupings primarily on an analysis of the correlations among the items.

[28] The means (standard deviations) for the four quality variables are as follows: total quality, 2.81(0.143); student-related component, 2.66(0.286); school-related component, 2.81(0.157); and teacher-related component, 2.94(0.157). The sample includes 461 schools.

Table 4. School practice ratings by weighting index category, with and without control variables.

	Overall School Practices		Practices Related to Student Needs		School-Wide Practices		Teacher Practices	
	I	II	I	II	I	II	I	II
WI categories								
1.0–1.1 (base)	2.832 (0.014)	2.797 (0.22)	2.738 (0.026)	2.654 (0.043)	2.823 (0.016)	2.772 (0.025)	2.961 (0.013)	2.993 (0.023)
1.1–1.2	−0.014 (0.023)	−0.022 (0.024)	−0.033 (0.045)	−0.027 (0.044)	−0.014 (0.028)	−0.025 (0.027)	0.012 (0.023)	−0.006 (0.023)
1.2–1.3	−0.016 (0.026)	−0.005 (0.025)	−0.045 (0.048)	−0.014 (0.048)	−0.008 (0.029)	−0.002 (0.029)	−0.021 (0.025)	−0.080 (0.029)
1.3–1.4	−0.028 (0.030)	−0.039 (0.029)	−0.096# (0.057)	−0.090** (0.055)	0.001 (0.034)	−0.015 (0.033)	−0.060* (0.029)	−0.080* (0.029)
1.4–1.5	0.002 (0.032)	−0.004 (0.030)	−0.024 (0.057)	−0.009 (0.056)	0.007 (0.035)	−0.004 (0.034)	0.023 (0.029)	0.007 ((0.030)
1.5–1.6	−0.046** (0.027)	−0.070* (0.025)	−0.131* (0.052)	−0.095** (0.050)	−0.028 (0.030)	−0.014 (0.030)	0.005 (0.026)	−0.003 (0.027)
1.6–1.7	−0.065* (0.025)	−0.045* (0.022)	−0.153* (0.046)	−0.132* (0.047)	−0.032 (0.028)	−0.039 (0.028)	−0.036 (0.024)	−0.052* (0.025)
1.7–1.8	−0.053* (0.022)	−0.026 (0.023)	−0.140* (0.040)	−0.101* (0.043)	−0.021 (0.025)	−0.016 (0.026)	−0.031 (0.021)	−0.048* (0.023)
1.8–1.9	−0.017 (0.023)	−0.026 (0.023)	−0.079# (0.043)	−0.072** (0.044)	−0.005 (0.025)	−0.018 (0.026)	0.000 (0.022)	−0.007 (0.024)
Other variables								
Rotterdam		0.120* (0.018)		0.182* (0.034)		0.125* (0.020)		−0.029 (0.018)
The Hague		0.078* (0.020)		0.183* (0.038)		0.070* (0.023)		−0.040* (0.021)
Utrecht		0.029 (0.024)		0.070 (0.043)		0.042 (0.027)		−0.023 (0.023)
Catholic		0.019 (0.017)		0.067 (0.032)		0.014 (0.687)		−0.001 (0.017)
Protestant		0.012 (0.018)		0.015 (0.031)		0.020 (0.018)		0.012 (0.017)
Special program		−0.044 (0.031)		−0.059 (0.059)		−0.052 (0.035)		−0.010 (0.032)
Other		−0.087* (0.028)		−0.132* (0.054)		−0.103* (0.032)		−0.027 (0.029)
1 school board		0.036 (0.025)		0.069 (0.047)		0.041 (0.028)		0.007 (0.025)
Large board		0.001 (0.017)		−0.003 (0.032)		−0.009 (0.019)		0.011 (0.017)
Year 2003–2004		−0.085 (0.031)		−0.160* (0.062)		−0.044 (0.036)		−0.088* (0.034)
Year 2004–2005		−0.058 (0.019)		−0.128* (0.039)		−0.018 (0.022)		−0.065* (0.021)
Year 2005–2006		−0.023 (0.019)		−0.024 (0.035)		−0.006 ((0.021)		−0.015 (0.019)
Year 2005–2006		0.009 (0.020)		−0.014 (0.040)		0.036 (0.023)		−0.008 (0.020)
R^2	0.026	0.229	0.040	0.191	0.006	0.168	0.023	0.097
No. of observations	461	460	518	517	462	461	516	516

Notes: The entries are the coefficients from the regression equations described in the text. Model I includes a constant for the base category and the other eight weighting index categories, and model II also includes the specified control variables, all of which are 0–1 variables. The city coefficients are relative to Amsterdam; the school type coefficients are relative to public schools; the board size coefficients are relative to average size boards (those with 2–14 schools); and the year coefficients are relative to 2006–2007. The sample sizes represent the set of complete observations for each of the dependent variables.

* denotes statistical significance at the 5 percent level and ** denotes the 10 percent level

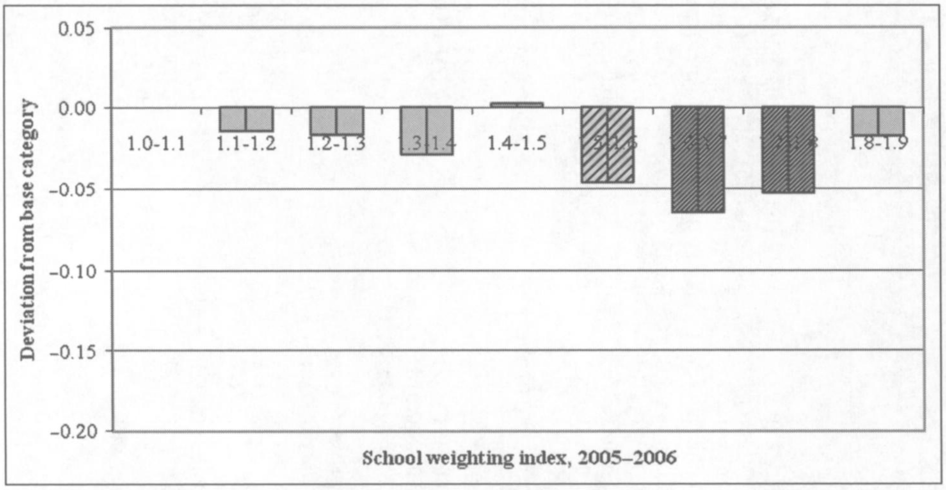


Figure 5. Overall measure of school practices by school weighting index, deviations.

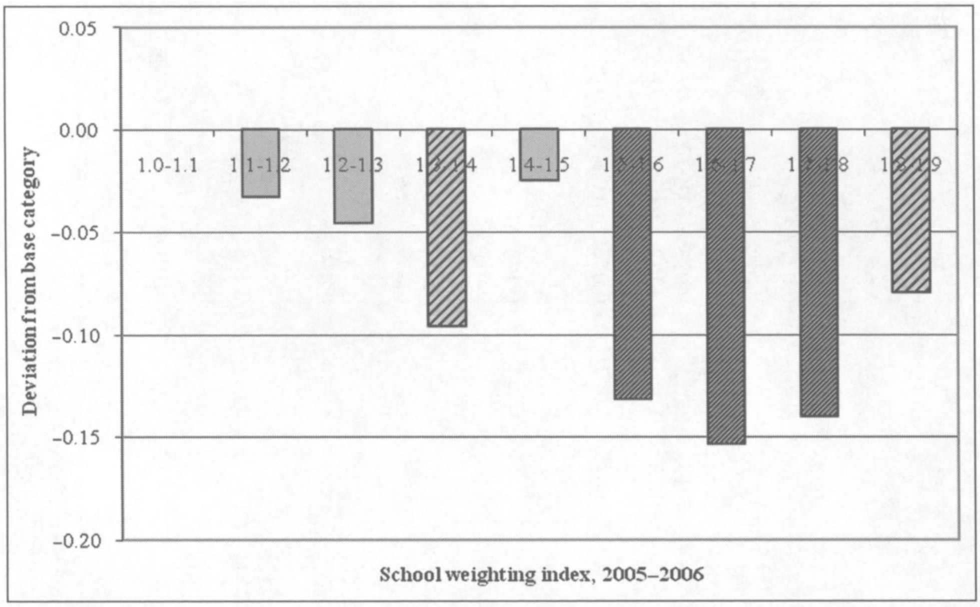


Figure 6. School practices related to student needs by school weighting index, deviations.

for each of the measures. The first is a regression model with a constant for the base category and indicator variables for each of the other school weighting index categories. Hence the reported coefficients can be interpreted as deviations from the base category. The second model adds control variables for each city (relative to Amsterdam), type of school (relative to publicly operated schools), size of board (relative to a board with 2 to 14 schools) and year (relative to 2006–2007). The figures display the deviations as estimated in the first model for each measure. The dark stripes indicate that the deviation is statistically significant at the 5 percent level and the lighter stripes at the 10 percent level.

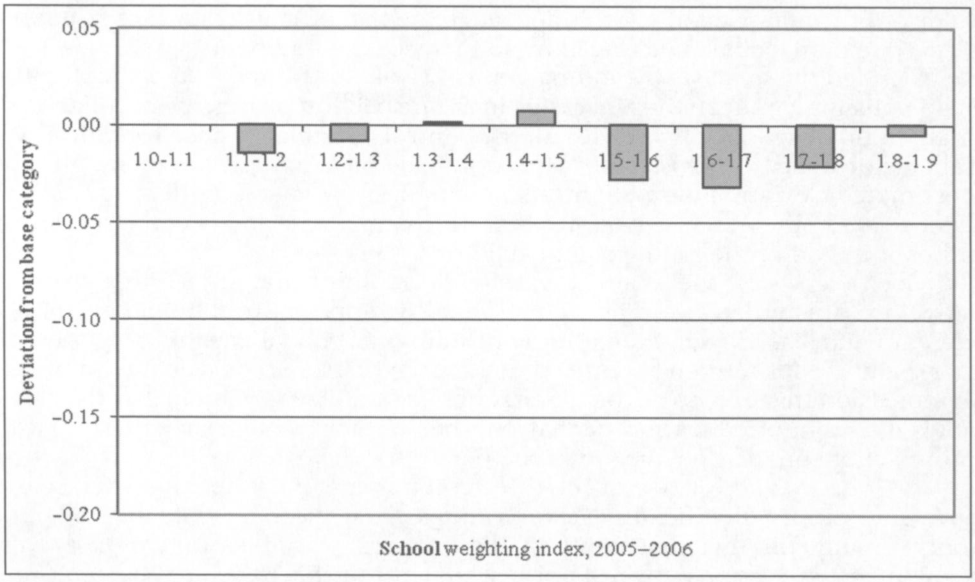


Figure 7. School-wide practices by school weighting index, deviations.

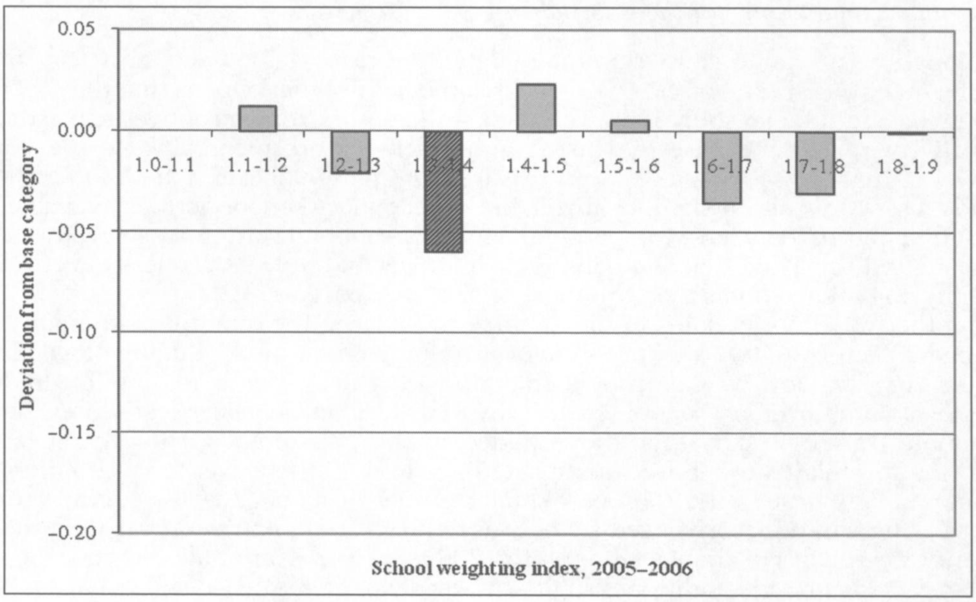


Figure 8. Teacher practices by school weighting index, deviations.

The figures tell the story. The overall measure of internal practices and policies (Figure 5) is lower than the base in three of the four high weight categories, and the shortfall is driven primarily by the negative deviations in the school practices related to student needs (Figure 6). Interestingly, the negative deviation for the highest weight category in both figures is smaller than for the prior three categories and is not statistically different from zero. Turning to the other components of school practices, we find no significant deviations for the school-wide practices (Figure 7) and only one in the 1.3–1.4 category for teacher practices (Figure 8). Thus, the challenge for many of the high-weight schools appears to be the difficulty they face in addressing the educational challenges faced by so many of their students.

We extended the analysis by adding control variables to make sure that the findings do not simply reflect idiosyncrasies in the inspection process or peculiarities of a small group of schools. Even with all the control variables—those for cities, types of schools or boards, and year of inspection—the basic patterns remain, although the estimated deviations are slightly smaller in some cases. With respect to the teacher-related practices, the negative deviations are larger and become statistically significant in two of the high weight categories.

The coefficients of the control variables exhibit some interesting patterns. Relative to Amsterdam, overall school quality appears to be higher in both Rotterdam and The Hague, even after controlling the school weight categories. The higher quality in Rotterdam for three of the four measures is consistent with the general impression that emerged from several of our interviews, namely that the elected official in charge of education in that city has been working particularly hard to improve school quality. The negative coefficient for the category of "other" schools for overall quality and for two of the three components indicates that such schools receive statistically significantly lower ratings than the base category of public schools. Finally, the fact that many of the indicator variables for the early years enter with negative signs suggests either that the inspectors have become more lenient over time or that schools have improved.

Potential Explanations for the Shortfalls in School Practices

Although we are not able to examine in detail the reasons for the quality shortfalls in the high weight categories, we consider some possibilities. One is that the schools receiving additional resources may not face sufficiently strong incentives to use them effectively, in part because the Inspectorate lacks enforcement powers. We note, however, that the schools also face pressure from parents because a child's eighth-grade test scores play a significant role in the secondary school options available to the child and parents have full parental choice of school. From this perspective, the explanation might be that the parents of high-weight students are less effective at monitoring their schools than are more advantaged parents.

Another possibility relates to the distinction between the quantity and quality of teachers. Unfortunately, we have little or no data to compare the quality of teachers in the high- and low-weight schools. In contrast to the U.S., it is not possible to distinguish Dutch primary school teachers by their teacher licensure test scores, their graduate training, or by their value added in the classroom.[29] The only specific information related to teacher quality we have found for the Netherlands emerges from a survey based on a relatively small number of teachers. This survey shows that teachers in underprivileged schools have taken fewer extra courses than those at more privileged schools (Jungbluth, 2003, p. 84). National survey data on vacancy rates provide additional suggestive evidence. Those data show that for the school year 2007–2008, the unfilled vacancy rate—defined as a fraction of all jobs in the school—was low in all schools, but it was more than four times as high in the schools serving more than 50 percent minority pupils as it was in schools with fewer than 5 percent of such students (Regioplan, 2009).[30] Because difficulty filling vacancies typically means that schools often have to settle for lower-quality teachers, the

[29] For an example of this type of analysis in the U.S., see Clotfelter, Ladd, and Vigdor (2007).

[30] The unfilled vacancy rate is defined as the unfilled jobs divided by the total jobs in a school averaged over the year and ranges from 0.2 in the schools with few cultural minority students to 0.9 in the schools with more than 50 percent such students. The information is based on a sample of 2,000 primary schools, which, according to the authors of the report, is not large enough to separate the effects of being in a big city from those of having a disproportionate share of minority students.

patterns suggest that schools with large minority populations have lower-quality teachers than others.[31] Thus, high-weight Dutch schools could conceivably have been more successful had they been given the flexibility to use some of their additional resources to raise salaries in order to attract higher-quality staff, rather than using it primarily to reduce class sizes.

Finally, two other potential explanations relate to the nature of the students in the high-weight schools. The first is that such schools serve a disproportionately large share not only of the immigrant children in general but also of those who are the most challenging to educate, because the more able students and more motivated students are likely to self-select into lower-weight schools. A related explanation starts from the recognition that it is difficult to teach concentrations of disadvantaged students and posits that teachers in the high-weight schools may not have the particular skills and knowledge necessary to do it well.

Why Are the Shortfalls Smaller in the Highest-Weight Schools?

One of the intriguing findings is the smaller quality shortfall in the highest weight category relative to that in the other high-weight categories. Our discussions with Dutch policymakers and researchers have generated a number of potential explanations, but most are hard to confirm or refute with our data. Among these is the possibility that it may be easier for schools to focus on the needs of their students when most come from a disadvantaged background than when the student body is more mixed.[32] An alternative, and related, explanation is that because many of the schools in the highest weight category have served very large proportions of migrant students for long periods of time, they have had time to adjust to the demands of their challenging environment.

Other potential explanations include the possibility that the municipalities give special attention to the schools with the highest proportions of disadvantaged students. That story is generally consistent with the current situation in Amsterdam, for example, where certain schools have been singled out to receive substantial additional support to develop school management plans. A variant of that explanation is the so-called "Rotterdam effect." Given that Rotterdam has both a large number of very high-weight schools and an active alderman pushing for high-quality schools, we hypothesized that the differentially small quality shortfall in the highest-weight schools might reflect the above-average performance of those schools in Rotterdam. A statistical test based on an interaction effect for Rotterdam, however, rules out that hypothesis. A final hypothesis is that the Inspectorate may simply be more sympathetic to those schools than to other schools. Our discussions with the Inspectorate about their procedures provide no support for that hypothesis, though we cannot rule it out.

Implications of the Practice Shortfalls

Although we cannot fully sort out the explanations for the patterns, the systematic shortfalls in school practices in many of the high-weight categories are of significant policy interest. Had the high-weight schools not had additional funding, they undoubtedly would have exhibited even greater shortfalls in school practices than

[31] Further evidence of this type emerges from a recent study of segregation in Amsterdam schools, which found that teacher vacancies in that city were far more numerous in the schools serving more than 70 percent disadvantaged migrants than in other schools (summarized in Karsten et al., 2006, p. 240).
[32] This explanation is consistent with the following conclusion in a recent background report on immigrant education based on research by Gijsbert (2006): "By tailoring their education to the pupil population, 'ethnic schools' are becoming increasingly successful in enabling comparable pupils to achieve comparable results" (quoted in Herweijer, 2009, p. 36). Further support for this hypothesis comes from Driessen et al. (2003) (reported in Karsten et al., 2006, p. 240).

those we observe here. The fact that shortfalls are evident in such schools even with the substantial additional funding suggests a significant limitation of the Dutch model of school autonomy. Importantly, the patterns imply that even in the presence of a well-developed public inspection system for schools as well as a system of full parental choice in which parents have many alternative schools from which to choose if they are not satisfied with the quality of their child's current school, students in schools serving large concentrations of disadvantaged students are still not enjoying the full benefits of what the Dutch define as a quality school.

WSF and the Dutch Achievement Gap

A number of obstacles prevent us from doing a careful analysis of what we consider to be a secondary goal of the Dutch system of weighted student funding: narrowing the achievement gap. The first is the limited information on test scores given that the Dutch have no required national tests. We were able to obtain test scores for eighth-grade students by school but only for the 85 percent of the schools using the privately administered Cito test. Obtaining the test scores of individual students is difficult because they are proprietary and because not all students in each school take the test.[33] The only other student-level test score information comes from national representative surveys to which we refer below. A second obstacle is that the WSF program is national and has been in place for a long period of time. Although the weights have recently been changed, the fact that the new weights are being phased in and the government has been smoothing the transition with small pots of additional funds makes it impossible to base an analysis on the change.[34] Finally, although the existence of a funding threshold suggests the possibility of a regression discontinuity approach, that strategy does not work in this case because the additional funds apply only to the marginal student beyond the threshold.

The best we can do is to describe the trends in achievement levels and gaps over time. Relying on the research of others, we do so for the main categories of immigrants and native Dutch students in Table 5, which reports trends in language and arithmetic tests for students in year 8 over the period 1994 to 2004.[35] The table documents the far lower test scores for the migrant groups, particularly Turks and Moroccans, relative both to native Dutch pupils whose parents have low education and especially to native Dutch

[33] Not surprisingly, our analysis of average eighth-grade test scores, regression adjusted for the percentage of students taking the test, shows that they decline monotonically across schools grouped by their weight index. This pattern provides no information, however, either about the appropriateness of the weights or about the success or lack thereof of WSF in raising student achievement given that within any group of weighted students, the students who are more motivated are more likely to seek out the lower-weight schools.

[34] This situation differs markedly from that for the two small Dutch subsidy programs that were the subject of analysis in Leuven et al. (2007). Both of those interventions, which were introduced around 2000 for at most two years, distributed additional subsidies either for personnel or for computers to schools with more than specified percentages of disadvantaged students. The introduction of the programs combined with the relatively clear-cut points for program eligibility allowed the authors to use regression discontinuity in the context of a differences-in-differences model to estimate their effects on eighth-grade Cito test scores of students in schools near the cut point. The authors find no positive effects on eighth-grade achievement of either program. That finding sheds no light on the achievement effects of the more general program of weighted student funding, in part because those programs represented supplemental funding over and above what was already a quite generous program of funding for schools serving disadvantaged students and because the estimates refer to effects at the eligibility cut point. Moreover, we note that the eighth graders who are the subject of the study were exposed to the policy changes for at most two years. Given the cumulative nature of the education process, any positive effects were likely to be limited at best.

[35] The data in this table are based on information from PRIMA, a national cohort study of students that started in 1994, based on a representative sample of about 600 schools, with an additional sample that overweights the high minority schools. We considered working with this data set but chose not to do so because the sample of students in the four big cities was not sufficiently large for us to do any meaningful analysis across schools by their weighting index.

Table 5. Scores on language and arithmetic test in primary school year group 8, by ethnic origin, 1994 to 2004.

	Turkey	Morocco	Suriname	Antilles	Native Dutch Low[a]	Native Dutch High[b]
Language						
1994	36.4	38.8	42.1	40.9	48.1	53.4
1996	37.6	39.2	43.6	40.3	48.0	52.8
1998	37.2	40.5	44.2	40.1	47.6	52.8
2000	38.8	40.8	44.9	40.5	47.3	52.9
2002	39.3	42.0	45.7	40.7	47.5	52.6
2004	40.3	42.8	44.4	41.9	47.1	52.5
Change in gap 1994–2004 (%)[c]	−28	−34	−28	−15	+2	—
Arithmetic						
1994	42.8	42.5	42.6	41.5	47.7	52.8
1996	44.7	43.2	44.1	39.2	47.6	52.4
1998	45.1	44.1	44.6	42.3	47.1	52.2
2000	46.0	44.6	45.8	41.6	46.8	52.2
2002	45.7	44.7	44.0	42.2	46.6	51.9
2004	46.1	45.7	45.4	41.5	46.3	51.8
Change in gap 1994–2004 (%)[c]	−44	−41	−37	−9	+6	—

[a] Highest educated parent has completed a low vocational education.

[b] Highest educated parent has completed an education to the level of senior general secondary education or higher.

[c] Gap is relative to native Dutch high.

Source: Herweijer (2009, Table 3).

pupils with more educated parents. The striking finding is that relative to the latter group, the gaps for the immigrant groups, but not for the disadvantaged Dutch, narrowed quite substantially between 1994 and 2004. For example, in language the gaps for Turkish and Moroccan residents fell by 28 and 34 percent, respectively, while the gap widened slightly for native Dutch pupils whose parents have low education. Other studies covering much the same period generate similar patterns (Mulder et al., 2005).

The program of weighted student funding could potentially account, at least in part, for the differential trends in achievement. That explanation is plausible given the far larger weights for the immigrant pupils than for the disadvantaged Dutch pupils and the fact that many of the latter are enrolled in schools that receive little or no extra funding because of the 9 percent funding threshold. As we noted above, however, it is impossible to isolate the effects of WSF from other programs designed to combat disadvantage. And, even more important, those effects cannot readily be separated from the achievement gains that would naturally accrue to the immigrant population as more of them become second-generation rather than first-generation migrants. Research shows that pupils from the second generation perform at higher levels than those from the first generation, even after accounting for the education level of the parents (Herweijer, 2009, p. 9).

Thus, to reiterate, we can shed no direct light on the question of the extent to which weighted student funding has contributed to the observed decline in achievement gaps between immigrant and non-immigrant children. The most we can say is that the patterns are consistent, with a positive effect of the additional resources available to the high-weight schools on the achievement of highly weighted students.

IMPLICATIONS OF RECENT CHANGES IN WSF

In 2006, the funding system was altered in three significant ways. First, funding was allocated to boards on behalf of schools no longer in the form of personnel units and money for supplies, but rather in the form of a lump sum grant. Second, the weights were changed. In particular, the 0.9 weight for immigrant children was eliminated and the 0.25 weight was replaced with two new education-related weights: 0.3 for children whose parents have low education and 1.2 for children whose parents have very low education, with the new weights gradually phased in over time. Third, the threshold was reduced from 9 percent to 6 percent. These changes are significant in their own right and also in terms of their lessons for the U.S.

In contrast to the pre-2006 period, for the more recent period, neither we as researchers nor the government as the funder are able to determine how much funding actually ends up in each school. The government still allocates funding to individual schools according to the WSF formula, and our analysis (not shown) of those per pupil allocations shows the same progressive patterns across schools as was shown for teachers above.[36] Because the central government is no longer responsible for paying salaries, however, it no longer has information on the number of teachers or staff in each school. More generally, it has no way to monitor whether resources given to the boards are in fact passed through to the schools in the progressive way intended by the government. Our interviews in 2009 with finance officers of several boards suggest some variation in practices across boards. In general, boards are taking some money off the top for board-wide purposes such as management costs, salaries for substitute teachers, insurance, and technology, with the rest allocated to schools as intended, but the percentages differ across boards.[37] In addition, one board official admitted that the board was "taxing" at a 17 percent rate the additional funding (that is, the money attributable to the weights) designated for high-weight schools and transferring it to the low-weight schools within the board.[38] Although it is difficult to say how common such redistribution of funding is across schools, our judgment, reinforced in part by Dutch education officials, is that it is likely to become increasingly common as boards gain experience with the new system. Such behavior, moreover, would not be inconsistent with the national government's expectations for the boards to play a more active role in managing their schools. Thus, there is a new tension within the system: At the same time that the national government is promoting lump sum funding as a way to provide more budgetary flexibility at the school level, it is also encouraging the boards to be more active managers.

We highlight this issue here because of its potential implications for funding of charter school organizations (CMOs) in the United States. They, like the Dutch schools, receive public funding that is intended for the specific schools they operate, but typically there is no oversight mechanism to ensure that it goes to the intended schools. As CMOs grow and expand the variety of their schools, concerns may well arise about the difficulty of following the money to the individual schools. If the U.S. were to adopt weighted student funding, this lack of accountability would become more salient as public policymakers would have no assurance that their approved funding would be distributed among schools as intended.

The weight changes illustrate the role of politics in the setting of weights in the Dutch system. From 1987 to 2006 the weights had been very stable, with only minor

[36] In particular, the schools in the highest weight category are allocated on average 74 percent more total funding per pupil than the schools in the base category. See Ladd and Fiske (2009) for details.
[37] Because some boards have greater financial reserves than other boards, they may be able to pass larger proportions of their government funding through to the schools. The issue of differential reserves across boards has recently become a political issue in the Netherlands and is currently the topic of a special commission (M. Van Den Tillaart, pers. comm., February 13, 2009).
[38] R. Richter (pers. comm., March 11, 2009).

changes during the period. Given the changing politics surrounding immigrants, especially Muslims, there was a political imperative to eliminate immigrant status as a weighting criterion. Significantly, the immigrant component of the criterion was eliminated despite the fact that studies commissioned in anticipation of the change continued to show that immigrant status was still highly predictive of student achievement, even with statistical controls for the education level of parents. By introducing a new large weight for students whose parents have very low education, however, policymakers continued to favor the children of immigrants. Moreover, the advent of a new center-right government elected with support from rural areas provided an incentive to increase the weight for educationally disadvantaged native Dutch children from 0.25 to 0.30, given their overrepresentation in rural areas. The reduction in the threshold to 6 percent was also designed to help those same areas. It appears, however, that the changes reflect no significant reduction in the country's basic commitment to weighted student funding for individual schools.

This recent Dutch experience highlights the observation that decisions about weights and how they are implemented reflect far more than technical considerations alone. Even in the Netherlands, with its widespread commitment to the view that no group should be left behind and its political system of coalition governments that generate stable policies over time, political considerations are still important.

In the U.S. context, the danger is that the weights, and how they translate into differential funding levels at the school level, would be far more susceptible to changes in administrations at all three levels of government. Thus, the advantages of clarity and stability associated with weighted student funding in the Dutch context are not likely to translate to the U.S. environment. Moreover, the Dutch experience makes it very clear that the additional weights for disadvantaged students are a separable component of a funding system in which money follows students to their schools. Indeed, the Dutch had student funding for 65 years before they added the differential weights. In sum, there is no guarantee that policymakers who support giving money directly to schools would support highly progressive weights.

INSIGHTS FOR THE U.S.

Weighted student funding is a natural and appropriate way to fund individual schools in the Netherlands. As we have shown, the country's long commitment to promoting equal-quality schooling within the context of a system of schools with differing religious or educational orientations and significant operational autonomy requires that funding flow to schools based on student enrollments. Further, the inflow of immigrants in the 1960s and 1970s made it natural for the Dutch to add student funding weights as a way of maintaining equal treatment in the context of widening variations across schools in their student bodies. Most striking about the Dutch system is the high weights for disadvantaged students and the fact that the high weights translate into far more resources for high-weight than for low-weight schools. At the same time, we have shown that even the highly progressive funding of the Dutch system does not ensure that high-weight schools provide a high-quality education, as measured by the Dutch school inspectors.

Emerging from this Dutch experience are three main insights for the U.S. One relates to the conditions for progressive funding weights, another to school autonomy, and a third to the political economy of school segregation.

Limitations of Using WSF to Fund Schools Within Districts

Central to the Dutch system is the high funding weights, which were feasible because of the egalitarian values of the Dutch and the county's centralized system of school funding. In contrast, individual schools in the U.S. are embedded in a far more complicated, multilayered education system. The use of WSF by big city school districts in the U.S. rather than by the federal or state governments, limits quite dramatically its potential to generate a progressive system of funding. To achieve equity in a broad sense in the U.S. context, any program of school-based funding within a district must at a minimum be part of a larger state system that directs funding to the districts in ways that take account not only of their differential revenue-raising capacities, but also of the educational needs of their students (Baker, 2008).

Further, weighted student funding within a district need not lead to as much equity and transparency across schools within the district as one might expect for any specified set of weights. This conclusion follows because other funding streams, whether they be district, state, or federal categorical programs, may flow to schools in nontransparent and potentially offsetting ways (see Roza, 2010). This situation contrasts with the Netherlands, where about 90 percent of the funding is from the central government, and any additional funding streams to individual schools in the Netherlands are far smaller, and for the most part appear to reinforce rather than offset the main program of WSF. At the same time, this concern is consistent with our discussion below of the recent shift to lump sum funding in the Netherlands; when the values of the funder and the boards differ, the money may not flow to the schools as initially intended.

Moreover, when weighted student funding is implemented at the city level alone, policymakers are likely to find it politically difficult to implement weights anywhere close to the magnitudes used in the Dutch system. As we emphasized earlier, the setting of weights is a political process. Within a district, WSF favors the schools serving disadvantaged students at the expense of those serving more advantaged students. The higher are the weights, the greater is the incentive for the families of more advantaged students to move out of the jurisdiction in favor of other districts that have either smaller proportions of disadvantaged students, no differential weighting, or both. To keep such families within the city, policymakers may well respond to their interests by keeping the weights for disadvantaged students low or by adding weights to benefit the children of the advantaged or by some combination of both. Consistent with this prediction, for example, are the relatively low 0.15 weight for low-income students and the almost comparable 0.12 weight for gifted students in Houston's program of weighted student funding.

Weighted Student Funding and School Autonomy

In contrast to the Dutch system, in which school autonomy has long been accepted as a basic component of the education system, the case for school autonomy in the U.S. must be made on more instrumental grounds, such as promoting more efficient management within schools and creating competition across schools. As a result, any alleged benefits of school autonomy within the U.S. context must be weighed against any societal disadvantages.

The Dutch experience shows that even with very high funding weights, schools with large proportions of challenging-to-educate students were not able to fully meet the country's desired quality of internal school practices. As we have documented, the high-weight schools systematically fell short in terms of tailoring their educational programs and processes to the different learning styles and educational needs of their students, and in terms of their ability to develop and monitor plans to meet those needs.

Because teacher salary schedules in the Netherlands are negotiated at the national level, we have no evidence on how the patterns might have differed had the high-weight schools been able to set their own salaries. The most we can say based on the Dutch experience is that when high-weight schools do not have the power to make explicit trade-offs between the quality and quantity of teachers, as was the situation in the Netherlands, and is quite likely to be the case in most U.S. cities for regular public schools, relative shortfalls in school practices are likely to persist. That is true even when weights are high. We are not in a position to make the reverse statement, however, namely that giving them such authority would eliminate the shortfalls. As our Dutch interviews suggest, even high-quality teachers may not have the skills and knowledge to address the complex educational needs of large concentrations of disadvantaged students.

In addition, the Dutch experience with weighted student funding and school autonomy raises the basic question of who should control what goes on in schools. In the Dutch case, the answer is clear. Other than following general curriculum guidelines and the requirement that they submit to periodic inspections, the Dutch schools have, by constitutional right, significant autonomy. That, in turn, limits the power of educational policymakers to promote coherent policies across a set of schools, for example, by assuring that all schools provide music or art, or that at least one school in a local area offers Japanese. Thus, emerging from the Dutch experience is the potential downside of diminished authority for local officials, namely the municipal authorities in the Dutch context (who would be the counterpart of district officials in the U.S. context). Some observers might well view this diminution as an important benefit of a more decentralized funding system. Because individual schools are part of an interconnected system of students and teachers, however, full school autonomy makes it difficult for local officials to ensure that the system meets the public interest, and not just the private interests of current parents.[39]

WSF and the Political Economy of Segregated Schools

A final lesson is that even the high weights within the Dutch system may have exacerbated rather than reduced the segregation of disadvantaged students. As should be clear from our general discussion throughout and the distribution of students by school weighting index in Appendix Table A1,[40] the Dutch schools in the country's four biggest cities are highly segregated by immigrant status. Although we have not specifically highlighted the issue of school segregation in this paper, in a separate paper we have documented segregation levels between disadvantaged migrants and other pupils in the four big cities that are as high or higher than in many U.S. cities, as well as levels of segregation that are rising over time in the smaller Dutch cities (Ladd, Fiske, & Ruijs, 2011).

Some U.S. proponents of weighted student funding argue that WSF would promote the integration of schools (Fordham Institute, 2006). The argument is that to the extent schools have some say over which students they enroll (which for most public schools is not officially permitted in the U.S., but undoubtedly often occurs), schools serving middle-class students would be more willing to enroll costly-to-educate students if they brought with them sufficient funds to cover the higher costs they occasion. Neither our interviews with Dutch school officials nor our analysis of segregation levels turned up any support for that outcome in the Netherlands, perhaps in part because of the 9 percent funding threshold. To the contrary, in the Dutch

[39] This issue was of significant concern in Rotterdam. (O. Treep, research coordinator of Youth, Education and Society [JOS], City of Rotterdam, pers. comm., May 8, 2009). Moreover, concerns of this type appear to have motivated Michelle Rhee, the superintendent of schools in Washington, D.C., to end the decade-old policy of weighted student funding in that city. With WSF, she was not able to carry out her promise to have art, music, and physical education teachers in all schools (Maxwell, 2008). Similarly, the Seattle Public Schools abandoned WSF because school autonomy made it "difficult to develop carefully coordinated strategies between the District and schools" (quoted in Baker, 2009, p. 22).
[40] All appendices are available at the end of this article as it appears in JPAM online. See the complete article at wileyonlinelibrary.com.

context, it appears as if weighted student funding may have exacerbated school segregation. By providing extra resources to schools with concentrations of high-weight students, WSF minimized one of the main political arguments against segregated schools, namely that they would have access to fewer resources than more advantaged schools.

CONCLUSION

Throughout this paper, we have used the term weighted student funding as it has recently been used in U.S. policy discussions, namely as a method of distributing resources to individual schools. Although WSF is a national program in the Netherlands, in the U.S. the term typically applies to the distribution of resources among schools within a single district. As a result, this paper does not speak to broader school funding discussions about the best way for states to fund their local school districts. We simply note that some of the concerns about WSF as applied to individual schools within districts may not carry over to state funding of school districts. In some states, for example, it might be more politically feasible for policymakers at the state level to direct more funding to high-weight districts than for district policymakers to direct more funding to high-weight schools. Moreover, concerns about the limitations of autonomous districts may be less salient than those that arise with respect to autonomous schools.

We conclude that a comprehensive and progressive system of school-level weighted student funding is far less natural in the U.S. than in the Netherlands because of the multilayered education system in the U.S. and the absence of a political consensus in favor of generous weights. With the growth in charter schools and other forms of autonomous schools, however, the U.S. will undoubtedly continue to move in the direction of linking school-level funding to student enrollments rather than to specific programs or activities. Whether that trend in the direction of student funding will be good or bad for disadvantaged students in the U.S. will depend in part on the level and stability of any need-based weights that emerge from the political process, and in part on the average capacity of the autonomous schools serving such students to deliver high-quality education. On both counts the Dutch experience suggests there are reasons to be concerned. The ability of the Dutch to maintain high and stable weights reflects their centralized funding system, a consensus on underlying progressive values, and a political system that promotes stability, none of which are present in the U.S. In addition, the Dutch experience shows that even with very high weights, weighted student funding alone is not sufficient to ensure that the schools serving large proportions of disadvantaged students will meet quality standards for internal school processes and practices.

HELEN F. LADD is the Edgar T. Thompson Distinguished Professor of Public Policy and Professor of Economics at Duke University, Durham, NC.

EDWARD B. FISKE is an education writer and editor, Durham, NC.

ACKNOWLEDGMENTS

This paper was initially prepared for the 2009 APPAM conference, November 5–7, in Washington, D.C. It is part of a larger research project completed while the authors were visiting researchers at the University of Amsterdam from January to June 2009. We thank Duke University for providing sabbatical support to Helen Ladd and the economics department at the University of Amsterdam for hosting our visit. We are also grateful to Nienke Ruijs for superb research assistance, and to the numerous Dutch researchers, school principals, and officials in the policy community who generously gave of their time and wisdom for this project. A longer and more detailed version of some of the empirical analysis in this paper is available as a working paper of the Sanford School of Public Policy (Ladd & Fiske, 2009).

REFERENCES

Baker, B. (2008). Review of Fund the Child: Bringing equity, autonomy and portability to Ohio school finance. Phoenix: Arizona State University, Education Policy Research Unit.

Baker, B. (2009). Within-district resource allocation and the marginal costs of providing equal educational opportunity: Evidence from Texas and Ohio. Education Policy Analysis Archives, 17, 1–28.

Baker, B., & Green, P. (2008). Conceptions of equity and adequacy in school finance. In H. F. Ladd & E. B. Fiske (Eds.), Handbook of research on education and finance (pp. 203–221). New York: Routledge.

Bosker, R., Mulder, L., & Glas, C. (2001). Naar een nieuwe gewichtenregeling? De feitelijke achterstanden van risicogroepen in het basisonderwijs en een onderwijskundige onderbouwing van een aangepaste gewichtenregeling. Nijmegen, the Netherlands: ITS.

Clotfelter, C., Ladd, H., & Vigdor, J. L. (2007). High poverty schools and the distribution of teachers and principals. North Carolina Law Review, 85, 1345–1379.

Downes, T., & Stiefel, L. (2008). Measuring equity and adequacy in school finance. In H. F. Ladd & E. B. Fiske (Eds.), Handbook of research in education finance and policy (pp. 222–237). New York: Routledge.

Driessen, G., & Dekkers, H. (2008). Educational inequality in the Netherlands: Policy, practice and effects. In R. Teese, S. Lamb, & M. Duru-Bellat (Eds.), International studies in educational inequality, theory and policy, Vol. 3 (pp. 257–274). Dordrecht, the Netherlands: Springer.

Driessen, G., Doesborgh, J., Ledoux, G., van der Veen, I., & Vergeer, M. (2003). Sociale integratie in het primary ondewijs. Amsterdam: SCO-Kohnstamm Instituut and ITS.

Duncombe, W., & Yinger, J. (2008). Measurement of cost differentials. In H. F. Ladd & E. B. Fiske (Eds.), Handbook of research in education finance and policy (pp. 238–256). New York: Routledge.

Fiske, E., & Ladd, H. (2000). When schools compete: A cautionary tale. Washington, DC: Brookings Press.

Fordham Institute. (2006). Fund the Child: Tackling inequity and antiquity in school finance. Washington, DC: Author.

Gijsbert, M. (2006). De afnemende invloed van etnische concentraties op schoolprestatites in het basisonderwijs. Sociologie, 2, 157–177.

Gordon, N. (2008). The changing federal role in education finance and governance. In H. F. Ladd & E. B. Fiske (Eds.), Handbook of research in education finance and policy (pp. 295–313). New York: Routledge.

Herweijer, L. (2009). OECD thematic review on migrant education: Country background report: The Netherlands. The Hague, the Netherlands: Netherlands Institute for Social Research.

Jungbluth, P. (2003). De ongelijke basisschool. Nijmegen, the Netherlands: UTS, Stichting Katholieke Universiteit de Nijmegen.

Karsten, S., Felix, C., Ledoux, G., Meijnen, W., Roeleveld, J., & Van Schooten, E. (2006). Choosing segregation or integration? The extent and effects of ethnic segregation in Dutch cities. Education and Urban Society, 38, 228–247.

Ladd, H. (2008). Reflections on equity, adequacy, and weighted student funding. Journal of Education, Finance, Policy, 3, 401–423.

Ladd, H. (2010). Education inspectorate systems in New Zealand and the Netherlands: A policy note. Education Finance and Policy, 5, 378–392.

Ladd, H., Fiske, E., & Ruijs, N. (2011). Does parental choice foster segregated schools? Insights from the Netherlands. In M. Berends, M. Cannata, & E. B. Goldring (Eds.), School choice and school improvement (pp. 233–253). Cambridge, MA: Harvard Education Press.

Ladd, H., & Fiske, E. B. (2009). Weighted student funding for primary schools: An analysis of the Dutch experience. SAN09-02. Durham, NC: Duke University, Sanford School of Public Policy.

Ladd, H., & Loeb, S. (in press). The challenges of measuring school quality: Implications for educational equity. In D. Allen & R. Reich (Eds.), Education, democracy and justice. Chicago: University of Chicago Press.

Leuven, E, Lindahl, M., Oosterbeck, H., & Webbink, D. (2007). The effects of extra funding for disadvantaged pupils on achievement. Review of Economics and Statistics, 89, 721–736.

Luginbuhl, R., Webbink, D., & deWolf, I. (2009). Do inspections improve primary school performance? Educational Evaluation and Policy Analysis, 31, 221–237.

Maxwell, L. A. (2008, August 25). DC's chancellor makes her case. Education Week, 28, 22–25.

Ministry of Education, Culture and Science. (2007a). The education system in the Netherlands. The Hague, the Netherlands: Dutch Eurydice Unit, Ministry of Education, Culture and Science.

Ministry of Education, Culture and Science. (2007b). Key figures 2002–2006. The Hague, the Netherlands: Dutch Ministry of Education, Culture and Science.

Mulder, C. (1996). Meer voorrang, minder achterstand? Het onderwijsvoorrangsbeleid getoetst (Trans.). Nijmegen, the Netherlands: Instituut voor Toegepaste Sociale Wetenschappen van de Stichting Katholieke Universiteit te Nijmegen.

Mulder, l., Roeleveld, J., van der Veen, I., & Vierke, H. (2005). Onderwijsachterstanden tussen 1988 en 2002. Amsterdam: ITS Nijmegan/SCO-Kohnstamm Instituut Amsterstam.

Onderwijsraad. (2002). Over leerlinggewichten en schoolgewichten. Den Haag, the Netherlands: Author.

RegioPlan. (2009). Retrieved March 13, 2009, from http://www.onderwijsarbeidsmarkt barometer.nl.

Rekenkamer. (2001). Aanpak onderwijsachterstanden. Bestrijding van onderwijsachterstanden. Den Haag, the Netherlands: SDU.

Ritzen, J., van Dommelen, J., & de Vijlder, F. (1997). School finance and school choice in the Netherlands. Economics of Education Review, 16, 329–335.

Roza, M. (2010). Educational economics: Where do $chool funds go? Washington, DC: Urban Institute Press.

13

AMERICAN INSTITUTES FOR RESEARCH®

Evaluation of Hawaii's Weighted Student Formula

Jesse Levin, Jay Chambers, Diana Epstein, Nick Mills, Mahala Archer, Antonia Wang, and Kevin Lane
American Institutes for Research

June 2013

Evaluation of Hawaii's Weighted Student Formula

June 2013

Jesse Levin, Jay Chambers, Diana Epstein, Nick Mills, Mahala Archer, Antonia Wang, and Kevin Lane

American Institutes for Research®

2800 Campus Drive, Suite 200
San Mateo, CA 94403
650.843.8100 | TTY 877.334.3499

www.air.org

Contents

Chapter 1 – Introduction

Many states currently use a weighted student formula (WSF) to distribute revenues to local school districts. However, in recent years, several school districts have also started using this type of funding approach to distribute revenues from the central office to schools.[1] While Edmonton (Alberta, Canada) is widely cited as the first district to implement a large-scale model incorporating a WSF (in 1974), more recently a number of districts in the U.S.—including Baltimore, Boston, Chicago, Cincinnati, Clark County (Las Vegas, Nevada), Denver, Hartford, Houston, Los Angeles, New York, Oakland, Poudre (Colorado), Saint Paul, and San Francisco, as well as Hawaii—have also implemented WSF policies that are similar to the one originally pioneered in Edmonton.[2] Hawaii presents a unique case of WSF implementation because the state operates its entire educational system as a single school district.[3]

The WSF model is intended to replace the traditional staffing model, which allocates teachers and other staff based on the number of students enrolled in the school, combined with the desired ratios of staff (teachers, administrative, and support personnel) to pupils. The district then allocates additional staff or resources for specific programs along with supplies and materials. In contrast, a core component of WSF systems is the development of a funding mechanism that allocates funds, rather than staff, to schools based on the relative educational needs of the students served by the school, and additional factors that affect the costs of providing educational services, such as school size and degree of geographic isolation.

General Objectives of WSF Policies

As applied as an intra-district method for allocating resources, the general objectives of WSF policies are to promote equity and transparency in funding to schools, autonomy linked to accountability at the school site, and a culture of innovation and efficiency:

- **Equity** – The WSF approach intends to promote the equity with which resources are distributed to schools by implementing a student-need-based funding model that allocates dollars rather than staff to schools.
- **Transparency** – The WSF approach tries to increase transparency by simplifying and clarifying the processes through which resources are distributed to schools and by increasing the access of stakeholders to information about the resources available to schools and the student outcomes produced.
- **Autonomy and Accountability** – The WSF approach attempts to link school autonomy to accountability by providing school leaders more discretion over resources coupled

[1] See, for instance, a 2006 report by the Thomas B. Fordham Institute that promotes the use of WSF policies (Fordham, 2006).
[2] For a comprehensive review of implementation of WSF formulas, please see the Reason Foundation Yearbook (Snell, 2009). For more recent information, in 2010 the *Fair Funding Summit* was convened in Baltimore, Maryland; it invited districts using the WSF approach to resource allocation to share their experiences. The proceedings of this summit, which provide detailed information on several WSF systems, can be found in the report by Educational Resource Strategies (2010).
[3] However, Baker and Thomas (2006) are quick to point out that this does not change the assumptions underlying a need-based funding system, as the organizational structure of other districts implementing WSF is widely varied.

with increased responsibility for generating results. Local autonomy and accountability can also be enhanced by engaging and including a wide range of parent and community stakeholders into the decisions surrounding resource allocation at schools.

- **Innovation and Efficiency** – The WSF approach can promote a culture of innovation and efficiency by putting resource allocation decisions in the hands of school leadership who, being closest to the students at their schools, are more knowledgeable about how to best serve their unique needs.

Hawaii has a significant history of exploring alternative funding and governance structures, which culminated in the 2006–07 adoption of a WSF as a means to (1) provide a more equitable system of school finance capable of directing higher levels of resources to student populations that are deemed more costly to educate, and (2) usher in a process for increasing local authority (including school leadership, parents, and community members) over educational decision making. In turn, it is not at all surprising that the three implementation goals of Hawaii's WSF are in close alignment with the four general objectives listed above:

Goal 1: Empowerment of principals and school communities with greater decision-making authority over the use of funds allocated to the school, which allows for increased accountability for principals**.**

Goal 2: Streamlining the allocation of resources to schools.

Goal 3: Increased transparency and equity in allocation of resources.

Research Questions

Given the state's relatively long experience with the WSF, it is only natural to ask how well the policy has done in reaching its goals. To this end, this evaluation investigates the following main research questions concerning implementation of the Hawaii WSF:

- How was the WSF originally developed, and what changes to the formula have been made since its initial implementation in 2006–07?
- How have other states and districts incorporated weights and WSF structures into their funding systems?
- What do the perceptions of principals and stakeholders tell us about the extent to which Hawaii's WSF has achieved the following three outcomes?
  - Increasing both school discretion over funding and the degree to which the local community participates in decision making pertaining to budgeting and planning.
  - Improving innovation and accountability of school leadership.
  - Promoting equity and transparency in how funding is allocated to schools.
- Has there been significant improvement in the equity with which resources are allocated to schools?
- What have been the major successes and challenges in the implementation of the Hawaii WSF since its inception?

Organization of the Report

To answer these questions, the research team has conducted a series of qualitative and quantitative analyses, the results of which are reported in the various chapters as follows. Chapter 2 provides an in-depth description of the development of the original WSF and the changes that it has undergone since its inception in 2006–07. Chapter 3 describes the emergence of cost-based funding and how this has manifested in specific state and district policies that use funding weights to account for the key factors (student needs, scale of operations, and geographic differences in resource prices) that differentiate the cost of providing educational services to students of varying needs and circumstances. Chapters 4 and 5 use principal surveys and interviews of stakeholders, respectively, to describe perspectives regarding the extent to which the WSF has delivered: increased school discretion over funding and the degree of stakeholder empowerment; improved effectiveness, innovation, and accountability of school programs; and better equity/transparency in how schools are funded. Chapter 6 provides a statistical analysis of funding allocations to explore whether there have been significant improvements in the equity with which resources have been distributed to schools since implementation of the WSF. The final chapter highlights the main analysis findings, characterizes the major successes and challenges faced over the course of implementing the WSF, and discusses a detailed set of policy considerations that should be taken into account as the state moves forward with future implementation of the formula.

Chapter 2 – Overview and Evolution of the Hawaii Weighted Student Formula

Hawaii has a significant history of exploring alternative funding and governance structures. The use of a weighted student formula (WSF) emerged in Hawaii as the means not only to provide a more equitable system of school finance to direct higher levels of resources to student populations that are more costly to educate, but also to usher in a process for increasing local authority over educational decision making. Although there is no requirement that reforms to implement a WSF and to increase local autonomy must be combined, Hawaii's strong history of decentralization efforts suggests that these two reforms be described in conjunction with one another. The following chapter provides an overview of the Hawaii's effort to increase both funding equity and local autonomy and specifically examines how the WSF has evolved from its inception in 2006–07.

Methodology and Resources Describing Hawaii's WSF

To develop a richer understanding of the Hawaii WSF and the changes that have occurred since implementation, the research team used resources that were, for the most part, publicly available online from the Hawaii Department of Education (HIDOE) website and that give insight into the reasoning behind the recommendations and decisions concerning this reform. The following provides a list of selected resources that were used to provide a descriptive overview of Hawaii's WSF since its inception:

- ***Act 51: Reinventing Education Act of 2004*** – The language from the act itself provides the purpose and intentions of the legislature in engaging toward a WSF approach to financing Hawaii's educational system. (http://reach.k12.hi.us/Act51SB3238amended1.pdf)
- **Yearly calculations of weighting factors and dollar values** (2007–08 through 2012–13 school years) – These documents show both the planned and implemented cost factors and their assigned weights for each year of implementation. These data are important for determining trends as well as being snapshots of the funding formula at any distinct point in time. (http://reach.k12.hi.us/empowerment/wsf/index.htm)
- **Recommendations and reports from the Hawaii Department of Education** – These memos explain the recommendations made to the Legislative Committee on Budget and Fiscal Accountability from the superintendent pertaining to adjustments in weights, characteristics, calculations, and included revenue sources. (http://reach.k12.hi.us/empowerment/wsf/index.htm)
- ***Recommendations to the Hawaii State Board of Education*** from the Committee on Weights, and the Committee on Weights reports to the Board of Education – These memos and reports explain the recommendations to the Legislative Committee on Budget and Fiscal Accountability from the Committee on Weights pertaining to adjustments in weights, characteristics, calculations, and included revenue sources. (http://reach.k12.hi.us/empowerment/wsf/committeeonweights/index.htm)

- **Committee on Weights and Board of Education meeting minutes** – Minutes from meetings include the discussion and debate about key issues of implementation and structure of the WSF. (http://reach.k12.hi.us/empowerment/wsf/committeeonweights/index.htm)
- ***WSF Implementation Manual*** (2005–2010) – These manuals are written by the HIDOE for use by school principals. They describe the WSF in detail and guide principals through the planning and implementation at their school site. (http://reach.k12.hi.us/empowerment/wsf/index.htm)

A Short History of Decentralization of Public Education in Hawaii

Decentralization efforts in Hawaii began with a site-based management law enacted in 1989 and continued with several additional decentralization efforts, including establishing structures for school/community-based management, "lump-sum" budgeting, and the creation of complex areas. However, none were as extensive as the implementation of the current WSF created under the direction of the Hawaii state legislature as part of *Act 51: Reinventing Education Act of 2004.* Later, we touch on each of these efforts in turn. However, before doing so, it is important to note a major contextual factor under which these efforts took place that distinguishes Hawaii's public education administration from others throughout the country. Specifically, the HIDOE functions differently from those in other states in that it is a single "local education agency" (school district) and, therefore, is in a unique position to streamline processes and decentralize by disseminating dollars directly to schools.

- **School/Community-Based Management (SCBM) initiative** – In 1989, the Hawaii State Legislature passed the School/Community-Based Management (SCBM) initiative. The SCBM initiative was a voluntary program designed to offer schools flexibility in exchange for increasing accountability for improving educational outcomes for students. SCBM had significantly increased collaboration among stakeholders through the establishment of SCBM councils. However, the number of resources included was minimal; there was a need for aligned accountability and for assistance with comprehensive planning; and, because participation was voluntary, the effect was not systemic (Izu, Aronson, De Long, Cuevas, & Braham, 1996).
- **Lump-Sum Budgeting initiative** – In 1992, HIDOE enacted the Lump-Sum Budgeting initiative to further increase principal control over funding streams that had previously been tied to special programs. The initiative also included a needs-based system of per-pupil allocation. As described in Hawaii Board of Education meeting minutes from September 1992, this initiative increased local control by addressing schools beyond the SCBM schools and increasing the amount of resources under local control. However, questions regarding the capacity of principals to make effective decisions, the need for increased training and support, and the limits on effective autonomy caused by insufficient discretion over funding (Auditor, State of Hawaii, 1998).[4]

[4] To this last point, the Auditor report states: "… school-based budgeting was designed to give schools more control and authority over their expenditures. The promise of school-based budgeting has not been achieved. Schools do not have sufficient control over their expenditures. … In practice, the actual proportion of the expenditures over which schools have control is relatively insignificant."

- **Complex areas** – In 2001, Hawaii formed complexes, combinations of high schools and their feeder middle and elementary schools, and complex area superintendents. The intent of this change was to decentralize decision making by eliminating district superintendents and emphasize smaller units of management. This change decentralized midlevel administration but did not directly allocate new autonomies to the school level (Hawai'i Educational Policy Center, 2003).
- ***Reinventing Education Act of 2004*** – In 2004, the Hawaii state legislature passed Act 51. The legislation set out a plan for major educational reforms in Hawaii that contained both a move toward a more equitable funding mechanism and additional decentralization. Act 51 put forth 13 key elements, which included the establishment of a WSF, empowering principals through capacity building and increased authority, streamlining processes for the purpose of reducing bureaucracy, and strengthening community involvement through the establishment of School Community Councils (see Appendix for a full list of the main elements of Act 51):
  - Establishing a WSF – The WSF ensures that funds go to the schools with the greatest need and acknowledges that some students are more costly to educate. The WSF allocates money to schools on the basis of a formula that includes weighted characteristics.
  - Empowering principals – The WSF will be most successful when combined with other reforms, including the increase in school authority related to budgeting and planning in return for being held accountable for performance through a system of rewards, assistance, and sanctions.
  - Reduction of bureaucracy – Educational processes and responsibilities are divided across different state agencies and are in need of alignment and streamlining to implement the WSF and appropriately support schools. This component will include the reorganization of departments and roles to streamline the allocation of resources to schools and improve the responsiveness of services.
  - Strengthen community involvement – This component shifts SCBM councils into mandatory School Community Councils (SCCs) at each public school. The SCCs will increase community involvement by including community members in the recommendation of key decisions related to school programming, interventions, and budgeting through transparent financial reporting and planning.

Act 51 defines a WSF as a means “for allocating operating moneys to individual public schools that includes a system of weighted characteristics affecting the relative cost of educating each student attending a public school.” By allocating at least 70 percent of education appropriations directly to schools, Act 51 furthered the goal of decentralization. Promoting funding equity requires that a significant portion of these dollars would be allocated through a WSF formula.[5] By allocating these dollars according to weighted characteristics, Hawaii hopes to achieve both *horizontal* and *vertical* equity for the purpose of improving student academic performance and closing achievement gaps. In the mainstream education finance literature, *horizontal equity* refers to treating similar students in similar ways (e.g., all students with a similar need such as

[5] As will be seen below, since its inception in 2006-07, approximately half of the annual General Fund education appropriation has been is allocated to schools through the WSF.

English language learner services will be provided the same level of resources), whereas *vertical equity* refers to treating different students classified according to need in systematically different ways (e.g., all students with a similar need such as English language learner services will be provided more services compared to an otherwise similar student with no need for these services). Promoting both horizontal and vertical equity ensures that all students, regardless of their specific needs or circumstances, will be provided an equal opportunity achieve a set level of outcomes.

A key concern voiced in studies of school finance in Hawaii, other districts, and other states is that of *adequacy* (or *sufficiency*).[6] Mainstream education finance literature defines *adequacy* as the minimum amount of resources necessary for educating a student to attain an established set of academic standards (Chambers and Levin, 2008). For Hawaii, *adequacy* has been defined as the opportunity for students to become proficient in the Hawaii Content and Performance Standards III. It is important to recognize that because of constraints on funding at its inception, the Hawaii WSF did *not* purport to ensure there was adequate funding, but rather to allocate existing available dollars equitably:

> *…current funding is not adequate. The weighted student formula re-allocates inadequate resources…* (WSF Implementation Manual, November 17, 2005)

Committee on Weights

Act 51 required that the HIDOE establish a committee to develop a WSF. The composition of the Committee on Weights (COW) is determined by the Board of Education (BOE) to contain key stakeholders. The initial COW was composed of 42 members, including nominees from the Superintendent of Education and the Dean of the University of Hawaii at Manoa's College of Education as well as principals, teachers, parents, and other appropriate members.[7]
Act 51 outlined seven duties for the COW to fulfill:

"1. Create a list of student characteristics that will be weighted;

2. Create a system of weights based upon the student characteristics that may be applied to determine the relative cost of educating any student;

3. Determine specific weights, including their unit value;

4. Determine which moneys shall be included in the amount of funds to be allocated through the weighted student formula;

5. Recommend a weighted student formula to the Board of Education;

6. Perform any other function that may facilitate the implementation of the weighted student formula; and

[6] These two words *adequacy* and *sufficiency* are often used interchangeably in the literature and are used to convey the same standard as applied in the different laws across states.
[7] Additional information regarding the COW may be found at http://reach.k12.hi.us/empowerment/wsf/committeeonweights/index.htm.

7. *Meet not less than annually to review the weighted student formula and if the committee deems it necessary, recommend a new weighted student formula for adoption by the board of education."*

The first COW began meeting in 2005 to plan and develop a system of weights for the first year of WSF implementation in 2006–07. Following up on a recommendation in 2005, the COW has continued meeting annually to monitor implementation, evaluate effectiveness, and recommend adjustments to the WSF. In 2011, the Hawaii Revised Statutes (HRS) 302A–1303.5 requiring the COW to be convened yearly and make recommendations for changes to the WSF as it deems necessary was modified to require their convening not less than every odd-numbered year.

Determining the Revenue Sources Distributed by the Hawaii WSF

A key task of the COW is to identify and recommend which monies are included in the WSF allocation. The COW uses the following criteria to determine which revenue to include in the WSF allocations:

- ***Include*** revenues from services or programs that are in place or available to every school.
- ***Include*** revenues from services or programs for which there is a formula to distribute dollars fairly.
- ***Include*** revenues of the service or program if they meet the prior two criteria for every school within a given schooling level (elementary, middle, high).
- ***Exclude*** revenues that are used to meet complex area or state responsibilities.

In the 2008 report, the COW IV revised these criteria to also include funds that "would provide greater flexibility to the school community, or were previously distributed in a manner that resulted in an inequity." These changes were made to emphasize and support the goal of ensuring that all students, regardless of their needs or where they attended school, were provided a similar opportunity to achieve the state standards (i.e., to promote horizontal and vertical equity in their funding distribution mechanism).

The COW I (2005) differentiated between discretion and total flexibility. The COW I stated that they are not the same and that there are certain restrictions that can limit the flexibility of some funds included in the WSF allocated funds. The COW IV recommended a significant increase in funding for the 2009–10 school year. Their report from July 2008 cites the goal of increased flexibility as central to this recommendation. The report states that "funds allocated via WSF give school communities the greatest degree of flexibility." It was decided not to include federal categorical dollars in the WSF, even when spent at the school site, because the lack of flexibility principals had in using these funds was too great for them to be considered as under principal discretion.[8] Although certain categorical revenues are spent by principals at the school site, these funds must be spent only on specified programs.

[8] Appendix E reports the specific revenue sources and the amounts under each that were distributed to school sites via the WSF.

SCCs and the Academic and Financial Plans

Establishment of the SCCs under Act 51 to address the need for increased and enhanced community involvement was based on the following three principles (Office of Curriculum, Instruction and Student Support, 2008, p. 4):

1. Those closest to students should be more involved in instructional programming.
2. Transparency fosters more support for school plans.
3. Students and schools are more successful when families are included in decision making at the school.

SCCs are an extension of the SCBM initiative described earlier and, as before, serve as the process for including both internal and external stakeholders in decision making about school programs and budgets. SCCs are made up of 50 percent internal stakeholders (principals, teachers, and noncertificated staff) and 50 percent external stakeholders (parents, students, and community members). One of the responsibilities of the SCC is to provide input into the development of the Academic and Financial Plans.

The Academic and Financial Plans are a collection of documents that were designed to provide a framework to ensure that school and complex area programs and priorities were aligned with the HIDOE Strategic Plan. The Academic and Financial Plans were also designed to be tools for the monitoring and evaluation of goals. It is part of a planning process that aligns goals for the school, school programs, and the resources available to the school, including those allocated through the WSF (Hawaii Department of Education, 2012).

Description of Hawaii’s WSF

The purpose of this section is to describe the WSF at its inception and to track any major changes that have occurred since first implemented in the 2006–07 school year.

Theoretical Background of Cost-Based Funding Systems

Any needs-based funding system for schools is based on the assumption that different groups of students have particular needs that require additional costs to offer the same educational opportunities. The education finance literature groups these *cost factors* into three different categories (Duncombe & Yinger, 2008).

The first category is *Student Needs*—pupil characteristics that necessitate additional or specialized services. This category usually includes such needs groups as students in poverty, those designated as English language learners, and those in special education. Later, we will see that the Hawaii WSF refers to this category as *student characteristics*.

The second type of cost factor is *Scale of Operations*—geographic and population characteristics of a school, including enrollment (students served by a district) and student population density (district enrollment divided by the area of a district in square miles). Hawaii’s WSF refers to these types of cost factors as *school characteristics*.

The third cost factor category is *Geographic Differences in Resource Prices*—differences in the cost of hiring similarly qualified staff across different regional labor markets and other associated costs with geographic differences.

Structure of Hawaii's Initial WSF (2006–07)

On January 7, 2005, the COW submitted its first report outlining its recommendations for the WSF to be used for the 2006–07 school year. For its first task, determining the student characteristics for which funding weights (weighting factors) would be developed, the COW identified several key issues. The first was the need for clarification of the distinction between student characteristics and school characteristics. During the seven years of implementation, the definitions of these categories have been modified as will be discussed in detail later. The COW used four criteria to determine which weighting factors would be taken into account in the WSF:

- Practicality – There exists a reliable method and available data source that can be used to identify current student counts and develop corresponding projections.
- Feasibility – Other school districts have proved the measure could be used successfully.
- Scale – There is a significant number of *schools* impacted by this factor—all schools, just high schools, and so on.
- Scale – There is a significant number of *students* impacted by this factor even if it is not spread across many schools.

Using these criteria, the first COW recommended three student characteristics that should be accounted for in the WSF: being economically disadvantaged, being an English language learner, or being in special education. Three others were considered but identified as needing further research before inclusion: transiency and mobility, being at risk, and being gifted and talented.

Their second task was to determine the specific weighting factors that represented the additional costs associated with each of these characteristics. At this point, the COW determined that there was not a reliable system for identifying transient, at-risk, and gifted and talented students. Therefore, they would not be recommended for inclusion in the WSF. The COW discussed different options for addressing these characteristics. For example, one option discussed to address transiency was to provide more frequent budget adjustments throughout the year. The HIDOE eventually did include transiency by developing a calculation described later.

The first COW also decided to leave the allocation of special education funds as is and not include this characteristic in the WSF, and this practice has continued throughout its implementation. One reason for this was that the degree of compliance with regulation as to how special education funding could be used made decentralizing these dollars a risky proposition. In addition, the allocation of dollars for special education was already based on a weighted formula and that this system should not be changed. The weights in the special education formula are designed to reflect relative intensities of the instruction needed for each student as determined by their Individualized Education Program (IEP). This information from IEPs is compiled in a state database, and then resources are allocated to schools on the basis of the weighted calculations.[9]

[9] The weights for Special Education funding are determined according to categories of instructional support. These categories include Intermittent Support, Targeted Support, Sustained Support, and Intensive Support.

The weighted formula for the first year of implementation (2006–07) is documented in the *Weighted Student Formula/School Financial Plan Implementation Manual* (2005)[10]. The original formula, represented in Exhibit 2.1 and explained later, contains a combination of weighted factors and nonweighted allocations divided into two categories (student characteristics and school characteristics). In later years, there were changes made to the weighted factors and nonweighted allocations as well as the organization of the categories. This section describes the original weighted formula under Act 51, and the subsequent changes are described later in this chapter. *Nonweighted* characteristics were calculated in terms of dollars per pupil or school rather than a weighting factor multiplied by the foundation per-pupil funding amount. The formula includes a per-pupil foundation funding amount for all students and eight additional weighting factors listed in the following table and described later.

Exhibit 2.1 – Weighting Factors in Hawaii's Original WSF

WSF Weighting Factors	Relative Weight
Student Characteristics	
K–2 Students	0.012
English Language Learner	0.263
Economically Disadvantaged	0.100
Transiency	0.025
School Characteristics	
Grade Level – Elementary Grade Level – Middle	0.0249 0.0553
Multitrack (Year-Round Schooling)	0.0025
Geographically Isolated	0.0050

Student Characteristics

- **(Regular Education, weighted characteristic)** The *Basic Allocation* to all students in the first year of implementation (2006–07) equaled $3,845. This amount is equal to a weight of one calculated by dividing the total educational revenues for inclusion in the WSF (reduced by the nonweighted factors) by the total weighted enrollment (Hawaii Department of Education, 2005, p. 12).
- **(K–2 Students, weighted characteristic)** The *K–2 Student* weighting factor was included to support continued smaller targeted class sizes of 20:1. The COW had recommended a level of 0.20 because of the need for 20 percent more teachers to serve these smaller classes. However, the DOE calculated a weight of 0.12 by determining that "if classroom teachers are approximately 60% of the WSF costs, then a 20% increase on 60% of the costs should result in a weight of 0.12" (Hawaii Department of Education, 2005, p. 11).

[10] This manual can be found at http://reach.k12.hi.us/empowerment/wsf/2006-2007/2006-07_WSF_Implementation_Manual.pdf.

- **(English Language Learners, weighted characteristic)** The additional personnel and nonpersonnel costs associated with the pre-WSF *English language learner program* were accounted for with a weighting factor of 0.263. This factor was determined by taking pre-WSF funding for English language learners in 2005–06, adding the related fringe costs, and dividing this sum by the total number of English language learners in Hawaii (12,377). This number approximately equals $1,010 per English language learner, and this amount corresponded to the resulting weighting factor of 0.263 (Hawaii Department of Education, 2005, p. 10).
- **(Economically Disadvantaged, weighted characteristic)** The count of students considered *Economically Disadvantaged* is defined as the number of pupils who qualify for the federal Free or Reduced-Price Lunch Program (FRPL). This allocation is in addition to federal categorical funds (Title I) that are allocated to schools where there is a concentration of 35 percent or more students who qualify for the FRPL. The weighting factor of 0.10 was determined by reviewing weighting factors commonly used by other districts using WSF (Hawaii Department of Education, 2005, p. 10).
- **(Transient Students, weighted characteristic)** The number of students counted under *Transiency* is determined as the number of pupils enrolled in a school at the end of the year who were not enrolled at the beginning of the school year. The count from the previous year is used to determine this allocation. Originally, this weighting factor was focused on students of military families, and the BOE had recommended a weight of 0.05 per military student in schools with more than 10 percent military students. However, the HIDOE expanded this factor to cover all transient students, who make up approximately 10 percent of Hawaii's total student population. For the formula to remain revenue neutral, the resulting assigned weight of 0.025 for all transient students must correspond to the total dollar amount equal to what would have been allocated only to military students at a weight of 0.05 (Hawaii Department of Education, 2005, p. 10).

School Characteristics

- **(Geographically Isolated Students, weighted characteristic)** Pupils enrolled in *Geographically Isolated* schools were provided an additional weighting factor to account for added transportation costs. To this end, schools on Molokai and Lanai and in Hana received a weight of 0.005 per student.
- **(Multitrack Students, weighted and nonweighted characteristic)** This characteristic has both a weighted and a nonweighted component. Pupils enrolled in *Multitrack* schools received an additional WSF weighting factor because of the added expenses of having year-round custodial service. It was calculated that these extra costs equaled approximately $10 per student at a multitrack school. The HIDOE applied a weight of 0.0025 to this factor, which equaled approximately $9.50 per student attending a multitrack school in the 2004–05 school year (Hawaii Department of Education, 2005, p. 9). In addition, multitrack schools were allocated a nonweighted *per-school* allocation of $111,050.50 to subsidize the additional costs of maintaining year-round administration at the school sites.
- **(Elementary School Students, weighted characteristic)** The HIDOE assigned a weight of 0.0249 per K–5 student (enrolled in kindergarten through grade 5), whether located at

an elementary school or at a combination school (i.e., a school that serves students from multiple schooling levels). This weight was calculated by determining the pre-WSF funding levels at elementary schools and dividing this total across all K–5 students. This calculation ensured that, in aggregate, elementary schools were held harmless to pre-WSF levels of funding (Hawaii Department of Education, 2005, p. 11).

- **(Middle School Students, weighted characteristic)** A weight of 0.0553 was applied to all grade 6–8 students whether located at a middle, intermediate, or combination school. This weight was determined, similar to the way in which the elementary student weight was determined, by dividing pre-WSF funding levels for middle and intermediate students across all grade 6–8 students. As with the elementary calculation, the middle school weight would hold harmless middle school students in the aggregate to levels allocated before WSF implementation (Hawaii Department of Education, 2005, p. 11).
- **(School Size, Nonweighted characteristic)** This characteristic was used to account for the benefits of economies of scale associated with large schools and the additional costs associated with small schools. Subsidies for small schools equaled an additional $400 per student. Small schools were defined as those with funding that was lower than the thresholds identified for each specific grade range (see Exhibit 2.2). The dollars to cover these additional allocations came in part ($3 million of a total of $7 million) from an assessment to large schools of a funding reduction of $400 per student, whereas the remainder of the subsidy came as a reduction spread across all schools. The benefits derived from economies of scale were the rationale for reducing the per-pupil allocations for large schools. Using enrollment data for each school, the top and bottom 25 percent were determined within each grade range and then used to determine the thresholds used for the school size adjustments as seen in Exhibit 2.2.

Exhibit 2.2 – School Size Adjustments

Grade Level	+$400 per student	+$0 per student	-$400 per student
Elementary	< 400 students	400 – 800 students	> 800 students
Middle	< 700 students	700 – 1,100 students	> 1,100 students
High School	< 1,150 students	1,150 – 1,850 students	> 1,850 students
K–8	< 400 students	400 – 1,100 students	> 1,100 students
K–12	< 400 students	400 – 1,850 students	> 1,850 students
7–12	< 700 students	700 – 1,850 students	> 1,850 students

Source: (Hawaii Department of Education, 2005, p. 8)

Characteristics not included in the 2006–2007 WSF

Special Education was not included in the WSF because these funds were already distributed using a weighted system with the dollars being used largely for prescriptive programs that have significant legal ramifications for noncompliance in meeting regulatory and legal requirements.

The COW looked at including gifted and talented as an additional weighting factor yet cited an absence of a consistent identification system as prohibitive to including this weight in the funding formula. This issue would be revisited in later years.

There are several special or unique schools that receive funding allocations primarily through categorical funds and, therefore, were not included in the WSF system: Olomana, Jefferson Orthopedic, Hawaii Center for the Deaf and Blind, Keanae, Niihau, Pohukaina.

Treatment of Schools With Losses Under WSF

The transition plan for the implementation of the WSF in Hawaii included a scaled approach to the Board-adopted WSF. Act 51 stipulated that assistance for schools adversely affected by the WSF will be provided for no more than three years beginning with the 2006–07 school year. Schools losing funds under WSF would be compensated for lost funds according to the following percentages during the first three years of the program:

- FY 2006–07: 90 percent of the difference
- FY 2007–08: 75 percent of the difference
- FY 2008–09: 50 percent of the difference
- FY 2009–10: none of the difference

The funds used to supplement schools with losses under WSF would be generated from the additional dollars that schools with gains would have received. Therefore, schools that would gain funding through WSF would have these phased in during the same period of time and at the same percentages. However, during the 2007–08 school year, the BOE decided to accelerate the phase-in by adopting the COW recommendation to implement the WSF fully in the 2008–09 school year and protected schools only against losses caused by enrollment decreases.

To this end, in 2008–09, a *loss threshold* was established to ensure that no school lost more than 4.00 percent annually because of enrollment shifts. In 2009–10, it was determined that the total cost of these adjustments should not exceed 1.50 percent of the total WSF appropriation and that the loss threshold must adjust accordingly. The loss thresholds that resulted from these policy changes were as follows:

- 2008–09: 4.00 percent
- 2009–10: 6.82 percent
- 2010–11: 3.07 percent
- 2011–12: 7.41 percent
- 2012–13: Loss thresholds were eliminated

Staffing Costs

For staffing purposes, the COW and the HIDOE agreed that average salaries should be used instead of actual salaries. For teachers, average salaries are calculated across all teachers statewide. Average principal salaries were calculated within schooling level (elementary, middle, high school). In the 2008–09 school year, principals were grouped by both school size category and schooling level to determine average salaries. A combined average for positions such as teachers, librarians, counselors, student services coordinators, student activities coordinators, and registrars is calculated and used for the development of the Financial Plan.[11] Using average salaries instead of actual salaries means that the true realized costs of staff (i.e., the costs of the salaries actually paid out to staff) are not reflected in school budgets. Any differences in teacher qualifications, and hence salary levels, from one site to another are masked by this policy and do not accurately reflect the actual realized cost of the various school programs. Fringe benefit costs associated with staffing were included in the WSF and allocated to the sites to budget in their Financial Plan until 2010–11 when they were removed from the programs included in the WSF allocations and provided for centrally.

Enrollment Calculations and Adjustments

The timing and calculation of enrollment counts is an important aspect of any WSF system. Because projected and realized enrollment counts determine how much funding a school will have to work with, the time at which this information is collected can greatly affect both initial funding projections as well as adjustments that are made to account for enrollment fluctuations. Prior to Act 51, enrollments for different student characteristics were calculated at different times of the year. This system led to problematic counts of students being used for funding calculations, which sometimes resulted in student counts for particular weighting factor categories that were larger than total school enrollment. For example, if the number of economically disadvantaged students is calculated at one point and total enrollment is recorded at a later date after large decreases have taken place, then the count for economically disadvantaged students could be overrepresented in the WSF allocation. Aligning the timing of these counts was necessary to distribute dollars fairly.

Enrollment projections are calculated in the prior fall and used to project WSF allocations for school planning through the Academic and Financial Plans. However, official enrollment adjustments are made at the start of school, as well as in September and January (collectively referred to as midyear adjustments). The official enrollment adjustment at the start of the school year may increase or decrease a school's WSF allocation. However, school WSF allocations are not decreased based on downward midyear enrollment adjustments. Schools that have increases in their midyear enrollment counts receive an increase in their allocations. HIDOE holds back $3 million in funding to cover these midyear enrollment increases. The total WSF holdback is allocated to schools experiencing midyear enrollment increases, and if the amount held exceeds the amount needed to cover the increases, any remaining dollars are allocated across all schools.

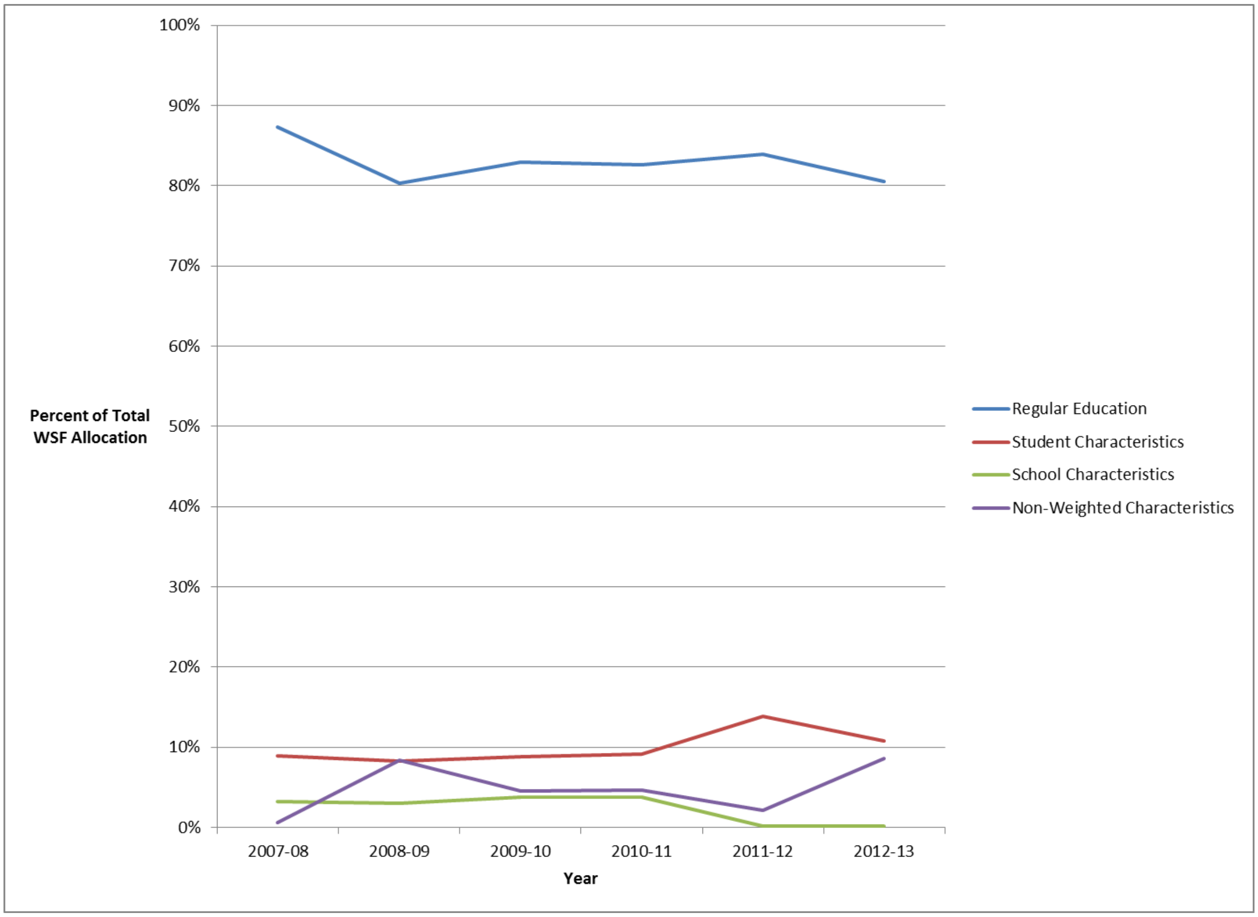
Changes to Weighting Factors Since Initial Implementation (2006–07 to 2012–13)

During the seven years since the inception of Hawaii's WSF, there has been widespread policy discussion stemming largely from the deliberations of the COW. This has resulted in changes to both the weighting characteristics and specific weighting factor values used by the WSF that are worth noting. The following section examines the modifications made in terms of the student, school, and nonweighted characteristics, as well as changes to the weighting factor values over time.

[11] The Academic and Financial Plans are documents that schools are required to use for academic and budget planning.

Exhibit 2.3 displays the relative contributions of each of the WSF weighting categories (i.e., student, school, and nonweighted) to the overall WSF dollar allocations. The portion of the WSF dollar attributed to student characteristic weighting factors has tended to be the largest during the implementation period and peaked in 2011–12 (13.8 percent). However, in 2012–13, the share of funding allocated through the student characteristic weighting factors decreased to 10.72 percent, while the contribution of nonweighted characteristic dollar allocations increased from 2.14 percent to 8.64 percent. The combination of these two factors had the impact of moving Hawaii away from an emphasis on weighting student needs (i.e., the proportions of WSF allocations driven by student and nonweighted characteristics was about equal by 2012–13). The percentage of the WSF included in the nonweighted category has fluctuated significantly across the years from less than 3.0 percent in 2007–08 and 2011–12 to close to 9.0 percent in 2008–09 and 2012–13.

Exhibit 2.3 – Proportions of Overall WSF Dollar Allocations, by Characteristics Category (2006–07 to 2012–13)



Source: Yearly Calculations of Weighting Factors and Dollar Values (SY 2007/08 – SY 2012/13): (http://reach.k12.hi.us/empowerment/wsf/index.htm)

The characteristics included in the WSF have remained relatively stable, with only a few additions and modifications. There was a significant shift in factors defined as student characteristics beginning in 2011–12. Specifically, the Grade-Level weighting factors were redefined as student characteristics instead of school characteristics because they apply individually per student. The same year, the number of school characteristics was reduced to one (Neighbor Island, which denotes the school is on a neighboring island of Oahu), placing an emphasis on student needs over both school needs and nonweighted factors.

The remainder of this section briefly discusses the weighting factors in each of the WSF characteristic categories. The table in Exhibit 2.4 below shows, by WSF characteristic category, which weighting factors were applicable in each of the implementation years and how these values changed over time.

Student Characteristics

K–2 Students – This weighting factor has remained stable, with only a minor upward adjustment in 2007–08 (from 0.0120 to 0.0150).

English Language Learner – Starting in the 2008–09 school year, the weighting factor for English language learners was divided into the following three categories, each with a specific weight: Fully English Proficient (FEP), Limited English Proficiency (LEP), and Not English Proficient (NEP). Each of the three weighting factors experienced modest changes in their values over time:

- FEP – Ranged from its lowest value of 0.0535 in 2010–11 to its highest value of 0.0590 in 2008–09, with the most current value at 0.0546 for 2012–13.
- LEP – Ranged from its lowest value of 0.1604 in 2010–11 to its highest value of 0.1780 in 2008–09, with the most current value at 0.1639 for 2012–13.
- NEP – Ranged from its lowest value of 0.3209 in 2010–11 to its highest value of 0.3560 in 2008–09, with the most current value at 0.3277 for 2012–13.

The division and differential weight for each subcategory of English language learner explicitly acknowledges the differences in the costs associated with providing adequate supports for students with varying levels of English proficiency.

Economically Disadvantaged – This weighting factor has remained constant since inception of the WSF. The COW acknowledged in its 2007 report that there is substantial evidence that the weight assigned is not necessarily adequate and is lower than most state allocations. In addition, the report by Baker and Thomas (2006) states that, whether measuring the explicit or implicit weighting of poverty, the magnitude of the weight in Hawaii's WSF is "very small" in comparison with those of other WSF systems.

Transiency – In 2007–08, the weighting factor for transiency was doubled from its original value of 0.0250 to 0.0500. After this year, the rate has remained stable.

Gifted and Talented – This weighting factor was added in the 2011–12 school year by the sixth COW (COW VI) to support the Board of Education Gifted & Talented Policy (2012). The COW VI acknowledged at the time that processes used to identify gifted and talented students still needed further improvement.

Grade Levels – Prior to the 2011–12 school year, this characteristic was listed under school characteristics. Moving it under student characteristics is more in line with research on needs-based cost factors. In making this change, the COW IV asserted that this was the original intent of the BOE when developing the WSF in 2005 (See the description of *Grade Levels* under School Characteristics later for a more full discussion of changes over time).

Exhibit 2.4 – Weighting Factors and Nonweighted Funding Support Changes Since WSF Implementation (2006–07 to 2012–13)

WSF Weighting Factor	Year						
	2006–07	**2007–08**	**2008–09**	**2009–10**	**2010–11**	**2011–12**	**2012–13**
Student Characteristics							
K–2 Students	0.012	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
English Language Learner	0.2630	0.2100	---	---	---	---	---
FEP	---	---	0.0590	0.0582	0.0535	0.0560	0.0546
LEP	---	---	0.1780	0.1745	0.1604	0.1670	0.1639
NEP	---	---	0.3560	0.3491	0.3209	0.3340	0.3277
Economically Disadvantaged	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Transiency	0.0250	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Gifted and Talented	---	---	---	---	---	0.2650	0.2650
School Characteristics							
Grade Levels Elementary	0.0249	0.0350	0.0350	0.0347	0.0347	0.0350[1]	---
Middle	0.0553	0.1000	0.1000	0.1004	0.1004	0.1000[1]	0.0435[1]
High	---	---	---	0.0240	0.0240	0.0240[1]	---
Multitrack Year	0.0025	0.0050	0.0050	0.0050	0.0050	---	---
Geographically Isolated	0.0050	0.0050	0.0050	0.0050	0.0050	---	---
Neighbor Island	---	---	0.0050	0.0050	0.0050	0.0040	0.0040
Neighbor Island – Secondary	---	---	---	0.0010	0.0010	---	---
Nonweighted School Characteristics							
Multitrack Year (Lump Sum Per School)	$111,050	$111,050	$111,050	$137,570	$97,804	---	Elementary: $80,000 Middle: $80,000
School Size	$400 Per Pupil	$400 Per Pupil	$400 Per Pupil	Sliding Scale Per Pupil	Sliding Scale Per Pupil	Sliding Scale Per Pupil	Base Funding[3] Elementary: $200,000 Middle: $347,000 High: $354,000 K-12: $465,500 K-8: $403,000 6-12: $410,000
Geographically Isolated (Lump Sum Per School)	---	---	---	---	---	$50,000[2]	---

[1] Starting in 2011–12, the Grade-Level weighting factors were considered *student* characteristics (as opposed to *school* characteristics).
[2] In 2011–12, the weighting factor for Geographically Isolated was eliminated, and a *nonweighted*, school-based allocation was used in its place.
[3] Base funding amounts were allocated based on school type and replaced the formerly per-pupil allocation.

School Characteristics

Grade Levels – When first implemented, grade levels were listed as school characteristics. As described earlier, these weights were later moved under the student characteristics category. From 2006–07 to 2008–09, the WSF included weighting factors for elementary and middle schools only. In 2009–10, programs associated with high school level programs were added to the WSF allocation. Accounting for this change and maintaining the relative amounts of funds allocated to each site across the three schooling levels required adding a weighting factor for high schools.

Geographic Isolation – This weighting factor remained constant at 0.0050 for the first six years of implementation (from 2006–07 through 2010–11) to support additional costs for students attending geographically isolated schools in Hana (on Maui) and on the islands of Lanai and Molokai. In 2011–12, the weighting factor for geographic isolation was eliminated and replaced with a nonweighted, school-based subsidy of $50,000 for each of the seven identified schools. As of 2012–13, this nonweighted school characteristic was eliminated completely.

Neighbor Island – This school characteristic was included to account for the additional costs associated with providing a similar learning experience to students who live on Oahu. This characteristic was added in 2008–09 as a single weighting factor (0.0050) but in the following year (2009–10) was split into two separate factors. One calculation was included for all geographically isolated students (0.0050), and an additional weight was included for secondary students (0.0010). In 2011–12, they were combined again into one weight (0.0040) and now remain the only school characteristic weighting factor.

Multitrack – The multitrack weighting factor existed from 2006–07 through 2010–11 and was eliminated in 2011–12. The COW V deemed that large enrollments and economies of scale at these schools offset any additional costs associated with staffing a year-round school.

Nonweighted Characteristics

School Size – In the first two years of implementation (2006–07 and 2007–08), schools received an additional $400 per student if they were lower than a particular enrollment threshold. Starting in 2008–09, Hawaii implemented a sliding scale that "provides an increasing amount of additional funding to schools as the enrollment gets progressively smaller" (Hamamoto, 2007).

Enrollment thresholds were lowered in 2009–10, and then lowered again in 2011–12 to align better with research regarding the effect of small schools on operating costs. Elementary thresholds were lowered from 650 to 500 to 300; middle school thresholds from 850 to 600 to 450, and high school thresholds from 1,690 to 1,000 to 750. In 2012–13, the sliding scale was eliminated and a Base Funding amount that was allocated per school replaced this system. These Base Funding allocations ranged from $200,000 for elementary schools to $465,500 for K–12 combination schools.

Multitrack – Additional lump-sum funding allocations beyond the school characteristic weighting factor for multitrack schools have been present in the funding formula through all but one of the WSF implementation years. It was eliminated in 2011–12 (from both the school and nonweighted characteristics) and then reintroduced as base funding under the nonweighted characteristics in 2012–13 (i.e., multi-track schools receive more in base funding than their non-multi-track counterparts).

Total and Relative Revenues Allocated by the Hawaii WSF

Since its inception, there has been a significant amount of revenue allocated by the WSF. Exhibit 2.5 contains financial information provided by HIDOE on the portions of the state's General Fund education appropriation that were allocated to schools through the WSF and those that remained outside of the WSF (Non-WSF), respectively, from 2006–07 to 2012–13. Exhibit 2.6 shows how the overall education appropriation (including the General Fund and most other sources of funding[12]) was split between WSF and Non-WSF allocations. In addition to listing the total dollar breakouts, the exhibits also provide the proportions of the General Fund and overall appropriations allocated within and outside of the WSF. It is important to note that the figures in both tables do not include dollars spent on fringe benefits. Below, we discuss the following types of trends:

- Changes in the education appropriation made out of the General Fund and all available funding sources;
- Changes in the total dollars allocated by the WSF;
- Changes in the WSF dollars as a proportion of the education appropriation from the General Fund and all available funding sources.

Exhibit 2.5 shows that over the seven-year period of WSF implementation (2006–07 to 2012–13), the General Fund appropriation fluctuated between $1.2 billion and $1.4 billion, with its lowest levels occurring in 2006–07 and 2010–11. The years in which the total General Fund appropriation was highest were from 2007–08 to 2009–10, where its level remained relatively stable at approximately $1.4 billion. The largest decrease in the General Fund appropriation occurred in 2010–11, when there was a 10 percent drop from the previous year, which mirrored a similar 11 percent decrease in the overall educational appropriation from all available sources (see Exhibit 2.6). These decreases were due to the fiscal crisis, which affected both the state and the nation. However, in the most recent two years (2011–12 and 2012–13), there was a sustained rebound in both the General Fund and overall appropriations, with increases of 11.6 percent and 7.7 percent, respectively, in 2011–12, which have held relatively steady in 2012–13.[13]

While the fluctuations in the overall education appropriation mirrored the General Fund appropriation over most years, the most notable difference (as seen in Exhibit 2.6) was in 2009–10. In this year, the overall appropriation increased by approximately 7 percent while the General Fund appropriations remained stable. The significant increase in 2009–10 was due to an influx of $117.8 million of American Recovery & Reinvestment Act (ARRA) funds in the federal apportionment.

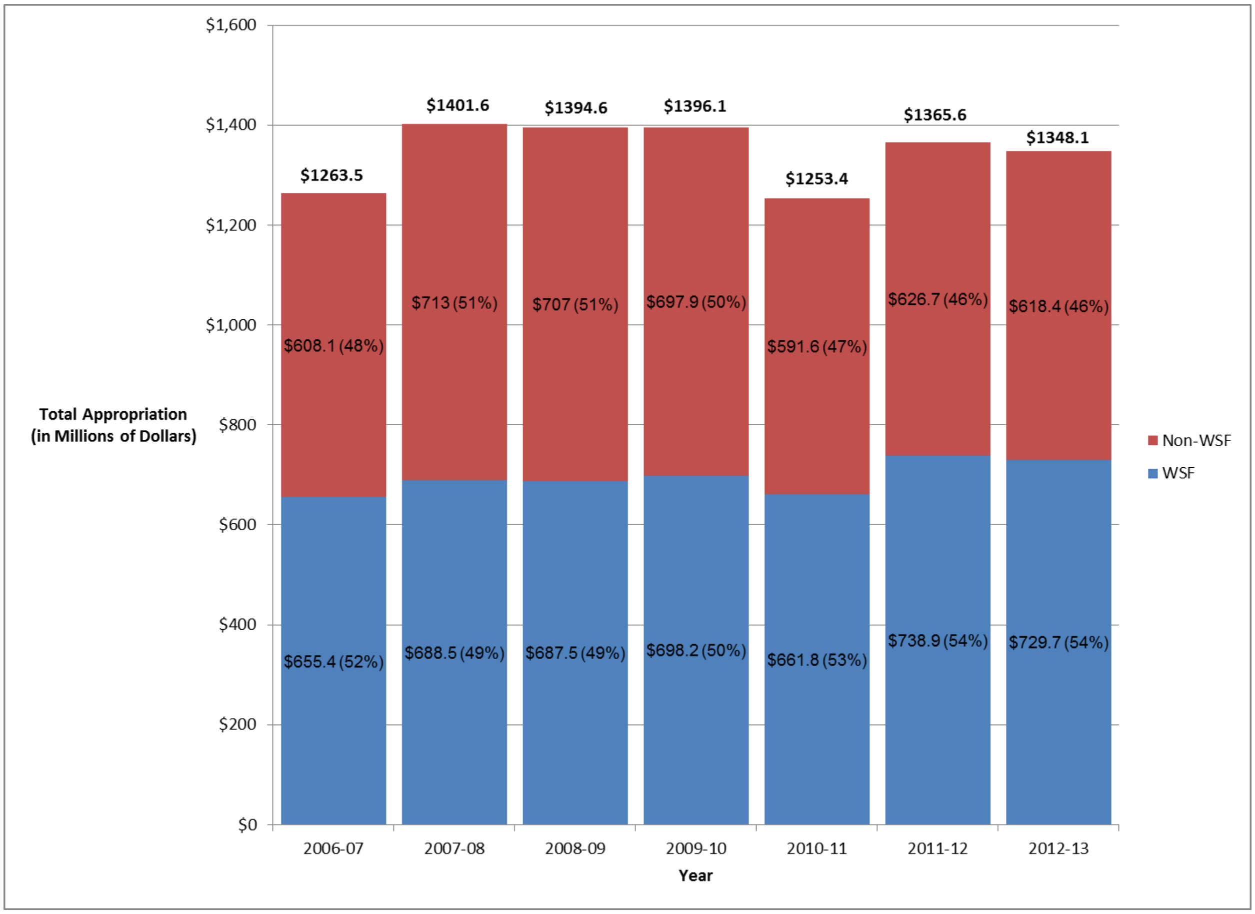
[12] While we refer to the more comprehensive appropriation measure below as dollars from "all available funding sources," please note that Interdepartmental Transfer, Revolving Fund, and Trust Fund appropriations are not included in the figures. Moreover, dollar appropriations targeted for fringe benefits have been removed from all dollar figures presented in Exhibits 2.5 and 2.6.
[13] The General Fund and overall appropriations fell by -1.2 and -2.1 percent, respectively, in 2012-13.

Exhibit 2.5 shows that over the seven-year period since the WSF was implemented, the total number of dollars allocated by the formula has fluctuated a bit but, overall, it has increased by 11.3 percent (from $655.4 million in 2006–07 to $729.7 million in 2012–13). In 2007–08, 2009–10, and 2011–12, there were year-over-year increases in the amount of funds flowing through the WSF of 5.0 percent, 1.5 percent, and 11.6 percent, respectively. In 2008–09, 2010–11, and 2012–13, there were decreases in the WSF allocation from previous years of -0.1 percent, -5.2 percent, and -1.2 percent, respectively. Note that a corresponding decrease in the overall appropriation of -11.5 percent occurred in 2010–11, which proved much larger than the -5.2 percent decline for the WSF portion. It follows that the decrease in overall appropriation was driven by the -15.2 percent drop (from $697.9 to $591.6 million) in the Non-WSF portion of the overall appropriation.

It should be noted that in addition to the total amount of education appropriation dollars allocated through the WSF, the relative share of the appropriation distributed by the formula has also been quite substantial. The figures in parentheses in Exhibits 2.5 and 2.6 provide a look at the dollars allocated through WSF in relative terms (i.e., as a share of the General Fund and all available funds, respectively). Since 2007–08, the WSF percentage of the General Fund appropriation has increased by 5 percentage points, from 49 percent in 2007–08 and 2008–09 to 54 percent in the most recent years, 2011–12 and 2012–13 (see Exhibit 2.5). It is important to recognize the sustained commitment that has been made to maintaining the level of support the WSF has received since its inception, even in leaner fiscal years. For instance, the proportion of the General Fund dollars dedicated to the WSF was insulated from the dramatic decrease in the General Fund appropriation experienced in 2010–11; a large part of this decline in the General Fund appropriation came from the non-WSF share.

Exhibit 2.6 shows that the amount of funding allocated by the WSF relative to the overall education appropriation has remained quite stable, ranging from 39 percent to 43 percent over the seven-year period.

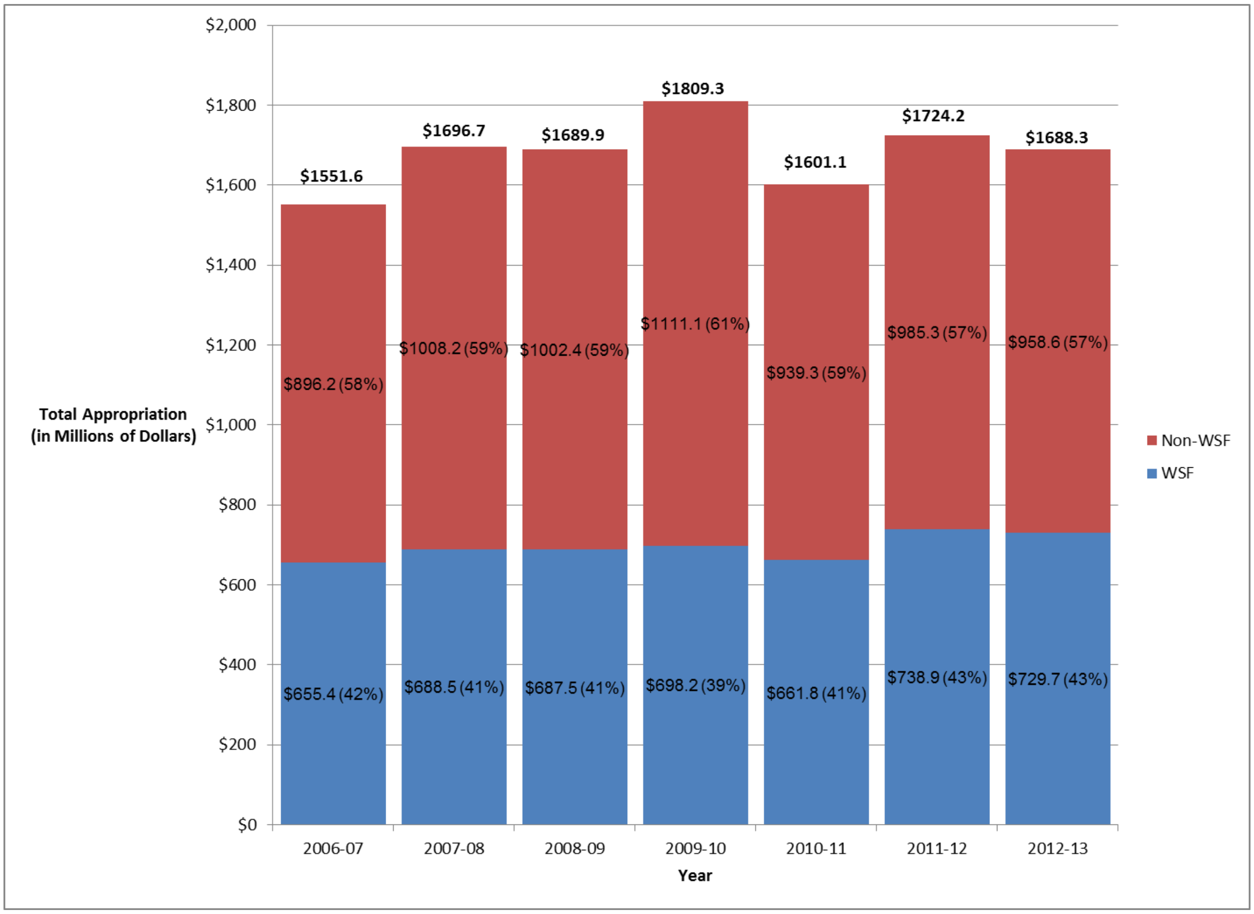
Exhibit 2.5 – Educational Appropriation From General Fund by WSF Status (2006–07 to 2012–13)



Source: Historical appropriations data obtained from Hawaii Department of Education Budget Execution Section.

Note: Proportion of General Fund appropriation in parentheses.

Exhibit 2.6 – Educational Appropriation From All Available Funds by WSF Status (2006–07 to 2012–13)



Source: Historical appropriations data obtained from Hawaii Department of Education Budget Execution Section.

Note: Proportion of appropriation from all available funds in parentheses.

Conclusion

Hawaii's WSF has combined a history of decentralization with an initiative intended to promote more equitable funding through recognizing the needs of individual students and the schools that serve them. Since 1989, Hawaii has enacted a series of reforms aimed at increasing local autonomy, transparency, and stakeholder engagement. The decentralization of funds to schools has empowered principals and stakeholders to make key decisions about programming and budgeting at the school site.

The key vehicle for this decentralization was Act 51, passed in 2004, which, through the implementation of a statewide WSF, effectuates a comprehensive system for not only driving additional funds to the schools but also doing so within a framework of equity. 70 percent of education revenue is intended to be allocated directly to schools through weighted and nonweighted allocations. Furthermore, more than half of these funds that are intended for direct distribution to schools are allocated through the WSF. Hawaii built its WSF on the inclusion of weighted factors for characteristics of students and schools requiring additional investment and support (e.g., English language learners, economically disadvantaged, geographic isolation). Although some changes to the weights and characteristics have occurred during the seven-year history of the WSF in Hawaii, many have remained stable.

Hawaii's unique circumstance as both a state and a district has facilitated the statewide formula to drive funds directly into the hands of schools and their communities. The use of the COW to regularly review, monitor, and recommend adjustments to the formula annually is a transparent and inclusive process that has proven to be a valuable system for the implementation of Hawaii's WSF. The COW was conceived as a system to create the initial WSF; however, Hawaii's recognition of the iterative nature of a fundamental reform, such as WSF, led to the regular review of WSF by the COW since inception. The changes that have been made over time to the weighted factors have become more student centered and simplified, creating a more transparent system. In addition, although the financial crisis had a negative effect on the availability of educational dollars Hawaii effectively insulated the WSF funding from these cuts, opting to allow the non-WSF funding to take a relatively larger hit. In doing so, the state affirmed its commitment to the WSF and maintained its importance as a core educational practice.

Chapter 3 – A Descriptive Survey of WSF in Other Districts and States

The state of Hawaii is unique in that the HIDOE operates as one local education agency (LEA) or school district, yet it also functions as a statewide agency. Thus, HIDOE functions in many ways similar to those of both states and districts. With that in mind, we have organized this chapter to describe a brief history and the current trends across the United States in the use of weighted student formulas and more general funding weights at both the district and state levels.

The Emergence of Needs-Based Funding and the Shift From Compliance to Accountability

The importance of accounting for differences in the factors that affect the cost of providing educational services (student needs, scale of operations, and geographical differences in resource prices) across schools and districts has been recognized since 1924 (Baker & Thomas, 2006). The notion here is that cost-based funding of schools will lead to an equitable system for providing the resources required to operate schools and attain academic success. Certain conditions such as grade level, school size, and geographic differences in resource prices were understood to be outside the control of local school administrators, yet these conditions had a sizable effect on the operating costs of schools. Indeed, these conditions became the basis for early discussions about differential funding systems.

In the 1960s and '70s, cost factors based on student needs such as economic disadvantage, language proficiency, race, and ethnicity were first taken into account in adjustments to school funding. Accounting for these conditions across schools and districts has become the rationale for the development of a weighted student formula (WSF) to finance education and is often referred to simply as *needs-based funding*.

States have approached the goal of needs-based funding in two primary ways: (1) through a system of categorical funds or (2) through a weighted formula. The difference between these two systems is more an issue of governance than finance. A WSF allocates dollars on the basis of need but then leaves the decisions about spending in the hands of the district. Weighted systems have gained traction in the area of education finance because of the flexibility they offer districts. This flexibility is combined with a focus on accountability for student achievement in place of the compliance system that accompanies categorical funds. Districts already navigate the considerable compliance requirements of federal categorical funding, which, when combined with additional categorical funding created at the state level, can create an unwieldy and inefficient system that can hinder districts and schools from focusing on their mission to improve the academic performance of students and close achievement gaps.

Districts face similar choices related to governance when creating a needs-based system for funding schools; however, instead of categorical systems, districts face a choice between central management of how funds are translated into staff and services provided to sites or allowing schools to determine programming within the flexibility of a weighted formula. In a system that allows for more local autonomy, as well as increased participation of site leadership and other stakeholders in key programming decisions, districts have developed systems to hold sites accountable for student performance similar to the shift to weighted funding at the state level. Part of the local autonomy discussion has been focused on the shift away from traditional systems of allocating staff through central decisions and staffing formulas. In traditional systems, sites receive staff through full-time equivalents (FTEs) determined by means of formulas for different positions. Shifts in staffing at individual sites are determined largely by district policies and collective bargaining agreements, leaving few decisions at the local school level. As part of the decentralization of decision making, increased autonomy concerning the quantities and qualifications of the staff employed at the site are a significant shift in governance; this autonomy is granted primarily through the allocation of dollars to schools instead of FTEs, allowing school sites more flexibility over staffing.

A similar federal shift from compliance to accountability can be seen in documents released by the U.S. Department of Education. The *Blueprint for Reform* from the U.S. Department of Education (2010) describes flexibility with federal funding in exchange for meeting accountability targets. Providing equity and the promotion of innovation and continuous improvement are cited as the benefits from this shift in governance. The Race to the Top grant, of which Hawaii is a recipient, requires that districts and schools have increased flexibility and control over programming and staffing decisions. However, even before the relatively new Race to the Top grants issued by the federal government, Hawaii embraced the shift, as evidenced by the implementation of its WSF in 2006–07.

Determining Adequate and Equitable Funding for Education

A key goal of education finance systems is to provide a quality public education program that produces a similar opportunity for all students to be academically successful regardless of their specific learning needs or other circumstances, such as where they attend school. The emphasis on subgroup achievement in the determination of Adequate Yearly Progress (AYP) is an example of this concept in federal policy. Accountability systems at the state level often have similar measures designed to incentivize the closing of achievement gaps. These accountability systems define the *outcomes* desired by the schooling system, whereas the discussion about educational finance is focused on determining the *inputs* necessary to achieve these educational objectives. The assumption within school finance is that *equitable* access to *adequate* levels of resources is a key lever for the attainment of academic success for students. Two key questions follow this assumption:

1. What does it cost to enable a public school system to provide students with an adequate education?
2. How can school systems allocate their resources equitably, such that all students are afforded an adequate education regardless of their need or circumstance?

The determination and provision of adequate funding is complex and constrained by competing demands for, and the limited availability of, resources. There are several methodologies for determining adequacy (described further later), but all start with the definition of desired outputs in the form of educational standards or targets. States and districts can then use costing-out studies to determine the minimal costs for providing access to these standards for all students.

In addition to base funding allocations provided to districts, states often provide additional funds to acknowledge cost factors that are beyond the local control of the school district and that affect the ability to provide *equitable* educational opportunities to all students. In the *Handbook of Research in Education Finance and Policy*, Duncombe and Yinger (2008) describe the factors that affect the cost of providing similar educational opportunity across students with differing circumstances:

- *Student Needs* – Pupil characteristics that necessitate additional or specialized services, including low income (measured in various ways, such as eligibility for the free or reduced-price lunch program), English language learner (ELL) designation, and enrollment in special education programs. The rationale for this type of cost factor is based on the concept of *vertical equity* (i.e., ensuring students with varying needs have access to systematically different resources necessary to provide them with equal opportunities for success in school). Certain student needs require more support, in the form of additional personnel, personnel with specific qualifications or certification requirements, and other nonlabor resources associated with providing those students an opportunity to achieve state outcome standards that is comparable to the opportunity provided to students with lower needs.
- *Scale of District Operations* – Geographic and population characteristics of a school district, including enrollment (students served by a district) and student population density (district enrollment divided by the area of a district in square miles) that affect the cost of providing educational services. This term refers to an array of factors that may result in costs associated with the diseconomies of operating small school districts and schools. In addition, geographic isolation may also be associated with the costs of providing specific educational services (e.g., transportation, special education, professional development).[14] Rural remote schools will often be small and will have certain minimal administrative and support costs similar to those of larger schools, which, therefore, will increase the per-pupil costs of operating the school and the district. Small schools also may present constraints on the way classes are organized by grade level (e.g., self-contained classrooms) or specialized subjects (e.g., laboratory sciences) for upper-grade students.
- *Geographic Differences in Resource Prices* – Differences in the cost of hiring and retaining similarly qualified staff across different regional labor markets and other associated costs with geographic differences such as the large scale pricing of supplies and materials. Education finance studies (Chambers, 1981; Taylor, 2006) have shown that there can be significant variations in the cost of recruiting and employing teachers with comparable characteristics across labor markets within a state. Differences in the cost of living and the attractiveness of regions as places to work and live can impact differences in the price of hiring and retaining labor in general as well as teachers and educators in particular. Although most of the emphasis in state systems is on geographic differences in labor costs, the price of nonlabor goods and services can vary due to access to consulting services (e.g., speech and physical therapists or professional development specialists) or large-

[14] For example, remote rural districts that are located far away from more urban communities may require schools to operate at necessarily small sizes because of the cost (and children's time) involved in transporting students over long distances.

scale pricing differences (e.g., buying supplies in bulk) that put small districts at a disadvantage. However, because these nonlabor inputs usually account for only a small portion of the budget, most of the emphasis related to geographic price differences has been on isolating the impact of differences in labor costs.

These cost factors are used to determine the allocation of funding that will ensure *vertical* and *horizontal equity* are achieved. Defining different needs and creating a system for treating similar students in similar ways achieves *horizontal equity*; the level of funding for students with similar needs should be similar and predictable. *Vertical equity* is achieved when students with different needs are treated in systematically distinctive ways. Therefore, if the state or district has identified, for example, the special education status as a cost factor requiring additional resources to provide a similar opportunity to achieve for students with this type of need, then it should follow that additional funding would be provided.

There is a rich literature base that addresses costing out educational adequacy. Exhibit 3.1 provides descriptions from Chambers and Levin (2009) of the four main costing-out methodologies that have traditionally been used to estimate the cost of an adequate education and how these costs vary with respect to different cost factors. Chambers and Levin (2009) also discuss the merits and drawbacks of each approach.

Exhibit 3.1 – Four Main Costing-Out Methodologies

Costing-Out Methodology	Description
Cost-Function Studies	The approach uses data on educational expenditure and correlates these with measures of student need; scale (size) of district operation; measures of efficiency, if available; and educational outcomes on the basis of achievement test results. The result estimates an education "cost function," which measures the cost associated with producing a given level of output (i.e., students educated to a certain standard) under specific conditions defined by measures of student need and scale of operations.
Professional Judgment Studies	Comprehensive panels of educators (e.g., teachers, principals, and special education and English language learner specialists) specify the resources (e.g., levels of administrative, student, and instructional support; teacher staff, supplies, and materials) necessary to deliver a set of defined adequate educational outcomes at a minimal cost across a variety of settings defined by student needs and school size. These resource specifications are used to calculate the costs of the desired achievement outcomes across each setting.
Successful Schools and Districts Method	This methodology looks at the spending of schools or districts that are deemed successful according to well-defined measures of educational outcomes.
Evidence-Based Approach	This method uses the research literature on educational effectiveness to specify the appropriate resources necessary to implement specific sets of best practices and then determines the corresponding costs.

Source: Chambers, J. and Levin, J. (2009). *Determining the Cost of Providing an Adequate Education for All Students.* Washington, D.C.: National Education Association.

Provisions to increase funding above and beyond a foundation per-pupil amount can be included in the major finance grant through weights or can be added to that amount as a separate provision outside the major finance formula through categorical aid. As discussed earlier, a major difference between these two systems is in the governance over the use of these funds. When districts or schools receive categorical aid, rules and regulations including "supplement, not supplant" and "maintenance of effort" usually disallow comingling of funds and can lead to the inefficient use of dollars to fund needed programming for students.

Weighted funding systems, on the other hand, can offer substantial flexibility in the use of funds. In concert with this increased flexibility, states and districts implementing a WSF have seen the need to develop supporting accountability systems that ensure that districts and schools are spending funds effectively and are ultimately held responsible for the achievement of all subgroups of students. Further, to hold districts and schools accountable, those that do not meet their accountability targets can lose flexibility in programmatic decisions. Alternatively stated, autonomy in resource allocation decisions should be earned.

Review of State Finance Systems

The following provides a review of state finance systems across the country. The source of the data is a 50-state survey of state finance policies and programs from fiscal year 2011 (Verstegen, 2011). The survey asked state departments of education to report on the type of finance system, as well as on the formal funding adjustments used to account for various cost factors. As discussed earlier, needs-based systems have been used for almost a century, and the survey showed that no fundamentally new state finance distribution models have emerged in recent years. However, there is a shift toward weighted mechanisms for addressing student and school cost factors motivated at least in part by the need for more equitable distribution systems. For instance, the increased emphasis on subgroup achievement through the accountability policies within the No Child Left Behind Act has highlighted achievement gaps and has resulted in increased emphasis on funding methods to help address these disparities.

The 50-state survey identifies five major types of state finance systems: Foundation Programs, District Power Equalization Systems, Full State Funding, Flat Grants, and Combination Systems.

- Foundation Programs (36 states) – Provide a uniform state guarantee per pupil with state and local district funding.
- District Power Equalization Systems (3 states) – Provide funding that varies on the basis of tax rates.
- Full State Funding (1 state) – All funding is collected and distributed by the state.
- Flat Grants (1 state) – Provides a uniform amount per pupil from state funds; localities can add funding to this amount.
- Combination Systems (9 states) – These combine several of the funding plans listed.

Exhibit 3.2 –Finance Systems Used Across States

Finance System	State
Foundation Programs (36)	AK, AL, AR, AZ, CA, CO, DE, FL, IA, ID, IN, KS, MA, ME, MI, MN, MO, MS, ND, NE, NH, NJ, NM, NV, NY, OH, OR, PA, RI, SC, SD, TN, VA, WA, WV, WY
District Power Equalization Systems (3)	CT, VT, WI
Full State Funding (1)	HI
Flat Grants (1)	NC
Combination System (9)	GA, IL, KY, LA, MD, MT, OK, TX, UT

Financing Student and District Needs and Characteristics

Virtually all states adjust their basic support of districts to acknowledge differential costs in providing equitable educational opportunities to all students. As described earlier, the cost factors accounted for in school systems may include size, geography (i.e., density or sparsity, rural or urban), labor market characteristics, and special student needs (e.g., low income or at risk, ELLs, gifted and talented, and special education). The additional funding that state finance systems use to address these cost factors are added to the basic support to districts through different methods (e.g., weights, categorical aid, flat grants).

Federal educational aid provides supplemental funding to support schools on the basis of student characteristics; however, this chapter will focus on state and district policies and practices. The most common cost factors for which states provide additional aid include student characteristics: students with disabilities and students who are low income or at risk, ELLs, or students who are gifted and talented. In addition, many states also provide additional funding for schools that are necessarily small or in sparsely populated (remote) areas.

Special Education

All states except Rhode Island provide state aid targeted for special education students in addition to the federal aid provided all states under the Individuals with Disabilities Education and Improvement Act (IDEA). According to the 50-state survey, states pay for this supplemental state aid through one of several methods (see Exhibit 3.3). The most common method is through a per-pupil funding system, which is most frequently used by adding an additional weight to the general education funding that a state would disburse.

Exhibit 3.3 – Special Education Funding Mechanisms

Mechanism	Description	Number of States
Per-Pupil Funding	Either pupil weighted or a flat grant	20
Cost Reimbursement	State defines eligible costs and percentages that the state will reimburse	7
Instructional and Teacher Units	Funds to support additional teachers	6
Census-Based Funding	Funds on the basis of the count of all students in a district	9
Other	Block grants, catastrophic funding, excess cost grant, and others	16

Of the 20 states that use a per-pupil method of funding special education, weights and number of weighted categories can vary widely from state to state. Some states, such as Maryland and Oregon, use a single weight, whereas other states divide weights into 3 to 12 weighted categories on the basis of disability (e.g., Oklahoma—orthopedic impairment, visual impairment) or, as in Kentucky, severity of intervention (i.e., mild, moderate, severe). Hawaii has used four categories that are based on the additional hours per week that services are provided.

Low Income and At Risk

Thirty-six states include a method of providing additional state aid for at-risk or low-income students. States also receive federal aid for students in poverty through Title I of the Elementary and Secondary Education Act. Most states use a weighted approach to providing additional assistance to low-income students. These students are most often identified as those who are eligible or participate in the FRPL, which defines eligible income as a measure of economic disadvantage. In most states, low income serves as a proxy for low achievement or being at risk of dropping out of school; however, in some states, such as New York and South Carolina, funding is tied directly to the number of students not meeting academic standards. Weights vary from 0.05 in Mississippi to 0.97 in Maryland, with an average of 0.29. Hawaii assigns a weight of 0.10 to students eligible or participating in the FRPL.

ELLs

Forty-two states provide some additional assistance for ELLs, bilingual education students, or students with limited English proficiency. As with special education and students of low income or at risk, these state funds are in addition to the supplemental revenues provided through federal funding. For ELLs, the federal funding comes from Title III, Part A of the Elementary and Secondary Education Act. States use a variety of funding methods, including weights, block grants, unit funding, and lump-sum appropriations. Weights vary from 0.10 in Texas to 0.99 in Maryland, with Hawaii applying different weights for ELLs categorized as non-English proficient (0.32), limited English proficient (0.16), and fully English proficient (0.05); however, Verstegen (2011) reported an average ELL weight of 0.2373.

Gifted and Talented

The 50-state survey also identified gifted and talented as a common student characteristic found in state funding mechanisms. Thirty-three states include some additional funding for gifted and talented students. Among the states that provide funding for the gifted and talented, some use weights, such as in Hawaii, where a weight of 0.265 was added to the state WSF in the 2011–12 school year. Some states, such as Virginia, provide a unit cost of one instructional position per 1,000 eligible students.

Size or Sparsity of Small Schools

Thirty-two states provide assistance to small schools through this cost factor. Twenty-five of these states use small size, and 15 provide assistance to isolated school districts, with some states providing both additional funding methods. Hawaii's treatment of this factor has varied across the implementation of the WSF to include several weights and nonweighted allocations to schools of small size and geographic isolation.

A summary table showing the inclusion of all of the previously described factors in state funding mechanisms across the country can be found in Exhibit 3.4. There are 15 states, including Hawaii, that address all five of these factors in their state funding mechanisms and zero states that provide no supplemental funding across any of these categories.

Exhibit 3.4 – State Funding Mechanisms for Special Populations

State	Special Education	Low Income or At Risk	ELL	Gifted and Talented	Size or Sparsity
Alabama	X	X	X		
Alaska	X		X	X	X
Arizona	X		X		X
Arkansas	X		X	X	X
California	X	X	X	X	X
Colorado	X	X		X	
Connecticut	X	X	X		
Delaware	X	X			
Florida	X		X	X	X
Georgia	X	X	X	X	
Hawaii	**X**	**X**	**X**	**X**	**X**
Idaho	X		X	X	X
Illinois	X	X	X		
Indiana	X	X	X	X	X
Iowa	X	X	X	X	X
Kansas	X	X	X		X
Kentucky	X	X	X	X	
Louisiana	X	X	X	X	X
Maine	X	X	X	X	X
Maryland	X	X	X	X	
Massachusetts	X	X	X		
Michigan	X	X	X		X
Minnesota	X	X	X	X	X
Mississippi	X	X		X	
Missouri	X	X	X	X	X
Montana	X			X	
Nebraska	X	X	X		
Nevada	X				X
New Hampshire	X	X	X		
New Jersey	X	X	X	X	
New Mexico	X		X	X	X
New York	X	X	X		X
North Carolina	X	X	X	X	X
North Dakota	X		X	X	X

Exhibit 3.4 – State Funding Mechanisms for Special Populations (continued)

State	Special Education	Low Income or At Risk	ELL	Gifted and Talented	Size or Sparsity
Ohio	X	X	X	X	X
Oklahoma	X	X	X	X	X
Oregon	X	X	X		X
Pennsylvania	X	X		X	
Rhode Island			X		
South Carolina	X	X		X	
South Dakota	X				X
Tennessee	X	X	X	X	
Texas	X	X	X	X	X
Utah	X		X	X	X
Vermont	X	X	X		X
Virginia	X	X	X	X	X
Washington	X	X	X	X	X
West Virginia	X		X		X
Wisconsin	X	X	X	X	X
Wyoming	X		X	X	X

Interpreting Explicit and Implicit Weights

The *explicit weights* mentioned earlier in the text represent the specific state-established, formula-based funding adjustments to the actual allocations of dollars to account for various cost factors. A word of caution is in order when comparing the explicit weights across states. Explicit weights represent *relative* differences in funding for different populations of students but do not necessarily say anything about the *absolute level* of the funding differentials provided to schools to account for student needs or other cost factors. To see this, consider the following structure of a simple per-pupil foundation funding formula:

$$\begin{aligned}\textit{Total School Funding} = {} & [\textit{Base Per-Pupil Foundation} \times \textit{Total Enrollment}] + \\ & [\textit{Base Per-Pupil Foundation} \times \textit{Count of Students with Need}_1 \times (1 + \textit{Weight for Need}_1)] + \\ & [\textit{Base Per-Pupil Foundation} \times \textit{Count of Students with Need}_2 \times (1 + \textit{Weight for Need}_2)] + \\ & \quad \ldots \\ & [\textit{Base Per-Pupil Foundation} \times \textit{Count of Students with Need}_k \times (1 + \textit{Weight for Need}_k)]\end{aligned}$$

The first term in brackets is simply the amount a school receives for its total student enrollment, irrespective of its pupils' individual needs or circumstances (i.e., the base per-pupil foundation multiplied by total enrollment). Each term that follows is the additional amount of funding the school is provided to account for students with a particular need or circumstance, which is equal to the product of the base per-pupil foundation and the weighted number of students (i.e., the count of students with the specific need inflated by the corresponding explicit funding weight). Using this structure makes it easy to see why interpreting differences in explicit weights between states as differences in funding levels can be problematic. Specifically, in addition to the explicit weights, both the base per-pupil foundation amount and the method with which students are classified in specific categories vary widely from state to state. Therefore, differences in explicit weights across states do not necessarily imply a real difference in funding, unless the base per-pupil foundation and count method by which students are classified in specific categories are comparable. Nevertheless, comparisons of the state-specific explicit weights can be useful in assessing the relative funding differences for various student needs populations from state to state.

Another important consideration in the analysis of a weighted funding system is the effect that the distribution of multiple revenue streams can have on the *implicit funding weights*. We use the term *implicit funding weights* to refer to the net relationships between per-pupil funding and cost factors that occur as an end result after a state- or district-specific combination of multiple funding policies have interacted with one another. This term is in contrast to the evaluation of *explicit funding weights* described earlier.

It is also important to recognize that the intended effects of these *explicit weights* may be reinforced after they have fully interacted with other, sometimes complementary, funding policies. For example, once a state WSF is combined with federal Title I categorical monies, the *implicit weight* for students eligible for the FRPL might increase significantly. With this distinction in mind, any analysis of a state or district finance system necessitates the identification of *implicit weights* and an analysis of the impact of multiple revenue streams to realize the goals for the *explicit weights* set out in weighted or categorical systems.

Chambers et al. (2012) conducted a district-level statistical analysis to estimate implicit poverty weights for virtually all states and reported the 10 largest: Minnesota, South Dakota, New Jersey, Arkansas, Ohio, Massachusetts, Indiana, Kentucky, Utah, and Connecticut.[15] Exhibit 3.5 shows the 10 state-specific weights listed in descending order. Of these 10 states, Minnesota had the highest implicit weight at 1.34, and Connecticut had the lowest at 1.13. In addition, the exhibit shows average implicit poverty weights across the top 3, middle 4, and bottom 3 of these 10.[16]

[15] In addition to poverty, the model used in this analysis controlled cost factors associated with school district size, population density, and geographic differences in staffing prices.
[16] We note that because this analysis investigated the variation in funding according to student poverty *across* districts in each state, Hawaii (being a single-district state) was not included.

Exhibit 3.5 – States With the Most Progressive Implicit Poverty Weights

State	State-Specific Weight	Average by Group
Minnesota	1.34	1.30
South Dakota	1.28	
New Jersey	1.27	
Arkansas	1.25	1.21
Ohio	1.25	
Massachusetts	1.18	
Indiana	1.17	
Kentucky	1.17	1.15
Utah	1.16	
Connecticut	1.13	

Source: Chambers, Levin, Wang, Verstegen, Jordan, & Baker (2012)

Districts With WSF Systems

The Reason Foundation published a Weighted Student Formula Yearbook (2009) that identifies the existence of at least 14 urban school systems—and the state of Hawaii—that were using some form of WSF. The Reason Foundation describes WSF as part of a larger reform that includes five key principles.

3. ***Per-Pupil Funding*** – Funding should be allocated on a per-pupil basis and follow the child to the school of attendance.
4. ***Needs-Based Weights*** – Per-pupil funding should be based on student characteristics.
5. ***Flexibility in Governance*** – Funding should flow to the school as dollars, not staffing positions or programs, and sites should have the flexibility to implement programs focused on achieving agreed on academic targets.
6. ***Comprehensive Formula*** – Allocations should include all revenue streams: federal, state, and local.
7. ***Transparency*** – School funding systems should be simplified and be transparent to all stakeholders, both internal and external to the organization.

One of the primary differences between WSF funding models at the district and state levels is the way in which staff is accounted for. Although a few states allocate dollars on a per-teacher basis, most disperse funding on a per-student basis. However, because of cost pressures stemming from collective bargaining agreements, most school districts allocate staff centrally or charge sites on the basis of districtwide average salary costs instead of actual salary costs attributed to the staff employed at each school. In general, few districts provide principals with flexibility in hiring decisions. This lack of hiring flexibility at the school site can lead to inequities in both qualifications and actual per-pupil spending on teaching staff across schools (see Miles & Roza, 2006; Haxton et al., 2012; Baker & Corcoran, 2012).

Weighted Categories and Magnitudes

The proceedings of the Fair Student Funding Summit (Education Resource Strategies, 2010) identified the following six key questions that should be asked in determining weights:

- Who or what should be weighted? (What characteristics best represent student needs, and what other characteristics, such as school size, deserve to be weighted?)
- What weighting gradations should be included within those characteristics (e.g., special education cognitive disabilities, time spent in an ELL program)?
- What should the weights be?
- Which student group(s) should represent the base (1.0) weight?
- Who should develop the weights?
- Which district standards, represented through weights, are nonnegotiable?

When reviewing weighted systems in districts across the country, we find that there are many commonalities among weighted categories and that they are primarily within the three cost factors described earlier (student needs, scale of operations, and geographic differences in resource prices). The only additional area that surfaces is a per-pupil allocation or subsidy for special programs, such as vocational education programs. Exhibit 3.5 presents a summary of the various weighting factors—student need and other cost adjustment factors commonly used across school districts across the nation. We describe each of these weighting factors in turn later.

Exhibit 3.6 – Weighting Factors in District Weighted Student Formulas (WSFs)

Weighted Factors	Baltimore[a]	Chicago[a]	Cincinnati[a]	Hartford[a]	Hawaii[c]	Houston[a]	New York City[a]	Oakland[a]	Poudre[b]	San Francisco[a]	Seattle[a]	St. Paul[b]
Student Characteristics												
Students with Disabilities or Eligible for Special Education Services	X	X	X	X		X	X			X	X	X
Low Income	X	X	X		X	X	X	X	X	X	X	X
Low Achievement	X		X	X			X					
Gifted and Talented, High Achievement	X			X	X	X			X			
ELLs		X	X	X	X	X	X	X	X	X	X	
Grade Levels		X	X	X	X	X	X	X	X	X	X	X
Other			Preschool Disabilities		Transient Students	Mobility	Transfers					
School Characteristics												
Geographic Isolation					X				X			
Small Schools and Enrollment		X		X		X			X		X	
Other			Career Path Participation			Vocational Education	Collective Bargaining Increases, Career and Technical Education, Portfolio Schools					

Sources: (a) 2010 *Fair Student Funding Summit: Conference Proceedings and Recommendations for Action* (Education Resource Strategies, 2010); (b) 2009 *Weighted Student Yearbook* by the Reason Foundation (Snell, 2009); and (c) Fiscal Year 2012–13 WSF Details of Weighting Factors for Official Enrollment Count Allocation downloadable at http://reach.k12.hi.us/empowerment/wsf/2012-2013/FY2012-13%20WSF%20Detail%20of%20Weighting%20Factors%20for%20OEC%20Allocation.pdf.

Student Needs

As mentioned earlier, student needs cost factors account for the additional costs associated with pupil characteristics that necessitate additional or specialized services. There are several common student needs characteristics that districts employing a WSF address through weighted and categorical measures:

- Students in specific grade or schooling levels (elementary, middle, or high)
- Students from low-income families
- ELLs
- Students not meeting educational targets
- Gifted and talented students
- Students with disabilities who are eligible for special education services

Grade level and poverty are the two most widely used weighting factors. Some districts have added weights to only certain grade spans, such as elementary school, to help cover the costs of smaller class sizes, whereas others have differentiated funding across all grade spans, sometimes forming up to five categories, as in San Francisco (Kindergarten, 1–3, 4–5, 6–8 and 9–12). Ranges of the relative weights across grade spans vary widely from district to district. Educational Resource Strategies (2010) report that some WSF districts did not weight by grade span at all (Houston) and others with quite differentiated relative weights across grade spans (e.g., in Hartford the weights were as follows: Kindergarten = 0.85, grades 1–3=1.20, grades 4–6 = 1.00, grades 7–8 = 1.10, and grades 9–12 = 1.30).[17]

Relative weights for poverty varied widely as well across the WSF districts investigated by Education Resource Strategies, with weights ranging from 0.05 in Cincinnati to 0.24 in New York City. Weighted systems that include poverty use this student characteristic as a proxy for addressing student need that is correlated with student outcomes, such as academic achievement and graduation rates. For instance, Denver uses poverty, as measured by eligibility for the FRPL, to allocate dollars to students deemed at risk of not meeting achievement targets, as well as an additional weight for the cost of specialized services such as nurses, counselors, and school psychologists. Denver also adds an additional weight for schools with a higher concentration of students in poverty by providing a per-pupil adjustment for schools that meet the threshold of being Title I eligible.

Including relative weights for ELL students is also quite common with seven of the nine WSF districts investigated by Educational Resource Strategies employing this type of adjustment. Again, the size of the relative weights varied widely depending on district, proficiency level of ELL student, and grade level ranging from 0.0561 for advanced English learners in San Francisco to 0.50 for grade 6–12 English learners in New York City.

---

[17] A summary chart that documents all of the funding weights across the WSF districts investigated by Education Resources Strategies for the 2010 Fair Student Funding Summit can be found online at http://www.erstrategies.org/cms/files/838-wsfsummarycharts.pdf.

Districts sometimes also use *low achievement* or *high achievement* as weighting factors. However, using a weight for low achievement poses possible problems arising from a disincentive for improving achievement of students. Districts such as Hartford include a weight for *high achievement* (0.10) as well to incentivize achievement and offset problems caused by the *low achievement* weights (0.05 and 0.10 for students that are below and well below proficiency, respectively). Baltimore and Houston are other examples of districts in which students with advanced academic need or identified as gifted and talented, respectively, receive additional funding weights (0.45 in Baltimore and 0.12 in Houston).

Some districts have been hesitant to include special education (SPED) among their weights because of the complexities in serving students in this program and the legal and regulation requirements associated with these funds. WSF districts that have included SPED program funding have done so slowly or only in limited ways. Weights assigned for SPED usually include different levels of funding related to the severity of the disability (mild, moderate, severe), such as in Hartford, or the restrictiveness of the program (in a self-contained versus mainstreamed classroom environment), such as in San Francisco. The weights range from 0.0097 in San Francisco, where the allocations are for professional development and supplies only, with all other costs managed centrally, to 5.25 for the most severe in Seattle, where staffing is included. Clearly, in circumstances in which there are large differences in the weights for student characteristics, the underlying rationale largely hinges on whether staffing costs are supposed to be covered by the formula.

Scale of Operations

Scale of operations cost factors include geographic and population characteristics of a school district, including enrollment (students served by a district), geographic isolation, and student population density (district enrollment divided by the area of a district in square miles).

Two of the school WSF districts listed in Exhibit 3.6 allocated funding by using weights based on geographic isolation. These districts (Hawaii and Poudre, Colorado) have rural schools where low population density can add to their operational costs, such as through increased transportation costs. Five of the WSF districts included weighting factors that account for the additional costs (diseconomies of scale) associated with operating small schools.

Other Programs

Four of the districts prioritized particular programs and allocated funds on the basis of participation in such programs, such as career path participation (Cincinnati), vocational and career and technical education (Houston and New York City), and portfolio schools (New York City).

Policy Considerations

WSF systems are linked with many other policy considerations and, therefore, necessitate in-depth study and the understanding that implementation of these formulas is an iterative and dynamic process. In concluding this review of state and district funding systems, we would like to highlight several policy considerations.

Autonomy

In 2010, educational leaders from nine districts that enacted WSF in various forms gathered to share key lessons and issues that have emerged through the implementation of WSF. This conference, called the "Fair Student Funding Summit," was organized by Education Resource Strategies. The nine school districts in attendance identified several key issues, one of which was the "balancing of principal autonomy with district oversight." Three approaches to autonomy were described:

- *Autonomy for All:* This strategy sets the starting point as flexibility for all sites where failure to meet accountability targets results in the loss of flexibility. A benefit of this approach is increased innovation that might result from the varied perspectives of principals and stakeholders. However, caution is needed due to the possibility of autonomy outrunning the capacity of the school leaders.
- *Earned Autonomy:* This strategy starts off more restricted, offering flexibility only to schools that have already demonstrated high performance. A benefit of this approach is the continued support of effective practices and differentiation across levels of capacity. However, this approach might cause principals to be more conservative in their approach and not risk failure through more aggressive or innovative reforms.
- *Tiered Autonomy:* This strategy combines measures of capacity, performance, and growth into a defined matrix for determining levels of flexibility. The benefit of this approach is the ability to reward *growth* and performance with autonomy and match support and guidance with particular needs associated with student performance or internal capacity.

Programs to Include

Not only is it necessary to determine *whether* to offer autonomy and to *whom*, but it is important to consider *what* programs and services. The assumption in offering autonomy in programming decisions at the local level is that those closest to the students (parents, teachers, principals, staff, and community members) are in the best position to match programs with the needs and priorities of the local community.

There are three considerations when deciding on which programs to include. First, principals may not want autonomy for everything. For example, principals may want to focus on decisions related to instructional programming and leave decisions related to utilities and the maintenance of buildings to the district. Second, there are also economies of scale to consider for decisions regarding the purchase of instructional materials, distribution of testing materials, and technology and software purchases, which have generally lower unit cost when purchased in large volumes. And third, there are districtwide priorities that may necessitate centralized management for the sake of consistency. For example, common benchmark assessments and standards across all schools are necessary to maintain an accountability system and establish common high expectations.

Exhibit 3.7 provides an overview of the resources that were under control of schools in the WSF districts investigated for the 2010 Fair Student Funding Summit (see Educational Resource Strategies, 2010). The overview shows a wide variety of resources related to staffing, services, materials, and supplies that were placed under school control in each district. It is likely that underlying each district's decisions about which resources to place in school control were thoughtful deliberation and planning on the part of the central office that involved input from school site leadership.

Exhibit 3.7 – Overview of School Controlled Resources Across Districts That Have Implemented a WSF

	Baltimore	Cincinnati	Denver	Hartford	Houston	New York City	Oakland	San Francisco	Seattle
Elementary School Homeroom Teachers									
Secondary School Core Subject Teachers	X	X	X	X	X	X		X	X
ELL Teachers	X	X	X	X	X	X	X	X	X
Special Ed Teachers –Mainstreamed/Resource Room		X	X	X	X	X	X	X	X
Special Ed Teachers –Self-Contained	X	X	X	X		X			X
Special Ed 1-to-1 Aides (IEP-driven)		X		X		X			X
Instructional Coaches			X						X
Librarian	X	X		X	X	X	X		X
Pupil Services Staff	X	X	X	X	X	X	X	X	X
Counselors									
Social Workers	X	X	X	X	X	X	X	X	X
Psychologists		X	X	X	X	X		X	
Nurses & Health Services Supplies		X	X			X			
Related Services Staff (OT/PT/Speech)	X	X	X	X	X				
School Administration Staff									
Principals									
Assistant Principals		X	X	X	X	X	X	X	X
Special Ed Case Managers	X	X	X	X	X	X	X	X	X
Parent/Community Coordinators or Liaisons	X								X
Secretarial/Clerical Staff	X	X					X	X	X
Operations Staff	X	X	X	X	X	X	X	X	X
Food Services Staff (Cooks, Porters, etc.)									
Maintenance Staff (Plumber, Electrician,)									
Custodial Staff (Custodians, Cleaners)									
Security Staff (Guard, Sentries, etc.)	X			X			X		
Technology Support Staff (IT Support, Help Desk, etc.)	X	X		X			X	X	
Transportation Staff (Drivers, Attendants, etc.)								X	
Staff Overtime or Substitutes									

Note: While resources are controlled by schools under WSF, they are still subject to federal, state, and local regulation, as well as collective bargaining agreements.
Source: Adapted from Fair Student Funding Summit summary charts, Education Resource Strategies (available for download at http://www.erstrategies.org/cms/files/838-wsfsummarycharts.pdf).

Exhibit 3.7 – Overview of School Controlled Resources Across Districts That Have Implemented a WSF (continued)

	Baltimore	Cincinnati	Denver	Hartford	Houston	New York City	Oakland	San Francisco	Seattle
Short-Term Substitutes									
Long Term Substitutes	X	X	X	X	X	X	X	X	X
Overtime for Instructional Staff		X				X			X
Overtime for Administrative/Maintenance Staff	X	X	X	X	X	X	X	X	X
Extracurricular Supplements	X	X	X	X	X	X	X	X	X
Other Extra-Duty Supplements	X			X	X	X	X		X
Staff Development	X	X	X	X	X	X	X	X	X
Release Time for Staff Development Activities									
Travel Expenses for School Personnel	X	X	X	X	X	X	X	X	X
Fees and Expenses for Speakers and Consultants	X	X	X	X	X	X	X	X	X
Staff Development Supplies and Materials	X	X	X	X	X	X	X	X	X
Instructional Supplies and Services	X	X	X	X	X	X	X	X	X
Computer Hardware									
Computer Software/Instructional Technology	X	X	X	X	X	X	X	X	X
Extracurricular/Athletic Supplies and Materials	X	X	X	X	X	X	X	X	X
Field Trips – Transportation	X	X		X	X	X	X		X
Instructional Supplies	X	X	X	X	X	X	X	X	X
Library Books and Materials	X	X	X	X	X	X	X	X	X
Testing and Assessment Materials	X	X	X	X	X	X		X	X
Textbooks	X					X			X
Admin/Operational Supplies and Services	X			X		X			X
Custodial Services and Supplies									
Maintenance Services and Supplies	X			X			X		
Office/Admin Services and Supplies	X								
Security Services and Supplies	X	X	X	X	X	X	X	X	
Transportation Services and Supplies	X	X		X			X		
Utilities									

Note: While resources are controlled by schools under WSF, they are still subject to federal, state, and local regulation, as well as collective bargaining agreements.
Source: Adapted from Fair Student Funding Summit summary charts, Education Resource Strategies (available for download at http://www.erstrategies.org/cms/files/838-wsfsummarycharts.pdf).

Use of Actual versus Average Salaries

When districts allocate dollars to schools in the place of allocating staff through FTEs, sites gain autonomy, yet there is still an issue with assigning costs to the specific staff employed at each school. Districts can choose to charge the actual salary costs of staff against school budgets or to charge based on costs determined using average salaries.

Although the use of actual salaries can lead to political and process complexities for which districts must be prepared, there are many advantages to switching from calculating costs on the basis of average salaries. The main advantage of using actual salaries when determining staffing investments is that actual salaries reflect true realized staffing costs in terms of dollars spent on the specific staff at each school. Actual salaries provide an increased level of transparency for all stakeholders, both internal and external to the organization, regarding the real costs of implementing programs and services at the school. The use of actual salaries also allows districts to directly address inequities associated with the distribution of teacher qualifications. Schools with higher concentrations of students in poverty often have more inexperienced staff and, therefore, have lower staffing costs. Under traditional staffing practices that use average salaries, these schools with lower staffing costs subsidize the higher costs of staff at schools with more affluent populations that attract more experienced, highly paid staff. The use of actual salaries unmasks this inequity and allows the sites with less experienced staff the flexibility to reinvest the monetary savings in strategies to increase capacity or provide programs targeted toward supporting high-need students. These opportunities for additional support and professional development also act as an incentive that school leaders in more challenging schools can use to attract better quality teaching staff.

Many districts continue to use average salaries because of the political and logistical complications associated with a shift to actual salaries. Principals argue that there is not a direct connection between the cost of individual teachers and effectiveness in traditional salary schedules, so schools with more senior staff would be penalized without a clear benefit for the additional cost. Principals also argue that the shift to actual salaries must be combined with increased autonomy for staffing formulas and hiring practices to be effective. Actual salaries also can lead to undesirable human capital practices, such as devaluing experienced staff and making decisions on the basis of costs and not on the basis of quality or qualifications. In a situation in which there is high turnover in staff, the use of average salaries can simplify processes. Actual staff costs, in this situation, are more volatile and less predictable, making planning difficult.

Although it is not common, some districts have attempted to switch from average to actual salaries.[18] For example, Chambers et al. (2008) investigated the adoption by Oakland Unified School District in California of a WSF (called *Results-Based Budgeting*) in which actual salaries were used. This example demonstrates the difficulties involved in such an undertaking and shows how equity can suffer when some schools pay less than the full salary expense of their staff and others pay more (as is the case when average salaries are used). Here, it was apparent that schools with a large numbers of veteran teachers on their rosters (who were guaranteed

[18] Specifically, of the nine WSF districts investigated under the 2010 Fair Student Funding Summit, only one made a complete switch to actual salaries (Oakland), whereas Houston and Seattle both applied actual salaries for staff supported by special funds and grant funding, respectively. Denver was also reported as piloting the use of average salaries.

placement at these schools through the collective bargaining agreement) would not be able to cover their staffing costs. Therefore, to make the move to actual salaries, a veteran teacher subsidy was provided to these schools, with an eventual phase out across several years. Although it was necessary to implement the subsidy, the report authors clearly show that the policy also undermined the intention of RBB. Specifically, similar to a system using average salaries, principals at schools receiving the teacher veteran subsidy (which tended to be lower poverty) no longer were facing the full salary expense of the staff at their schools, and these excess costs had to be covered by drawing from the district pool of dollars available to all schools (i.e., the distribution of dollars across schools under RBB was, as in any WSF, a zero-sum game). Through empirical analysis, the study showed that the full increase in equity resulting from RBB was not realized because of the use of the veteran teacher subsidies. Specifically, it showed that the relationship between per-pupil spending and student poverty (i.e., the extent to which higher poverty schools had higher spending per pupil) would have been stronger without the veteran teacher subsidies in place.

Establishing the Central Office Service Economy

When decentralization of decision making is coupled with weighted funding initiatives, as it often is, then a necessary shift in the role of the central office must take place. As increased amounts of programming and staffing decisions are taking place at the school site, the role of the central office must shift to a supporting role. This shift requires changes in the culture and staff roles. The most obvious shift is in providing additional assistance to schools in budgeting and staffing decisions and processes, which is often an area in which principals have the least expertise. Although training and capacity building are necessary, reorienting centralized staff roles to support school sites in understanding and developing their own budgets, as opposed to completing the work themselves, is necessary. The educational services staff is another area in which a considerable shift in roles must take place. For example, the central office staff must shift their role to one of offering advice to and monitoring of individual schools as opposed to deciding on best practice for the district as a whole. Extensive training and the redefinition of roles at the central office are necessary for this shift in culture toward a service mindset.

Conclusion

Greater efficiency, transparency, innovation, and equity are all desirable outcomes that are associated with the implementation of the WSF (Education Resource Strategies, 2010). Although the particulars of state and district decisions regarding weights and factors vary, there is a growing number that have either implemented or are considering weighted funding initiatives.[19] Included in the weighting factors are student characteristics associated with vulnerable populations that have a history of underperforming academically (e.g., ELLs, students in poverty). One of the aims of a more equitable funding system would be to provide the resources for districts and schools to address these achievement gaps. Weighted systems, by providing a predictable formula for the allocation of dollars and consolidating funding streams, also significantly increase system transparency. In addition, recent economic constraints and pressures for increased achievement for all students and the desire to close achievement gaps

[19] For instance, Colorado recently passed legislation that will institute statewide weighted student funding (Engdahl, 2013), and there are major efforts under way to implement a similar system in California (Ujifusa, 2013).

have highlighted the need to implement funding practices that improve both the equity with which funding is distributed and the efficiency with which it is used. A WSF approach allows states and districts to address equity even in a time of inadequate resources.

A second issue related to but not required of WSF is decentralization. Decentralization can provide many benefits, including increased innovation, more authentic stakeholder engagement, and specialization of programs designed for a targeted group of students. Although economies of scale provide benefits for some decisions to be made by central management, innovation can be fostered through programming linked to the unique characteristics of a district or school's population. Decentralization provides the process by which those closest to students can make tailored decisions for the use of monetary resources. The more decisions that are placed in the hands of local communities, the more authentic the collaboration can be between external stakeholders (e.g., parents) and internal stakeholders in the educational system.

The HIDOE has chosen to combine these two initiatives of WSF and decentralization and may be benefiting from the effects listed earlier. Because of Hawaii's unique role as both a state and a district, the HIDOE has included aspects of WSF and decentralization that are similar those assumed by both states and districts. As shown in the previous chapter, Hawaii's WSF is comprehensive in that it addresses many student and school characteristics commonly used in other funding systems, allocates a significant amount of funding through the formula, and empowers stakeholders through the COW at the state level and the SCC at the school level.

Chapter 4 – Principal Attitudes and Perspectives Surrounding Hawaii's WSF

Background and Purpose

As mentioned in the introduction, Hawaii's WSF was implemented to achieve the following key goals:

- Empowerment of principals and school communities with greater decision-making authority over the use of funds allocated to the school, which allows for increased accountability for principals.
- Streamlining the allocation of resources to schools.
- Increased transparency and equity in allocation of resources.

As part of the evaluation of the implementation of the WSF and its effectiveness in meeting these goals, the AIR team administered an online a survey to all public school principals (excluding charters) in the state to measure attitudes and perspectives about the WSF. The perspective of school leaders is particularly important to assess if the intended goals of the WSF are being realized at the school level. The survey was designed to address the following topics:

- The extent to which principals feel they have real autonomy concerning resource allocation decisions;
- The extent to which and ways in which the WSF has led to innovative instructional programs in schools (i.e., promoting a culture of innovation and efficiency);
- Principal perspectives on the equity with which WSF resources are allocated to their schools;
- Principal perceptions about the sufficiency of WSF funding (overall and relative weights) for students with varying needs and for school operations;
- The appropriateness of the approved formula for the 2012–13 and 2013–14 school years to meet student needs;
- Principals' understanding of how the WSF is applied to determine schools' allocations;
- The extent to which principals feel they are held accountable for student results;
- The extent to which principals involve School Community Councils (SCCs) and faculty in resource allocation decisions at the school site.

Description of Survey Respondents

The draft survey was pilot tested with three individuals identified by HIDOE and then after minor modifications was administered online from February 5–28, 2013. The final response rate was 83 percent, or 210 of the 252 principals who were administered the survey. Exhibits 4.1 and 4.2 describe the distribution of the respondent principals' experience, both as a principal at any school and as a principal at his or her current school.

Exhibit 4.1 – Total Prior Years of Experience Serving as Principal

	Frequency	Percentage	Cumulative
0–4 years	94	44.76	44.76
5–9 years	51	24.29	69.05
10–14 years	36	17.14	86.19
15+ years	29	13.81	100.00
Total	210	100.00	

Exhibit 4.2 –Prior Years of Experience Serving as Principal at This School

	Frequency	Percentage	Cumulative
0–4 years	132	62.86	62.86
5–9 years	44	20.95	83.81
10–14 years	24	11.43	95.24
15+ years	10	4.76	100.00
Total	210	100.00	

The schools whose principals responded to the survey were categorized along the following dimensions:[20]

- *Geographic isolation*: 202 not geographically isolated, 7 geographically isolated
- *Location*: 139 Oahu, 70 Neighbor Island
- *School Level*: 140 elementary, 33 middle, 24 high, 12 mixed
- *School Size*: Within each school type (elementary, middle, and high) split into three equally sized groups on the basis of total enrollment and labeled as small, medium, or large
- *Percentage Free or Reduced-Price Lunch*: Split into three equally sized groups on the basis of the percentage of students eligible for free or reduced-price lunch and labeled as low, medium, or high
- *Percentage ELL*: Split into three equally sized groups on the basis of the percentage of English language learner students and labeled as low, medium, or high
- *Locale*: Split into four groups of different size on the basis of the National Center for Education Statistics (NCES) locale code for City (48), Suburb (79), Town (56), and Rural (26)

To investigate whether the sample suffered from nonresponse bias, we compared the principals who responded to the survey with those who did not respond across each of the categories listed.

[20] The reader will note that one principal who was surveyed could not be categorized according to school characteristics because the individual was listed as leading a brand new school opening in the upcoming school year (2013–14). Therefore, although the responses from this principal were used for the aggregate analysis, they could not be included in the more granular investigation.

The results demonstrate that the response sample is representative of the larger universe of public school principals in Hawaii. The comparisons are included in tables in Appendix 4.A.

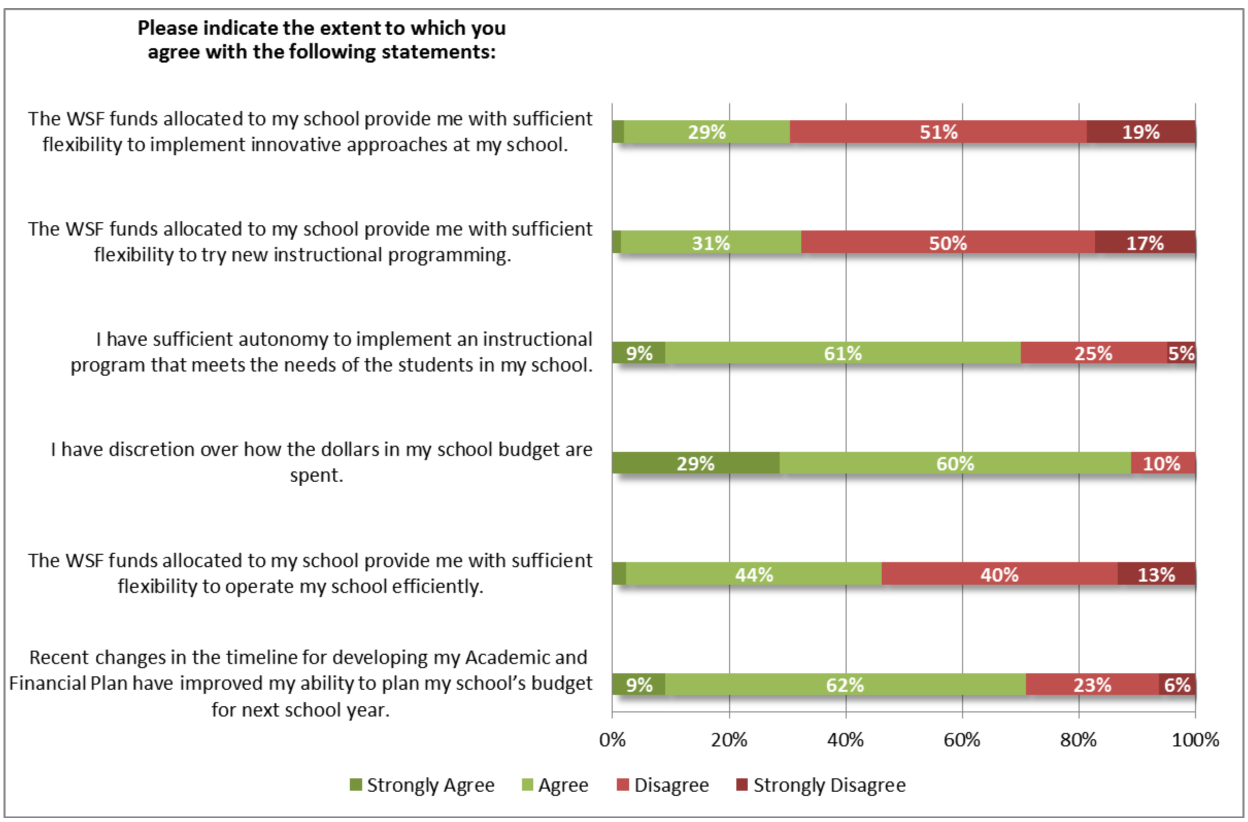
Aggregate Survey Results

This section presents the survey results for all 210 principals who completed the survey. Respondents were required to complete all questions, so there are no missing data for individual items.

- *Most principals agreed that they had discretion over how funds were spent in their schools, but fewer than one third of principals agreed they had sufficient flexibility to be innovative or try new instructional programs.*

As shown in Exhibit 4.3, principals generally agreed that they have discretion concerning how funds are spent and sufficient autonomy to implement an instructional program that meets their students' needs. In contrast, fewer than one third of principals agreed that they have sufficient flexibility to implement innovative approaches or try new instructional programming at their school, and less than half agreed they have sufficient flexibility to operate their school efficiently.

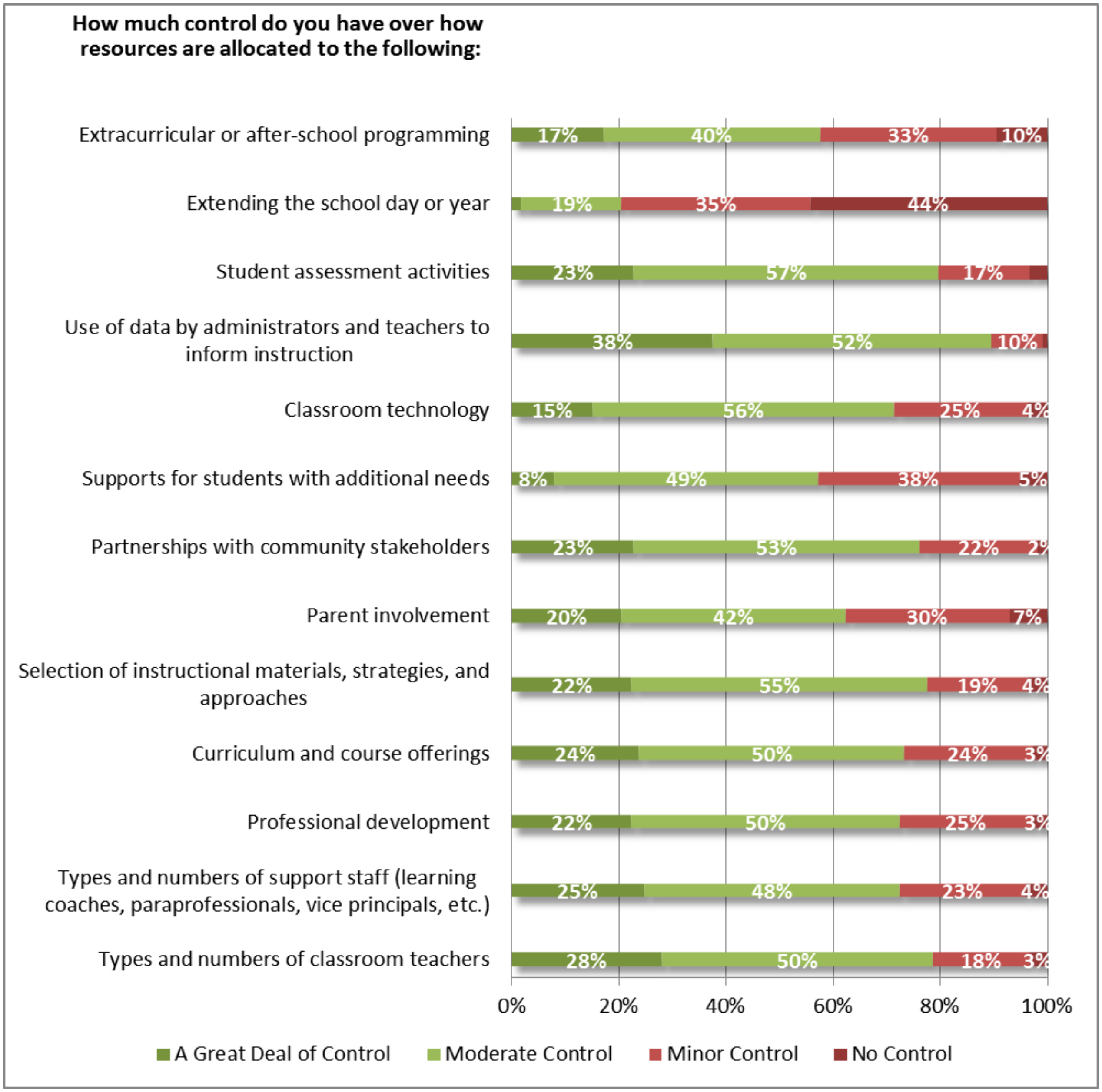
Exhibit 4.3 – Empowerment and Flexibility



- *A substantial majority of principals responded that they exerted control over a wide variety of programmatic components at their school, though fewer than one fifth indicated they had control over extending the school day or year.*

When asked how much control they have over how resources are allocated to various programmatic components at their school, around two thirds of principals generally agreed that they have control (Exhibit 4.4). The area with the most reported control was administrator and teacher use of data to inform instruction, with 90 percent of principals reporting that they had moderate or a great deal of control. At least 70 percent of principals said they had moderate or a great deal of control in all areas except for parent involvement (62 percent), support for students with additional needs (57 percent), extracurricular or afterschool programming (57 percent), and extending the school day or year (21 percent).

Exhibit 4.4 – Control Over the School's Programmatic Components

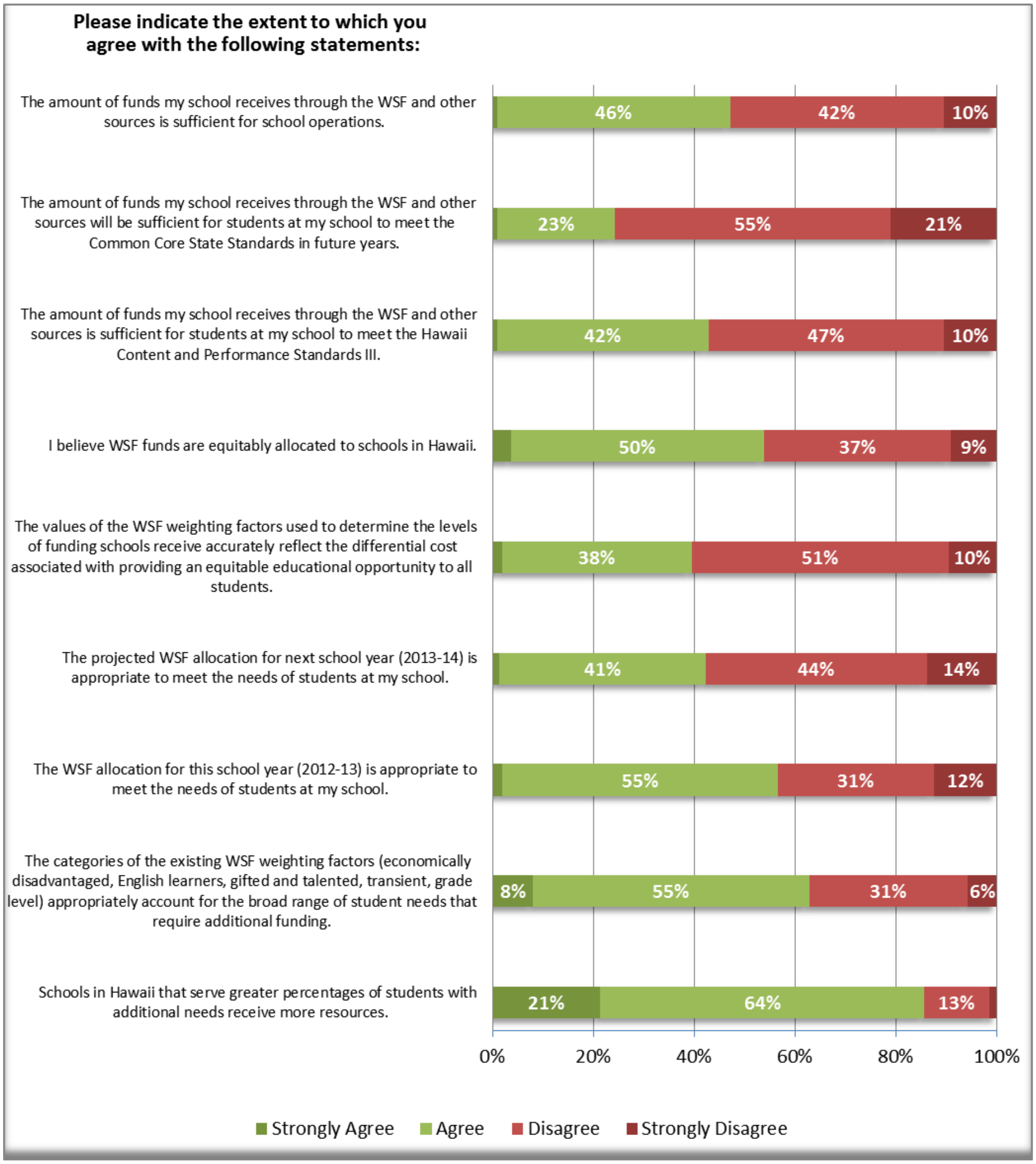


Principals were given the option of writing in an "other" category in the question shown in Exhibit 4.4 that asked "How much control do you feel you have over how resources are allocated to the following areas in your school this year?" They could also select either "no control, "minor control," "moderate control," or "a great deal of control" to correspond with their response. Fifteen principals responded to this item as follows: five wrote "staffing," either personnel or hours (all selected "no control"); three wrote "PD" (Professional Development) (one selected "no control," one selected "minor control," and one selected "moderate control"); two wrote "special education/special needs" (both selected "no control"); one wrote "physical plants" ("minor control"); one wrote "supplies" ("a great deal of control"); one wrote "contracting services" ("minor control"); one wrote "projected enrollment was low" ("minor control”); and one wrote “the school was able to get more funding during restructuring” (no rating given).

- *Most principals agreed that WSF funding is equitably allocated to schools, but they did not agree that the amount of funding is sufficient.*

As shown in Exhibit 4.5, the survey questions about resource and programmatic equity revealed that principals did not agree that the WSF provides sufficient funding. Although 85 percent of principals agreed or strongly agreed that schools that serve greater percentages of students with additional needs receive more resources, only 54 percent agreed or strongly agreed that WSF funds are equitably allocated to schools. Furthermore, only 48 percent agreed or strongly agreed that the amount of funds their school receives through the WSF and other allocations is sufficient for school operations. Principals generally reported that future allocations will be less sufficient than current allocations: 57 percent of principals agreed or strongly agreed that the WSF allocation for the current 2012–13 school year is appropriate to meet the needs of their students, and 43 percent agreed or strongly agreed that the funding from WSF and other sources is sufficient to meet the current Hawaii Content and Performance Standards III (HCPS). However, only 42 percent agreed or strongly agreed that the projected WSF allocation for 2013–14 would be sufficient, and only 24 percent agreed or strongly agreed that current levels of funding from WSF and other sources would be sufficient for students to meet the Common Core State Standards in future years. When asked about the WSF itself, 63 percent of principals agreed or strongly agreed that the existing WSF categories appropriately account for the range of student needs that require additional funding, and 39 percent agreed or strongly agreed that the values of the weights reflect the cost of providing equitable educational opportunity to all students.

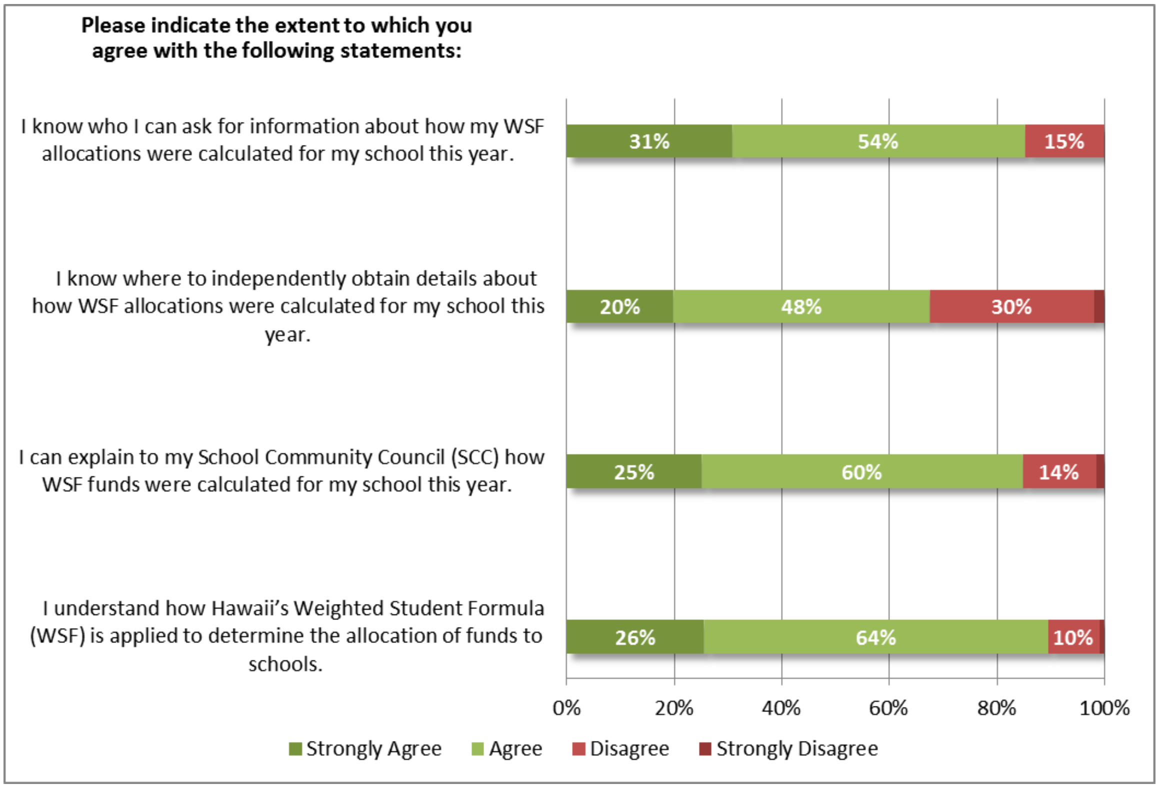
Exhibit 4.5 – Resource and Programmatic Equity



▶ *Most principals understand the WSF and know where to go for more information if they need to.*

As shown in Exhibit 4.6, most principals agreed or strongly agreed that they understand the WSF, can explain it, and know who to ask for more information if needed. Principal agreement decreased slightly as the required level of understanding in the statement increased; for example, 85 percent knew whom they could ask for more information about WSF calculations, but only 68 percent knew where to independently obtain details about how WSF allocations were calculated for their school this year.

Exhibit 4.6 – Transparency of School Funding



▶ *Principals agreed that they are held accountable for student performance, but most do not agree that the SCC is held accountable.*

Exhibit 4.7 shows that principals overwhelmingly agreed that they are held accountable for student performance by the State Board of Education, the State Superintendent, their SCC, and their Complex Area Superintendent. Eighty-six percent of principals agreed or strongly agreed that teachers are held accountable for student performance (Exhibit 4.8), and 79 percent agreed or strongly agreed that the Complex Area Superintendent is held accountable for student performance. In contrast, only 31 percent of principals agreed or strongly agreed that the SCC is held accountable for student performance.

Exhibit 4.7 – Principal Accountability

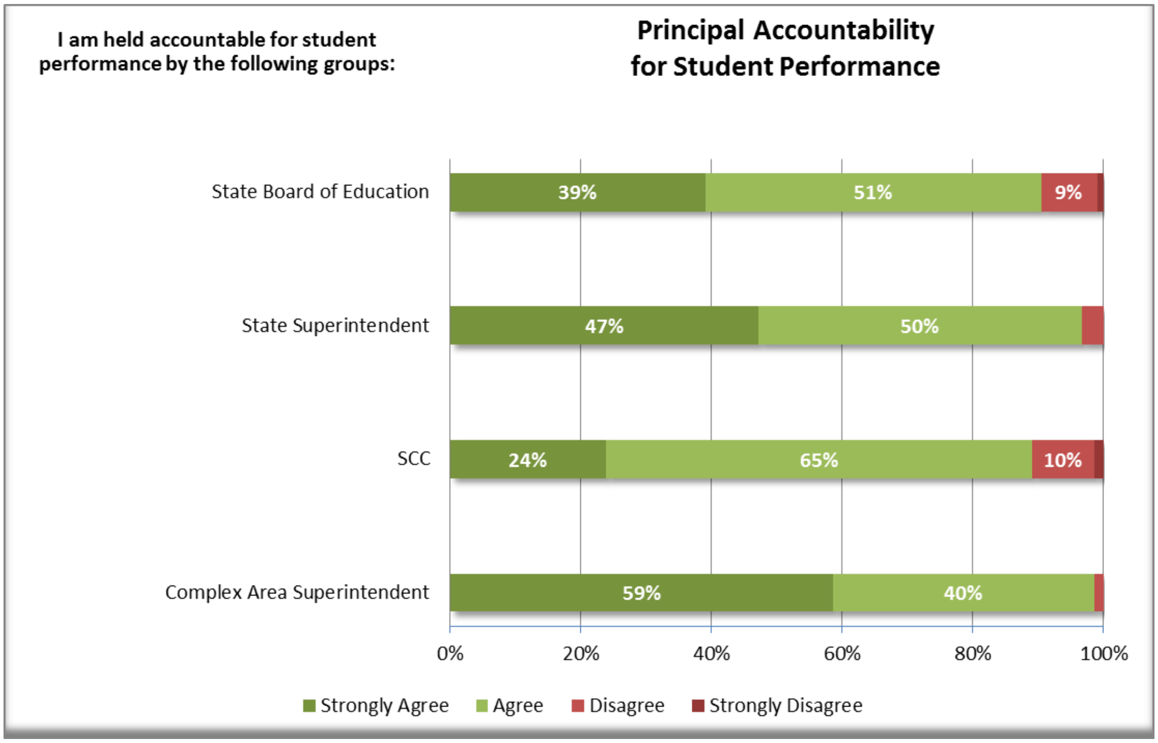
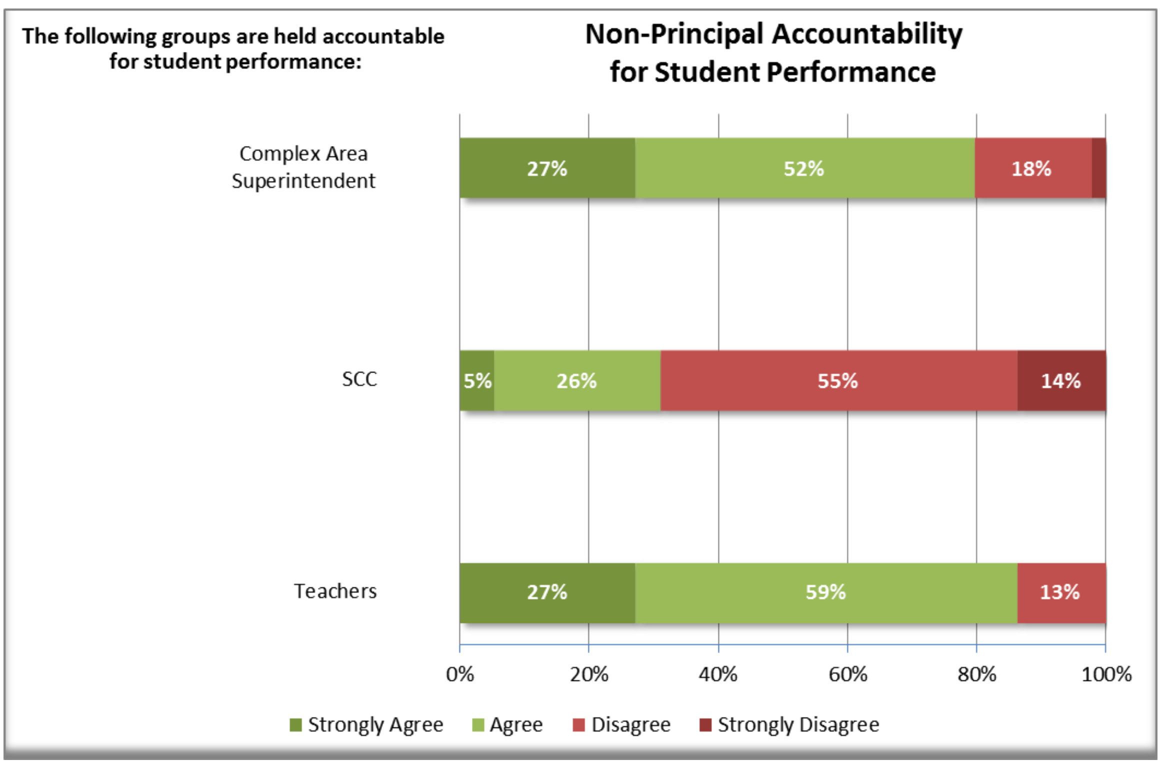


Exhibit 4.8 – Nonprincipal Accountability



► *Principals are holding regular SCC meetings, and they are communicating—and often consulting—with the SCC and with faculty about resource allocation decisions.*

When asked about the frequency of SCC meetings (Exhibit 4.9), 88 percent of principals reported that they hold between 5 and 15 meetings in the typical year, and 98 percent reported that up to 10 meetings are to develop and review the Academic and Financial Plans. Only 12 percent of principals reported that they are not complying with the rule that notice of SCC meetings be posted at least six days in advance (Exhibit 4.10).

Exhibit 4.9 – Frequency of SCC Meetings

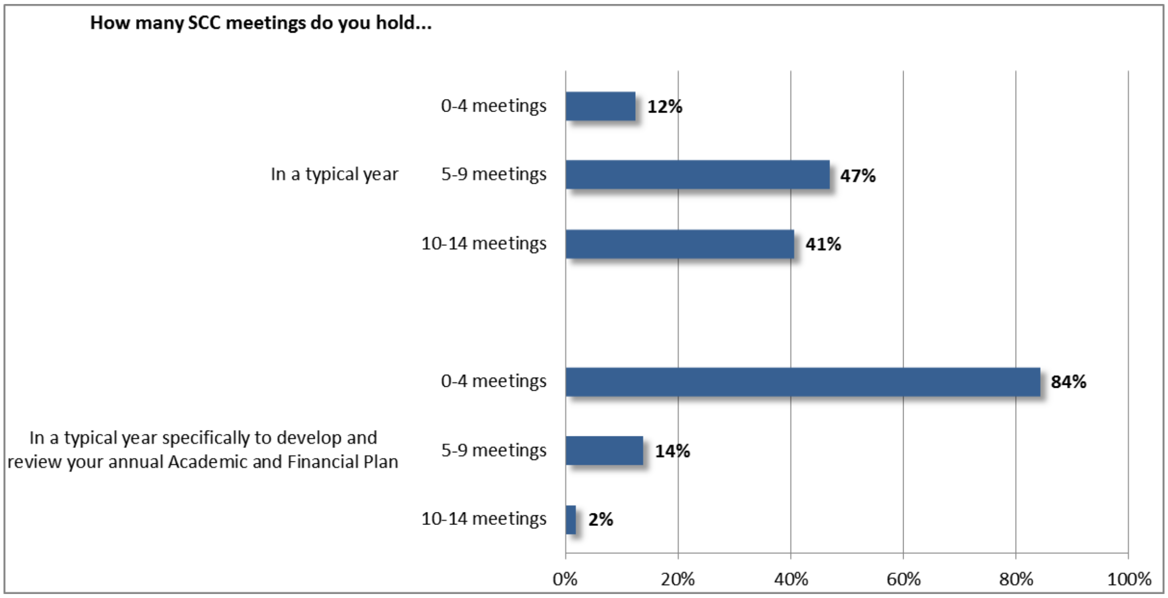
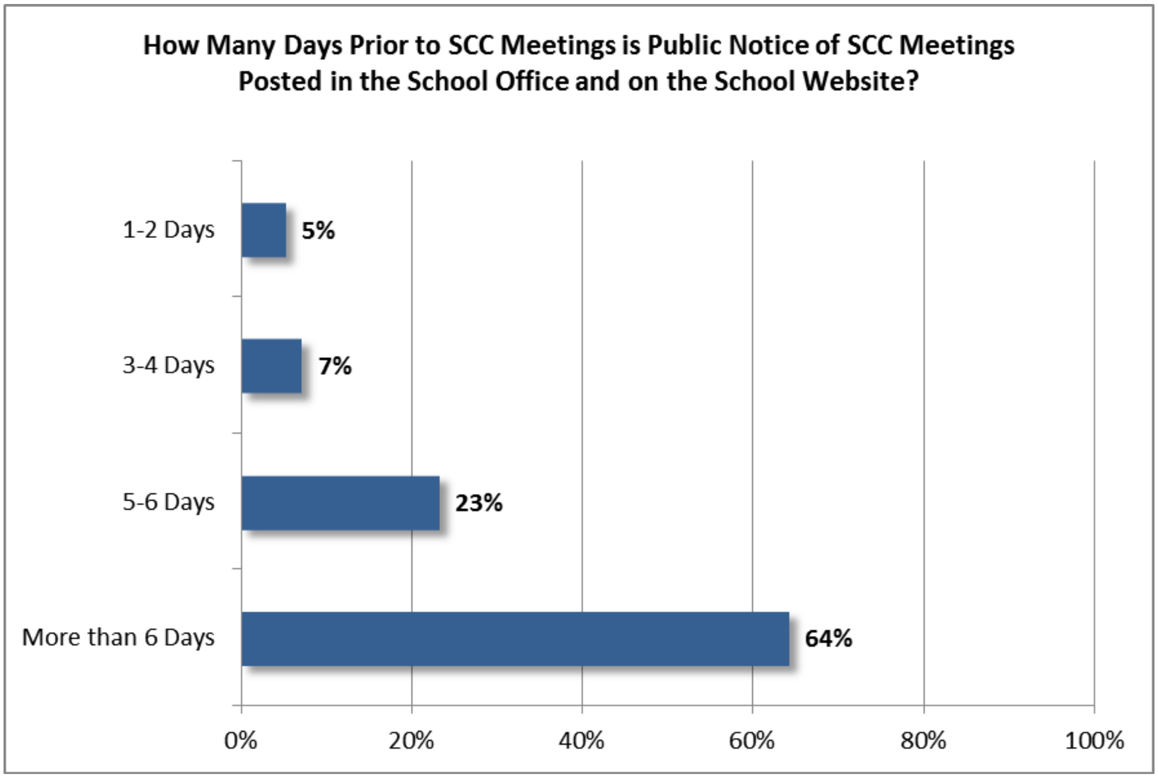


Exhibit 4.10 – Public Notice of SCC Meetings



The survey question concerning engagement between the principal and the SCC about key resource allocation decisions shows a bell-shaped pattern of responses across the varying degrees of principal and SCC engagement (Exhibit 4.11). Ten percent of principals reported that they make the final decisions together with the SCC, 40 percent of principals reported that they are in two-way communication with the SCC about key resource allocation decisions, and 33 percent reported that they consult with the SCC about key resource allocation decisions. Seventeen percent reported that they make key decisions and then inform the SCC.

Exhibit 4.11 – SCC Engagement

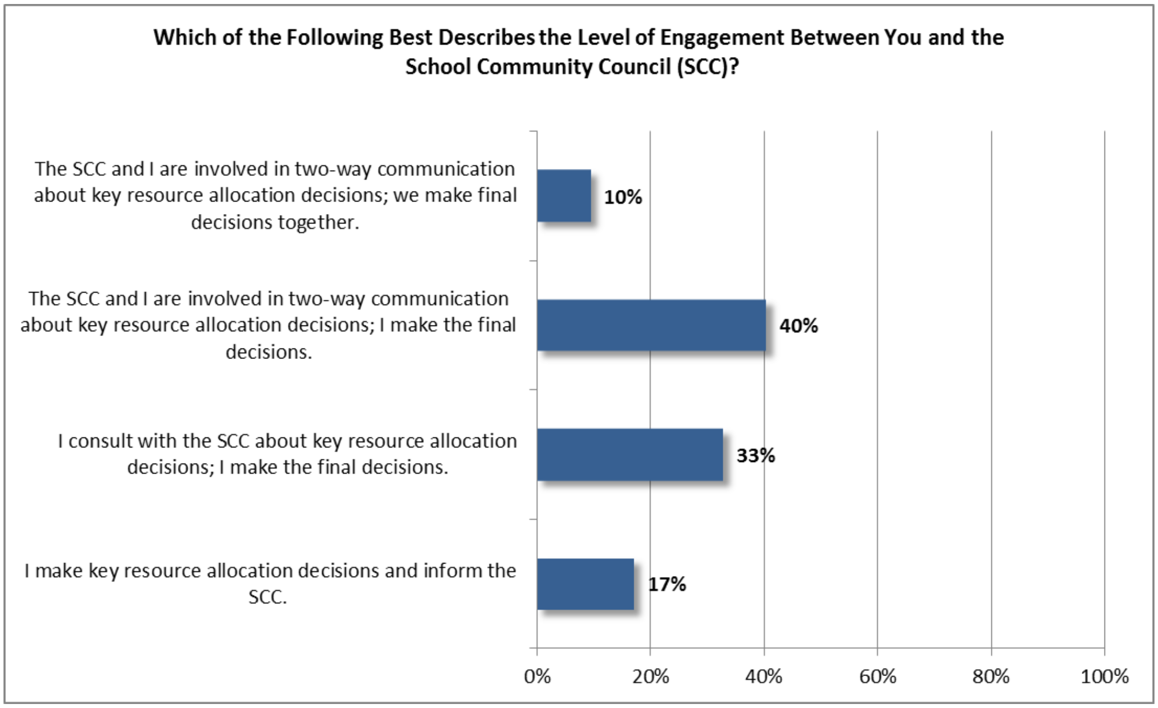
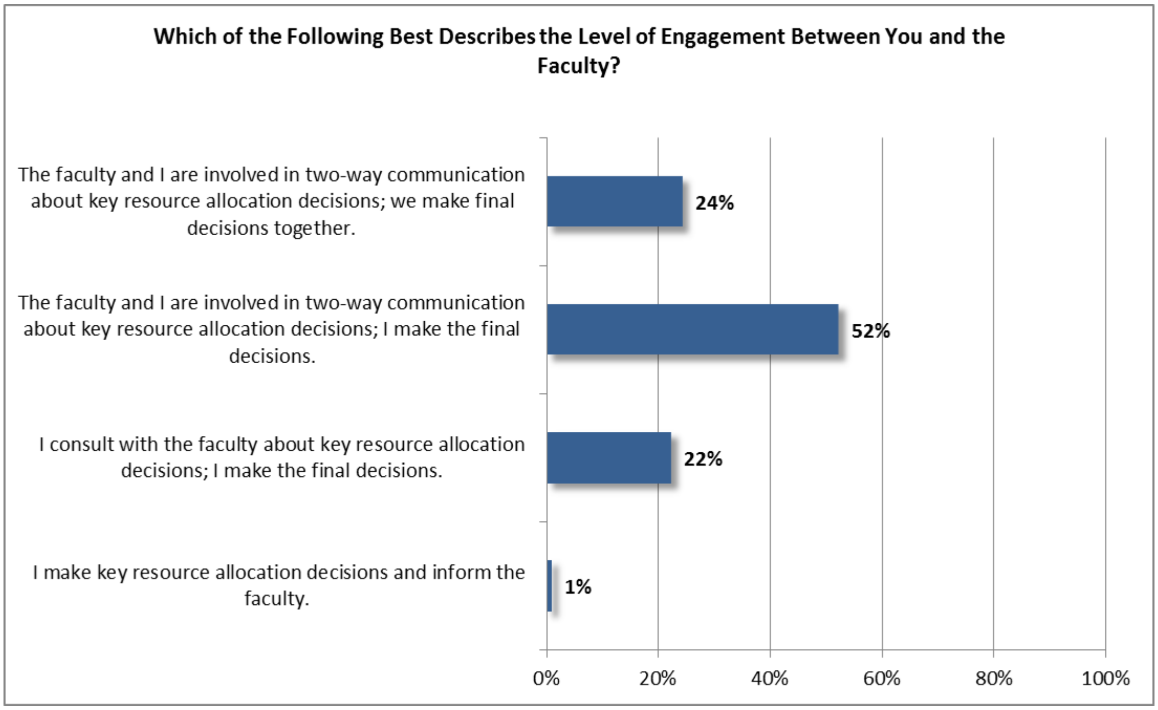


Exhibit 4.12 shows that principals are more engaged with the faculty in decision making about key resource allocations than they are with the SCCs: 24 percent of principals reported making final decisions together with the faculty, and 52 percent reported that they are in two-way communication with the faculty before making the final decisions themselves. Twenty-two percent of principals consult with faculty and then make the final decisions, whereas only 1 percent make key decisions and then inform the faculty.

Exhibit 4.12 – Faculty Engagement



Open-Ended Survey Responses

At the end of the survey, respondents were asked, "Has the WSF permitted you to design and/or implement an innovative program in your school?"

▶ *About half of principals said that the WSF has permitted them to innovate, including hiring staff, providing extra support, and implementing new programs.*

In response, 97 principals selected "yes," and 113 selected "no." Those who selected "yes" were then asked, "Can you briefly describe one example of a program you have developed that would have been difficult to implement without WSF?" and "Please tell us how you have used the flexibility provided by WSF funding to implement the program." Of the 97 principals who selected "yes," 82 filled in responses for these questions. The categories with the greatest number of responses[21] are as follows:

- Hiring staff (34 responses)
- Extra support (21): reading program (4), afterschool program (7), ELL (English language learner) (6), tutoring in math and reading (3), summer programs (3)
- New learning programs (14): AVID (Advancement Via Individual Determination) (5), technology programs (4), International Baccalaureate (2), STEM (2)
- Professional development (12): professional learning communities (3)
- Purchasing materials or devices (computers, updating technology) (3)

[21] Some principals listed multiple responses in different categories.

- Reallocate resources (moving funds from one program to another) (10)
- Part-time teachers – for extra support and to allow teachers extra PD time (8)
- Rearrange schedules (8): Saturday school (1), year-round school (1), extended school day (1), extended school year (1)
- Using grants, private funds, PTA money to support what remains or what WSF does not cover (4)

Principals who selected "no" in response to the original question were asked, "Please explain why the WSF has not permitted you to design and/or implement an innovative program in your school."

- ▶ *More than half of principals said that the WSF has not permitted them to innovate, and many cited insufficient WSF funding that supports only basic staff and operations.*

Of the 113 who selected "no," 107 filled in responses for this question. The categories with the greatest number of responses are as follows:

- WSF funding is insufficient (44)
- WSF supports only basic staff and operations (29)
- Funding problems for small or isolated schools (14)
- No or not enough flexibility (7)
- Not able to have professional development (7)
- Facing decreasing enrollment or WSF funds (6)
- Use of other funds outside WSF (6): Federal funds (5), Title I funds (3), Partnerships (3), Fundraising (e.g., by PTA) (3)
- Insufficient time to implement or gauge innovation (new to the position) (5)
- Special education (5): Inclusion or coteaching of special education children (4)
- Mandates and compliance issues (4): RTT (1), Common Core Standards (4), EES (2)
- Predicted versus official versus actual enrollment numbers (Actual enrollment differs from projected enrollment) (4): High mobility means Day 1 enrollment numbers become inaccurate (1)
- Weights and funds keep changing or are insufficient (4): PK weight (1), Middle school weight (2), Neighbor Island weight (1)

Principals were also asked, "Do you have any suggestions for how the WSF formula could be improved (e.g. additional categories or different weights)?"

- ▶ *More than half of principals suggested ways to improve the WSF, and more than one third of those suggested increasing weights or adding specific categories of student need.*

One hundred twenty-three principals responded to this question, and the categories with the most responses are as follows:

- Adjust (increase) the weights or additional money categories (47): Small schools (18), Isolated schools (14), SPED (11), Poverty (8), ELL (6), Gifted and talented (5), Middle schools (5), Low-proficiency kids (4), Mobility (3)
- More funding in WSF or in general (bigger pot of money) (15)
- Ensure any funding can cover basic staffing and operation costs (13)
- Minimum base amount for each school (by school level) (6)
- Increase funds for facility and maintenance (4)
- Resolve staffing issues (e.g., having a clerk, administrator, elective teachers, and other staff members) (4)
- More flexibility (3)
- Fund principals or vice principals outside of WSF (3)
- Travel money for Neighbor Island schools to attend PD on Oahu, Maui (3)

Finally, respondents were asked, "Do you have any suggestions for how the implementation of WSF could be improved?" Ninety-one principals answered this question, and the categories with the most responses are as follows:

- More money for WSF (11)
- More categorical positions (i.e., fund essential personnel at every school outside WSF) (8)
- More PD and training for principals and CAS (Complex Area Superintendent) (6)
- Allow more carryover funds (use them as reserve funds in case school's enrollment decreases the next year) (5)
- More flexibility (5)
- More funding for small schools (5)
- Mandates inhibiting innovation and flexibility (4)
- Have a minimum base amount for each school regardless of enrollment (4)
- Easier procurement policies (too much red tape) (4)
- Adjust timeline of Academic and Financial Plans process (3)
- Get rid of WSF (use old funding methods) (3)
- More support for isolated schools (3)
- Fund textbooks outside WSF (3)
- Use assessment scores to determine weights (3)

Survey Results by School Type

The survey data were also analyzed by school type by using the following categories defined at the start of this chapter: Oahu versus Neighbor Island, geographically isolated versus non-isolated, school type (elementary school, middle school, high school, mixed), school size within school type (small, medium, large), percentage of ELL students (low, medium, high), and percentage of free or reduced-price lunch (low, medium, high). The results from one principal are excluded from these analyses because he or she is the principal of a new school opening in fall 2013, so the sample size for all questions in this section is 209. Key findings are summarized here, with a presentation of selected graphs following. The complete presentation of the charted data can be found in the Technical Appendix.

Key Findings

1. Principals at the 70 Neighbor Island schools generally responded similarly to principals on Oahu. If anything, principals at Neighbor Island schools reported more agreement that WSF funding is sufficient and that it affords them sufficient flexibility.
2. The 12 principals at mixed schools (i.e., those not classified as elementary, middle, or high schools) reported less agreement than did other principals on survey questions related to the WSF's equity, sufficiency, and flexibility.
3. Principals at small schools—particularly small elementary schools and small high schools—generally reported less empowerment and flexibility than did principals at large schools.
4. Few differences were reported among principals on the basis of a school's percentage of ELL students or percentage of free or reduced-price lunch (FRPL) students.
5. Few differences were reported among principals on the basis of a school's location in a city, suburban, town, or rural setting.
6. Differences were found in survey responses between the principals at the seven schools deemed geographically isolated and those at the non-isolated schools (the isolated principals tended to report less agreement that WSF funding was sufficient and offered enough flexibility to allow innovation).

Isolated Schools

Far fewer principals at the seven isolated schools agree or strongly agree that WSF funds are equitably allocated to schools in Hawaii (Exhibit 4.13) or that the WSF funding for this year and next year is appropriate to meet the needs of students at their school (Exhibit 4.14). Furthermore, only 14 percent of principals at isolated schools agreed or strongly agreed that the amount of funds their school receives through WSF and other sources is sufficient for school operations, compared with 49 percent at non-isolated schools (see Technical Appendix).

Exhibit 4.13 – Resource and Programmatic Equity, by School Isolation (Part 1)

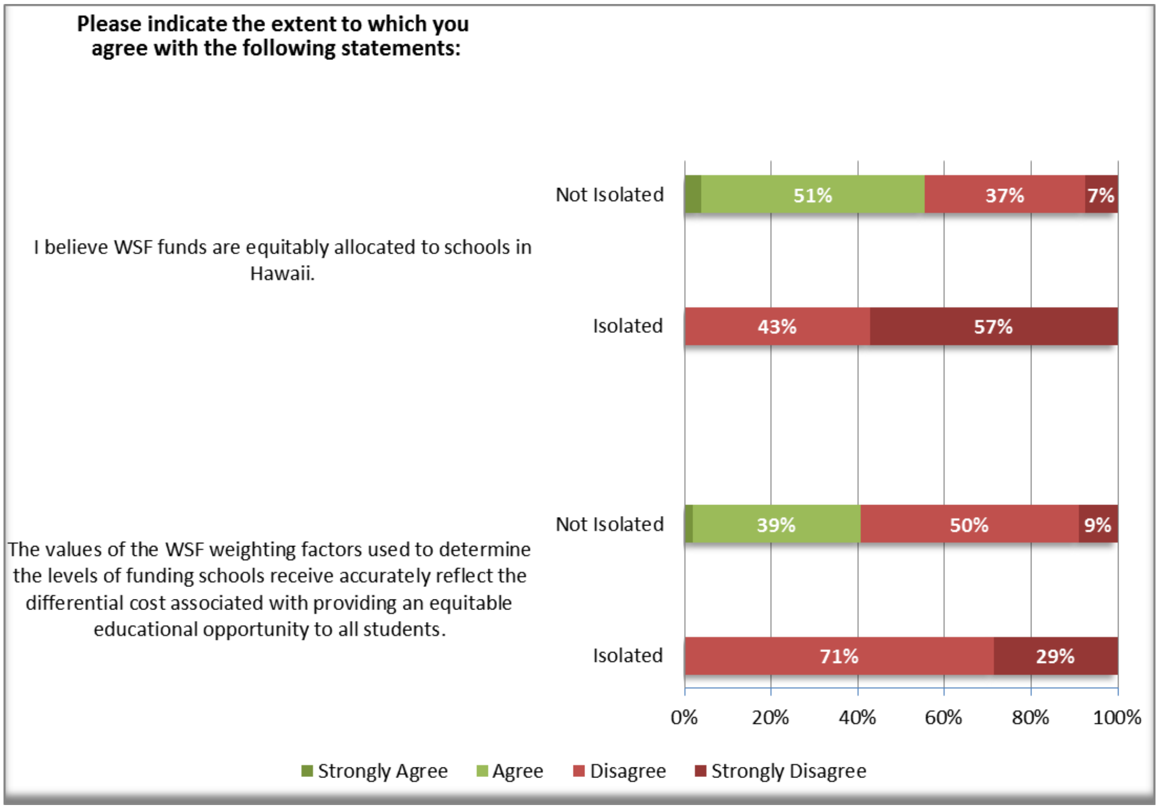
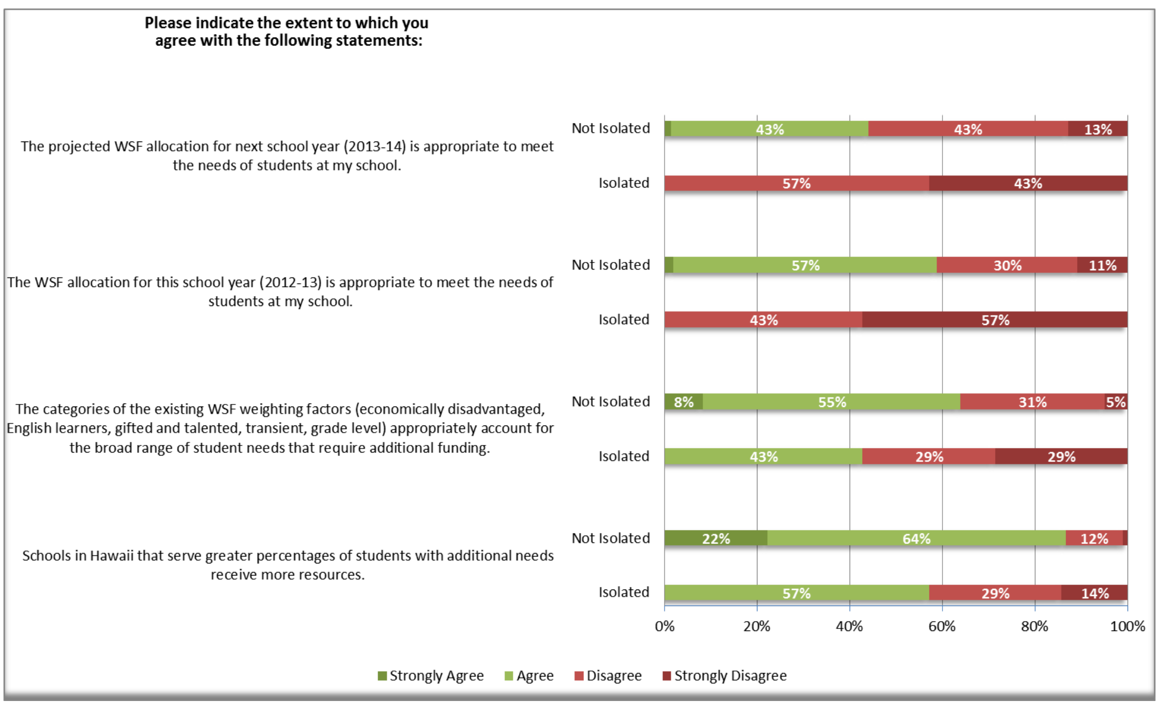
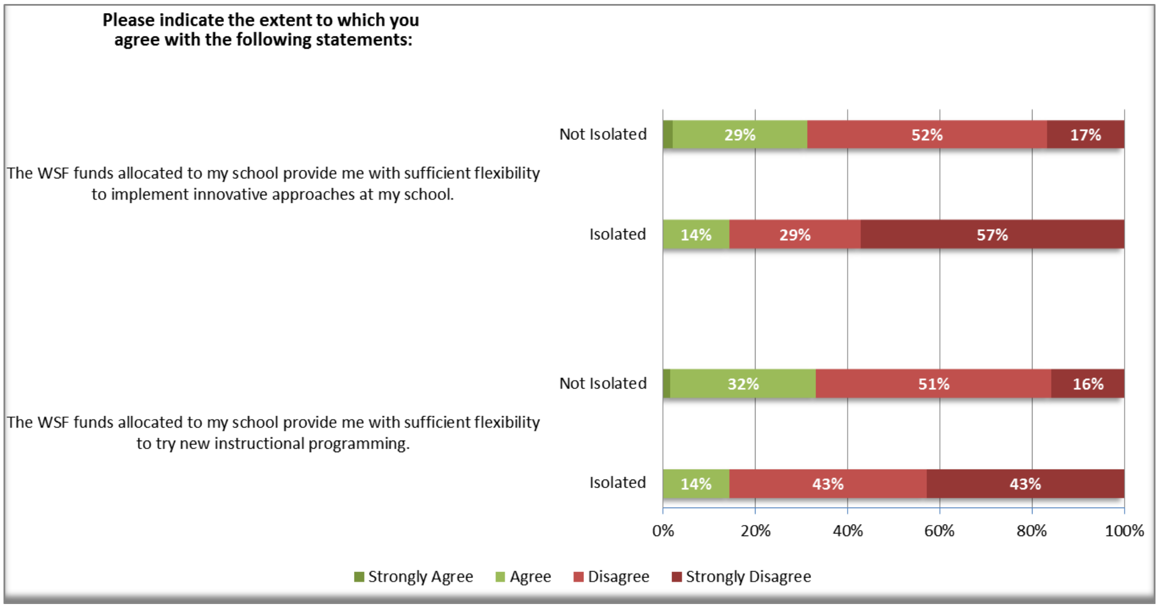


Exhibit 4.14 – Resource and Programmatic Equity, by School Isolation (Part 2)



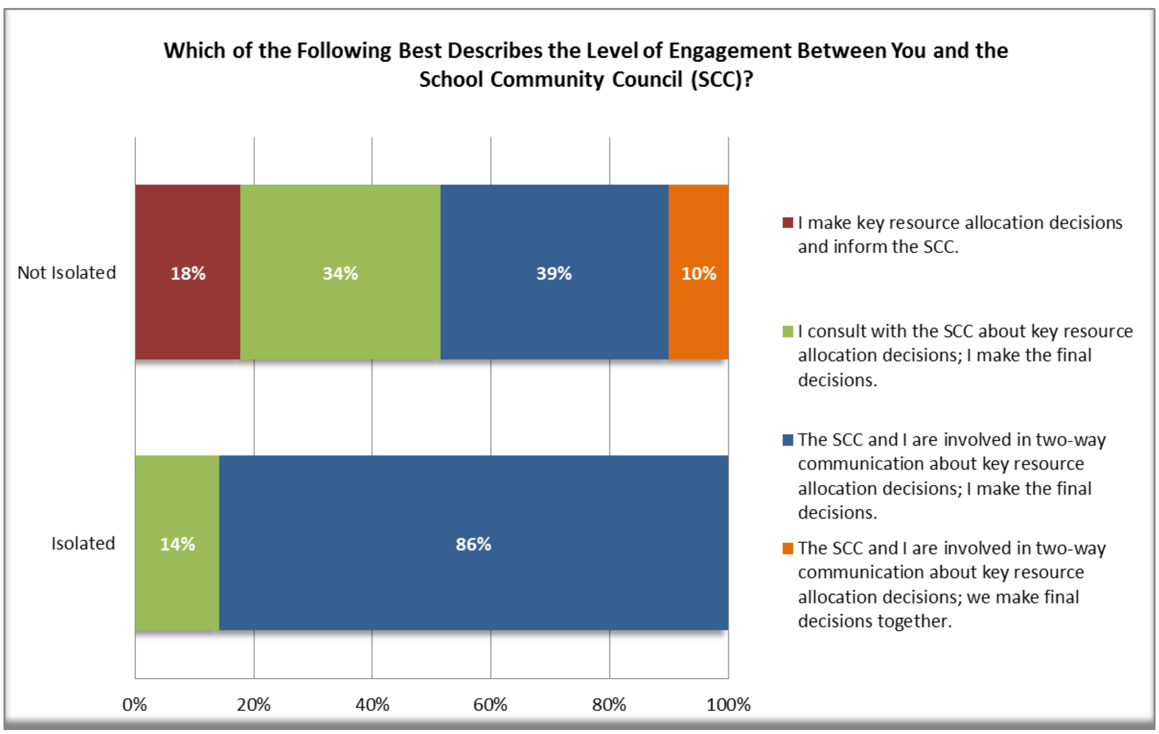
Fewer principals at isolated schools agreed or strongly agreed that they have sufficient flexibility to implement innovative approaches or try new instructional programming than do principals at non-isolated schools (Exhibit 4.15).

Exhibit 4.15 – Empowerment and Flexibility, by School Isolation



In contrast, principals at isolated schools appear to be involving their SCCs more closely in key resource allocation decisions than do principals at non-isolated schools (Exhibit 4.16).

Exhibit 4.16 – SCC Engagement, by School Isolation



Neighbor Island Schools

Principals at Neighbor Island schools and those on Oahu generally reported similar levels of agreement on the survey questions related to resource and programmatic equity (Exhibit 4.17), though fewer Neighbor Island principals agreed or strongly agreed that the amount of funds their schools receive through the WSF and other sources is sufficient for school operations (Exhibit 4.18).

Exhibit 4.17 – Resource and Programmatic Equity, by Neighbor Island Status (Part 1)

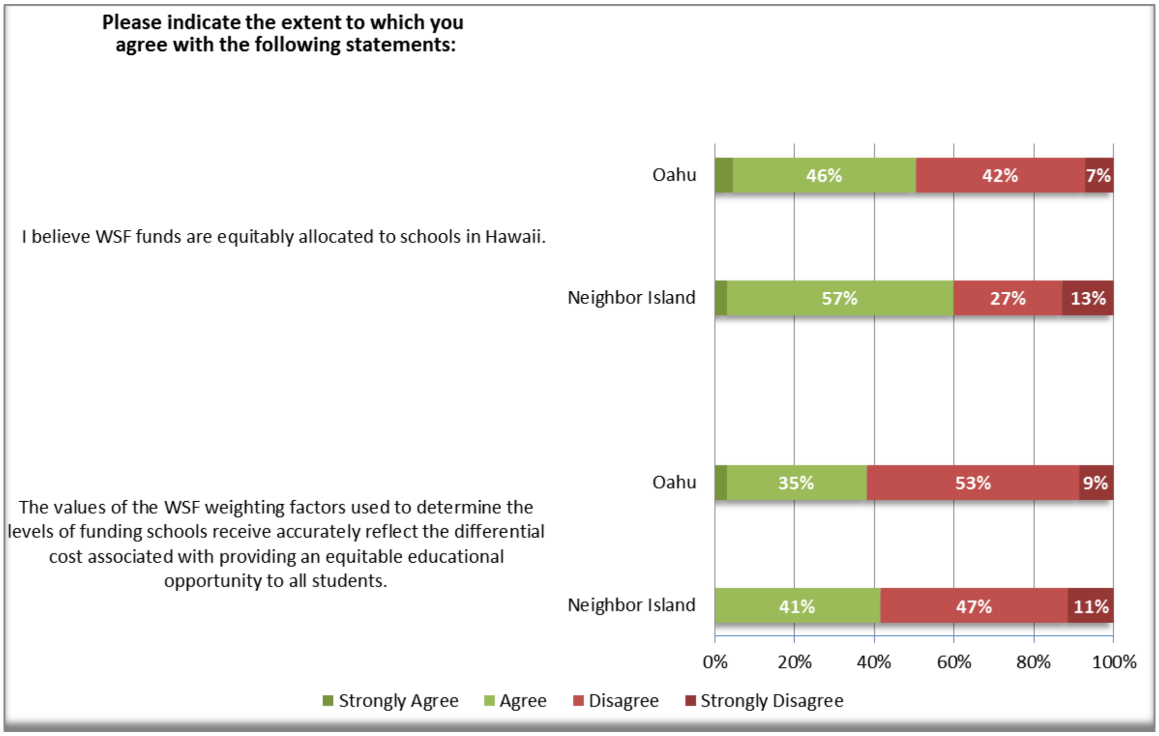
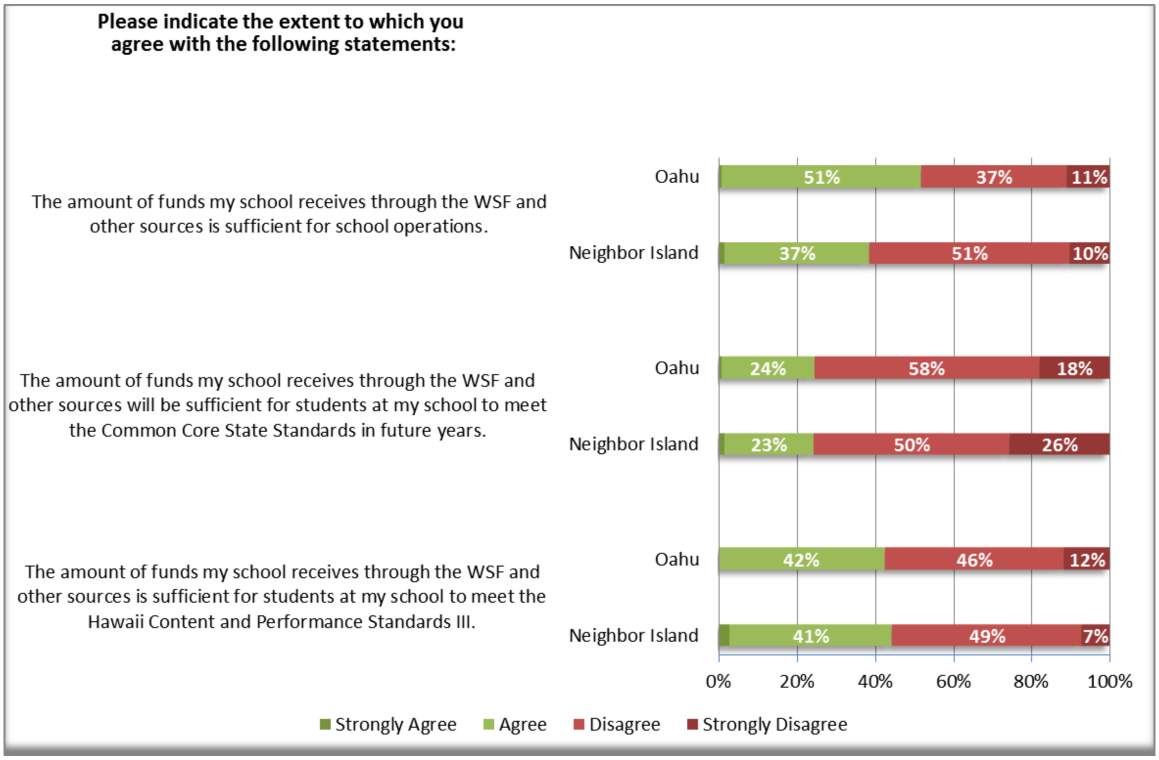
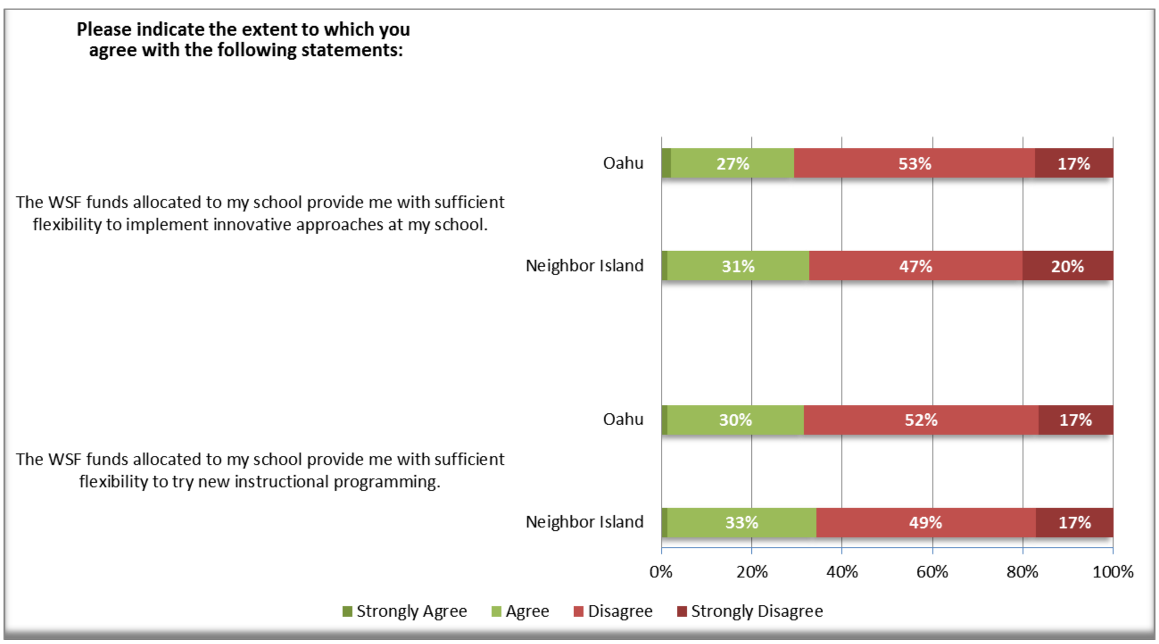


Exhibit 4.18 – Resource and Programmatic Equity, by Neighbor Island Status (Part 2)



Principals at Neighbor Island schools reported slightly higher agreement that WSF funds provide them with sufficient flexibility to implement innovative approaches and new instructional programming at their schools (Exhibit 4.19).

Exhibit 4.19 – Empowerment and Flexibility, by Neighbor Island Status



Unlike the differences between principals at isolated schools and non-isolated schools, principals at Neighbor Island schools and those on Oahu reported similar levels of engagement with their SCCs in key resource allocation decisions (see Technical Appendix).

Mixed Schools

The responses from principals at mixed schools tended to follow a different distribution than did those of principals at other schools. Only 2 of the 12 mixed schools were also classified as isolated schools, so by and large they represent a different category of principals. Mixed school principals reported less agreement that WSF funds are equitably distributed, that the weighting factors accurately reflect differential costs (Exhibit 4.20), and that the amount of funds they receive through the WSF and other sources is sufficient (Exhibit 4.21).

Exhibit 4.20 – Resource and Programmatic Equity, by School Level (Part 1)

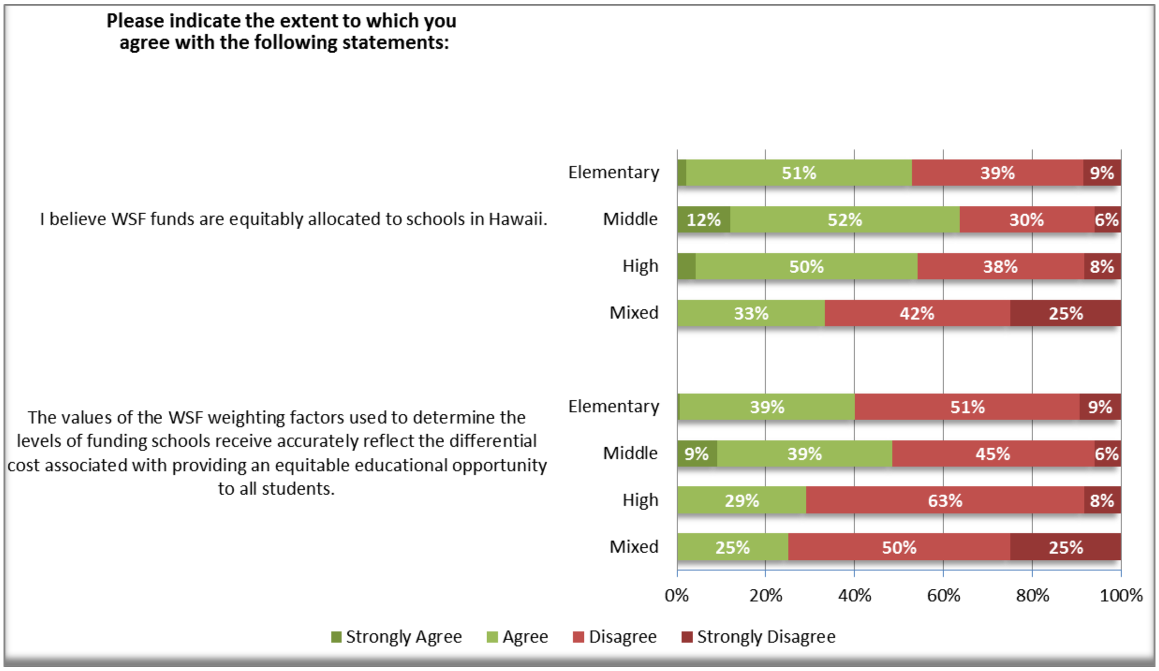
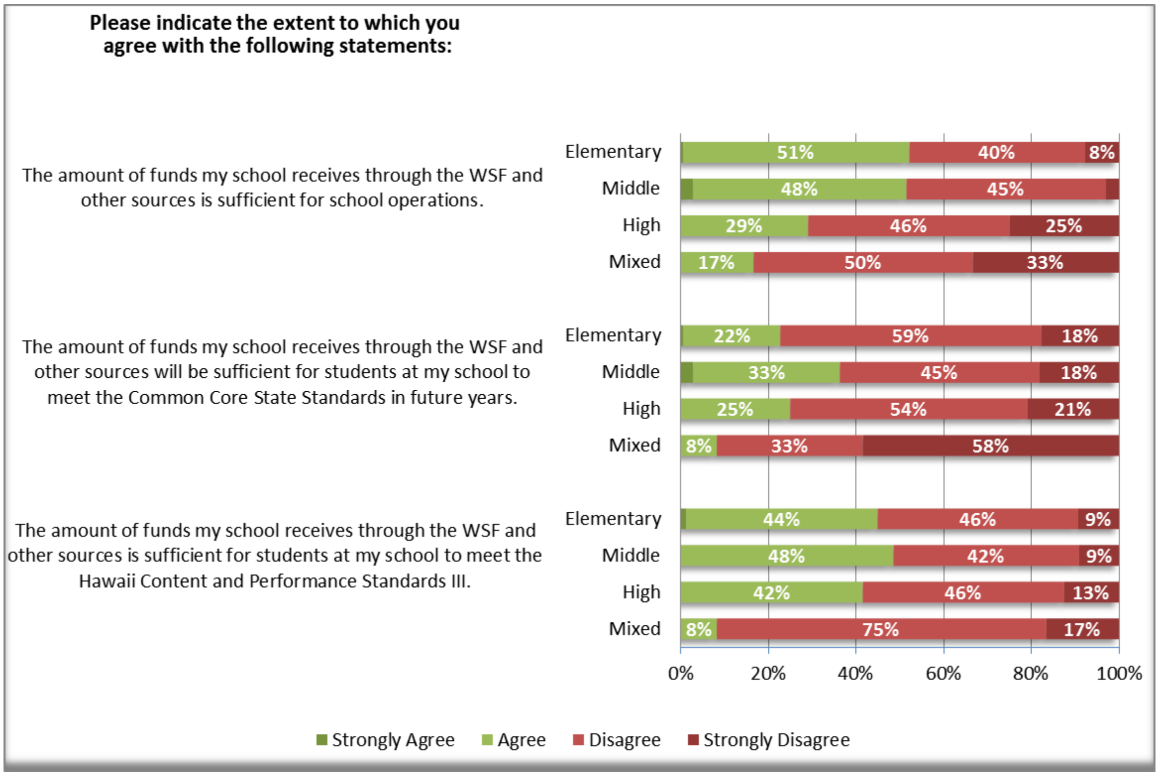


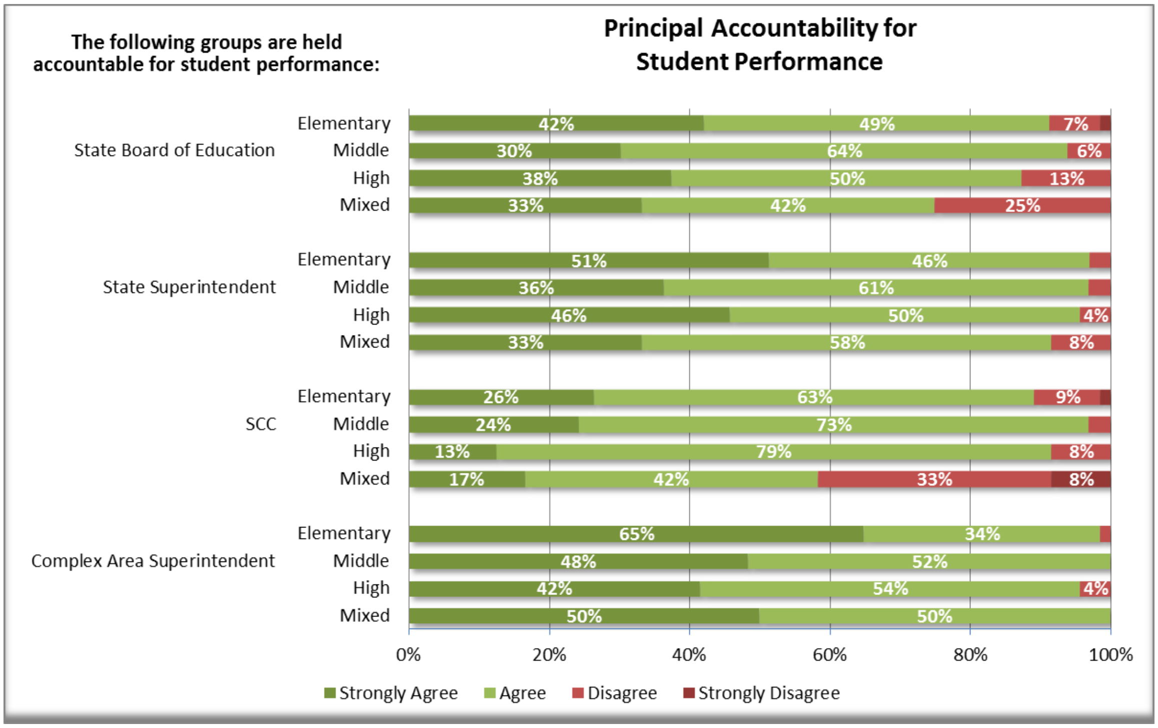
Exhibit 4.21 – Resource and Programmatic Equity, by School Level (Part 2)



Principals at mixed schools also reported less autonomy and flexibility than did other principals: for example, only 42 percent of mixed principals agreed that they have sufficient autonomy to implement an instructional program that meets the needs of students at their school, compared with 71 percent at high schools, 70 percent at middle schools, and 73 percent at elementary schools (see Appendix). Similarly, only 16 percent of principals at mixed schools agreed or strongly agreed that the WSF funds allocated to their school provide them with sufficient flexibility to try new instructional programming, compared with 29 percent at high schools, 33 percent at middle schools, and 35 percent at elementary schools. The results are similar for efficiency: only 16 percent of principals at mixed schools agreed or strongly agreed that the WSF funds allocated to their school provide them with sufficient flexibility to operate their school efficiently, compared with 33 percent at high schools, 52 percent at middle schools, and 50 percent at elementary schools (see Technical Appendix).

Principals at mixed schools reported less accountability for student performance to the SCC and to the State Board of Education compared with accountability reported by other principals (Exhibit 4.22).

Exhibit 4.22 – Principal Accountability, by School Level



Small Schools

Principals at small schools—particularly small elementary schools and small high schools—generally agreed or strongly agreed with statements about empowerment and flexibility at lower rates than did principals at large schools. For example, compared with principals at large elementary schools or large high schools, fewer principals of small elementary schools and small high schools agreed that they have sufficient autonomy to implement an instructional program that meets the needs of their students or for which they have discretion concerning how the dollars in their school budget are spent. This finding contrasts with that for principals at small middle schools, more of whom who agreed they had autonomy and discretion than did principals at large middle schools (Exhibits 4.23, 4.24, and 4.25). Similarly, when asked if the WSF funds allocated to their school provide them with sufficient flexibility to operate their school efficiently, only 35 percent of principals at small elementary schools agreed or strongly agreed compared with 65 percent at large elementary schools, whereas 0 percent of the principals at small high schools agreed or strongly agreed compared with 50 percent at large high schools (see Appendix).

Exhibit 4.23 – Empowerment, by Elementary School Size

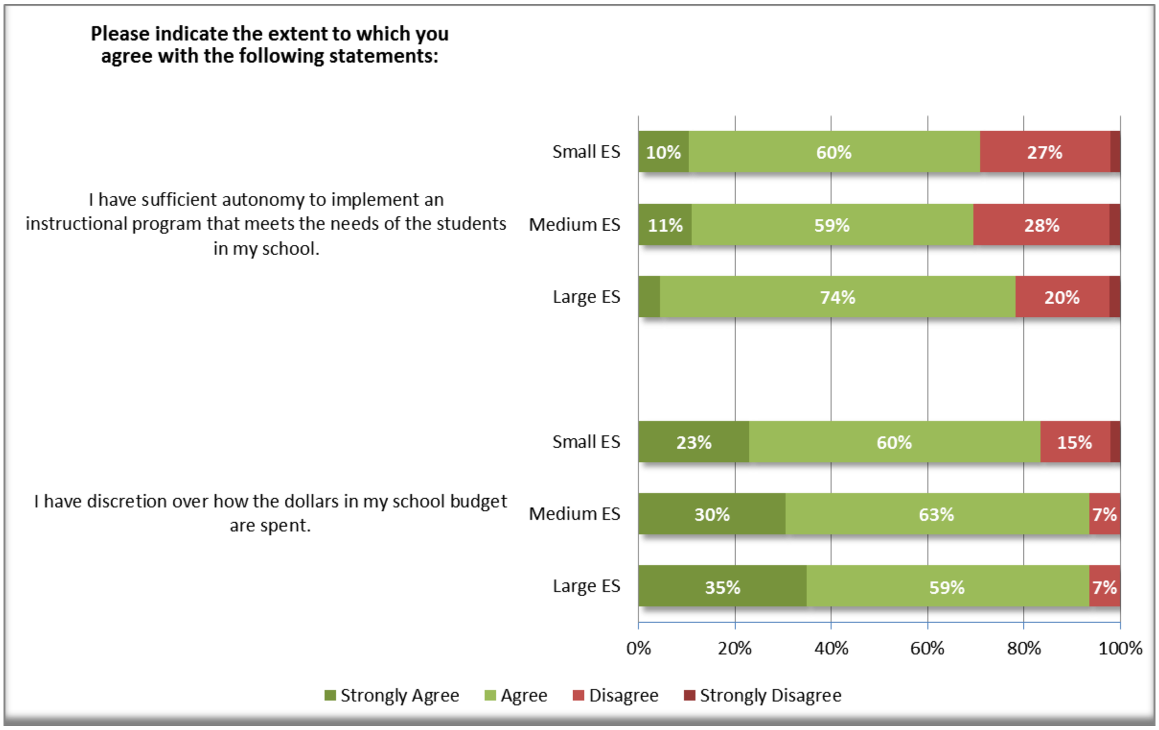


Exhibit 4.24 – Empowerment, by Middle School Size

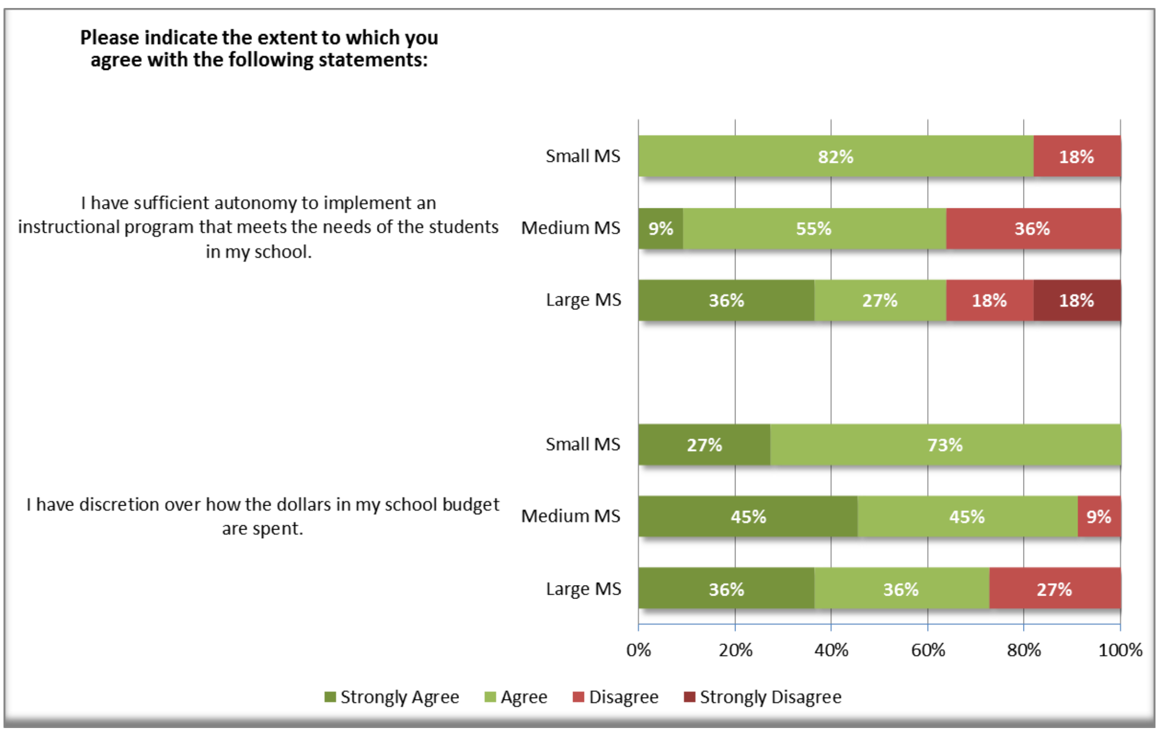
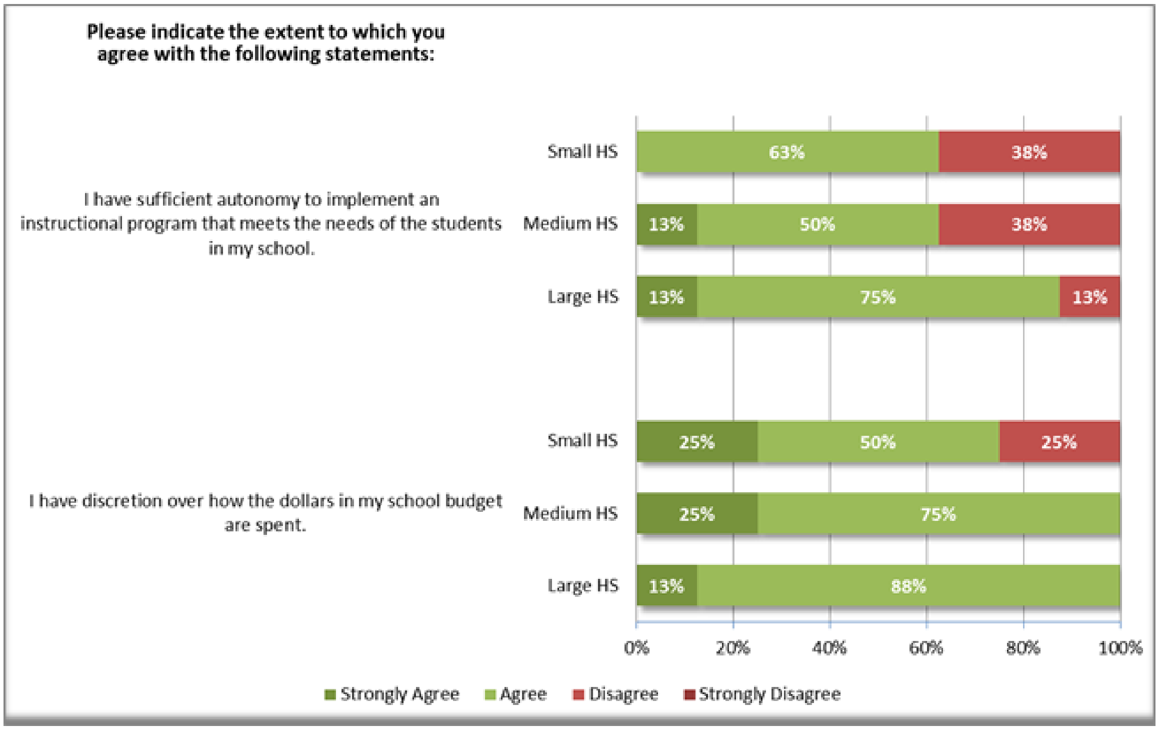


Exhibit 4.25 – Empowerment, by High School Size



When asked if the WSF funds allocated to their school provide them with sufficient flexibility to implement innovative approaches, 25 percent of principals at small elementary schools agreed or strongly agreed compared with 47 percent at large elementary schools. Twenty-seven percent of principals at small middle schools agreed or strongly agreed compared with 36 percent at large middle schools, and 13 percent at small high schools agreed or strongly agreed compared with 50 percent at large high schools (see Exhibits 4.26, 4.27, 4.28).

Exhibit 4.26 – Flexibility, by Elementary School Size

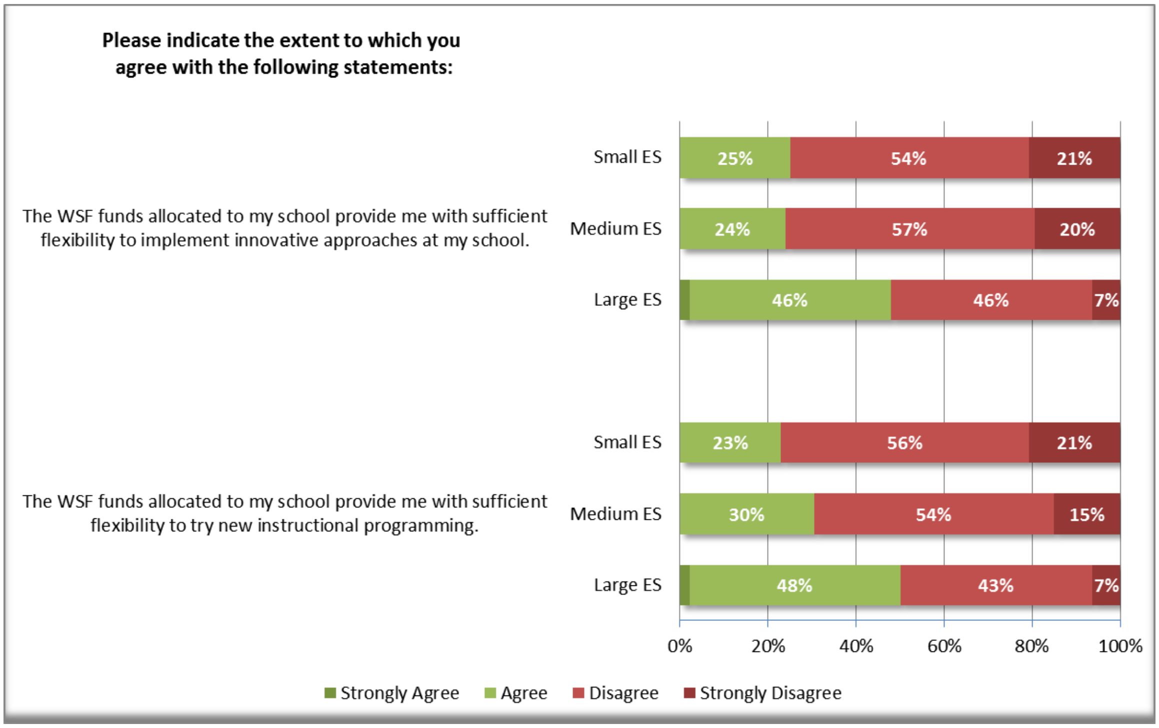


Exhibit 4.27 – Flexibility, by Middle School Size

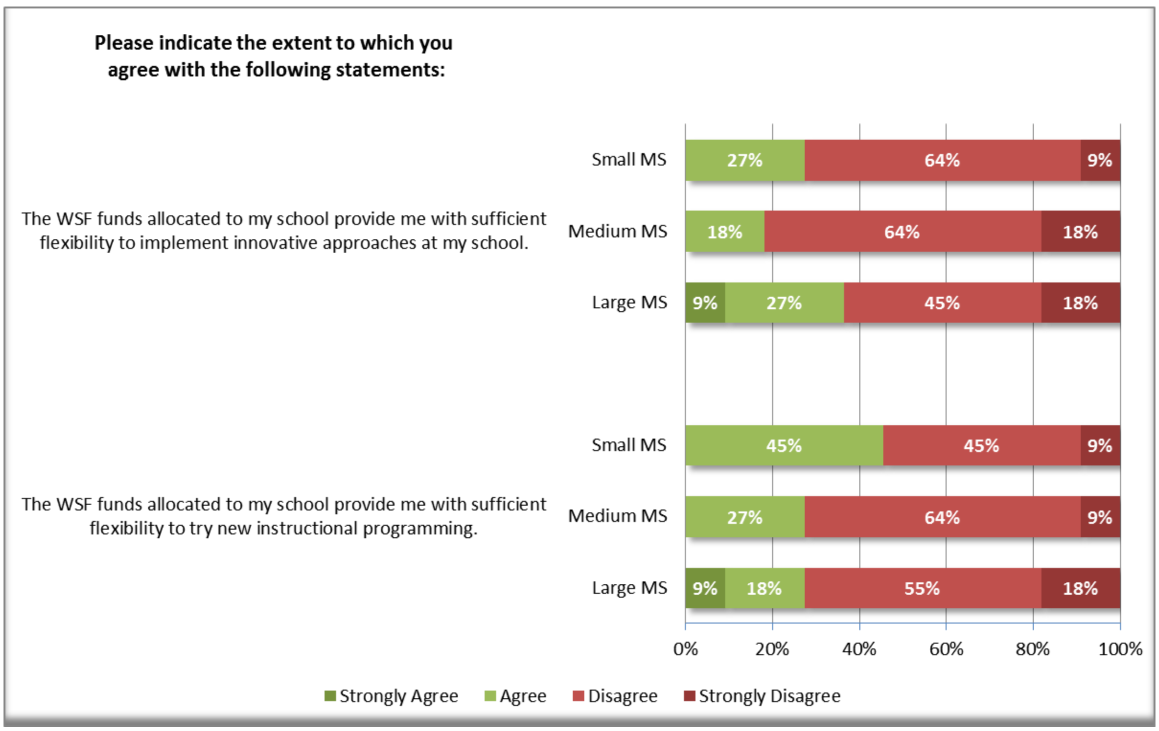
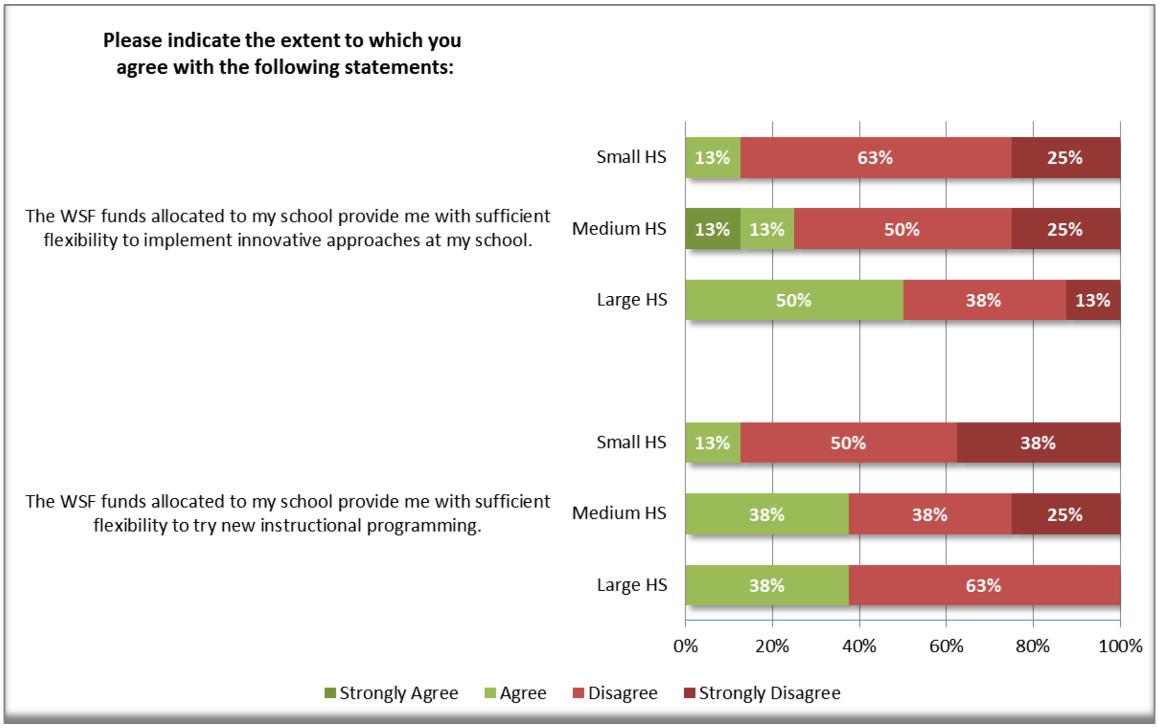


Exhibit 4.28 – Flexibility, by High School Size



In some cases, the differences among principals of varying school sizes appeared to be the most pronounced at the high school level. For example, 48 percent of principals at small elementary schools agreed or strongly agreed that WSF funds are equitably allocated to schools in Hawaii compared with 69 percent at large elementary schools, but at high schools the level of agreement was 26 percent for principals at small high schools compared with 75 percent for principals at large high schools (see Technical Appendix). Results were generally more even for middle schools of varying sizes than they were for elementary schools and high schools. However, when asked if the amount of funds their school receives through the WSF and other sources is sufficient for school operations, fewer principals agreed or strongly agreed at small elementary schools (38 percent), small middle schools (36 percent), and small high schools (25 percent) than at large elementary schools (72 percent), large middle schools (64 percent), and large high schools (50 percent) (see Technical Appendix). Similarly, fewer principals at small elementary schools (33 percent), small middle schools (55 percent), and small high schools (25 percent) agree or strongly agree that the projected WSF allocation for the next school year (2013–14) is appropriate to meet the needs of students at their school compared with the percentages of principals at large elementary schools (54 percent), large middle schools (73 percent), and large high schools (50 percent) (see Technical Appendix).

English Language Learners and Students Eligible for Free or Reduced-Price Lunch

There were few notable differences in responses among principals in schools with low, medium, and high percentages of ELL students or among principals in schools with low, medium, and high percentages of FRPL students. The full set of graphs for these survey results can be found in the Technical Appendix.

Locale

There were few notable differences in responses among principals at city, suburban, town, and rural schools, and the results are not always consistent. For example, slightly more rural principals agree or strongly agree that they have discretion concerning how the dollars in their school budget are spent, yet fewer rural principals agree or strongly agree that WSF funds provide them with sufficient flexibility to implement innovative approaches or try new instructional programming. Rural principals report being the most engaged with their SCCs in key resource allocation decisions, yet they also report the least agreement that they are held accountable for student performance by their SCCs. The full set of graphs for these survey results can be found in the Technical Appendix.

Chapter 5 – Stakeholder Attitudes and Perspectives Surrounding Hawaii's WSF

Purpose and Methodology

Successful implementation of WSF requires a clear understanding of the policy, as well as alignment of stakeholders at different levels of the system about the goals of the system and possible solutions to emerging challenges. To gain a broad understanding of attitudes and perspectives about the goals of WSF, the implementation process, and the extent to which the policy is achieving its intended outcomes, 16 semistructured interviews were conducted with stakeholders.

The pool of stakeholders interviewed covered a wide range of roles and included the following: seven principals, five staff members from the State Department of Education or at the Complex Area level (referred to as *state staff members*), three state legislators, and one teacher. The scope of the investigation of stakeholder attitudes and perspectives was limited because of budgetary constraints, and, therefore, we note that the findings here represent only a limited, albeit important, set of stakeholders and their perspectives.

The interviews were designed to gather data on the following topics:[22]

- Perceptions of the intended goals and outcomes of the WSF policy
- Key decisions made in the creation of the WSF
- Perceptions of the implementation process since inception, changes in resource allocation, and changes in the budgeting and planning process over time
- Extent to which respondents perceive the WSF to provide sufficient funding to achieve desired student outcomes
- Extent to which school leaders have the necessary autonomy to make a difference in student learning
- Capacity of stakeholders at different levels of the system to implement WSF
- Support and communication about the WSF
- Understanding of the WSF and involvement of the school community in decision making
- Extent to which the WSF has increased innovation and efficiency
- Overall likes and dislikes about the WSF
- Impact of other state and federal policies and procedures on the WSF
- Suggestions for how the WSF could be improved in the future

Four of the interviews were conducted in person, and the rest were conducted by phone. Not every respondent was asked every question; the specific questions asked were determined by time constraints and by the respondent's particular role, length of experience, and area of

[22] The full protocol can be found in Appendix 5.A.

expertise. Interviews ranged from 45 to 60 minutes and were audio-recorded and then transcribed. Interview transcripts were imported into NVivo analytic software and coded by domains corresponding to the main sections of the interview protocol. The transcripts were then analyzed to identify major themes and determine response frequencies.

Findings 1 – Background, Goals, and Implementation Process

Goals for WSF

- *Almost all respondents were aware of the goals of the WSF policy; roughly two thirds thought that equity was a goal of the policy, and about half thought that a goal was autonomy and flexibility for school leaders. Respondents reported that the goals have not changed over time.*

All 16 respondents were asked about the state's goals for the WSF policy, and only one stated that she did not know what the goals were. Eleven of the remaining 15 respondents said that one goal was resource distribution equity based on school enrollment, and 5 of those 11 also mentioned equity based on student need. Eight of the 15, including all 3 state legislators, cited giving school leaders more autonomy and flexibility in school budgeting decisions as a goal. Four of the 15 said that improved student achievement was a goal, and 2 cited transparency and accountability.

Fourteen respondents were asked to what extent the goals have changed since the WSF's inception, and all 14 said that they were not aware of changes or that that there have been only minor changes. Three respondents said that the formula and weights have been modified: one mentioned the establishment of a "slush fund" for schools that had large funding decreases, and one state legislator said that schools now have a base amount and that weights are added on top of that base. One respondent mentioned more of an emphasis now on the alignment of the Academic and Financial Plans; one said that schools are increasing their spending on personnel, especially vice principals, because of Race to the Top (RTTT) demands concerning teacher evaluation; and three alluded to the difficult economic situation of a decreasing budget paired with increasing enrollment.

Development of the WSF

- *Respondents suggested that the WSF policy was grounded in the desire to create more local control.*

Twelve respondents were asked about the process by which the WSF was created, and nine of those were asked how the WSF originally got on the state policy agenda and key decisions in its creation. Respondents explained that the idea started in Hawaii in the late 1980s, that it was grounded in the idea of local control, and that research was done on other districts that used per-pupil funding methods. Three of the respondents described how the COW was created and has evolved. All 12 were also asked specifically about the data and analyses that went into creating the WSF. Six of the 12 described the budget office gathering data from different departments and using those data to run scenarios to determine whether funding would be sufficient under the WSF. Two of the legislators mentioned debates about which items should go into the WSF: one said that the categorical money that schools receive from the weights is insignificant compared with the new responsibilities placed on principals, and the other described problems with putting gifted and talented funds into WSF, adding a mobility weight, and leaving high-end special education funding out of the formula. Two of the legislators described how the weights have fluctuated from year to year, explaining that the weights were tweaked a lot for the first few years but are more stable now.

Percentage of school resources from WSF

- *There was wide variation in understanding how much of a school's resources come from WSF funds.*

Fifteen respondents were asked what percentage of a school's resources comes from WSF funds. Six respondents replied with an amount that was between 50 percent and 90 percent; for example, "most," "the bulk," "two-thirds," or "almost 80 percent, if not more." Five respondents, including four of the principals, said 90 percent or more of school funding comes from the WSF. Three did not know or were not sure, and one said that it depends on the school.[23]

Implementation

- *Respondents provided useful context and descriptions of how the WSF implementation process has proceeded over the years in terms of fluctuations in the weights, the use of the superintendent's reserve fund, and the use of average versus actual salaries and application of fringe benefits in the calculation of teacher compensation.*

Seven respondents—those with the most institutional memory—were asked to describe how implementation of the WSF has proceeded since its inception, and each had slightly different descriptions of how the process has proceeded. Three of the respondents (one legislator and two state staff members) indicated that state budget and enrollment fluctuations cause the weights to fluctuate from year to year, so the funding allocation to schools fluctuates as well. In referencing the creation of the superintendent's reserve fund, one respondent used the example of a virtual school that saw enrollment increase but funding decrease:

> *I guess we ran into problems a few years ago where if the enrollment went up and then even though they gained students, when they did the official enrollment count the school lost money. So what they created was this virtual school that they set aside money and they also implemented loss threshold, but as of this fiscal year they took away the loss threshold and they created what we call a superintendent reserve for the schools to get some of the money they'll be short.*

Two of the state legislators said that salaries were an issue during implementation, one citing missteps around adding in and taking out fringe benefits when calculating salaries and the other explaining the effects of using average or actual salaries on hiring practices:

---

[23] The analysis in Chapter 6 shows that the percentage of overall dollars for schools coming from WSF funding equaled 66.5 percent (see Exhibit 6.1).

> *The toughest nut to crack in weighted student formula is should you use average teacher salaries or actual salaries? ... The problem with actual salaries is it's very tempting for a principal to hire younger teachers. Maybe it's subconscious or what because it's cheaper; you can probably get three new teachers for the price of two seasoned teachers. Just punch me with a lawsuit on age discrimination or whatever. So people use average. It's a little clumsy, but I can't think of any other way in which you can kind of strike what the actual expenses are in a given school except for using average.*

Two of the legislators also described the difficulty in assessing opinions of the WSF because schools that get more funding are happy and those that get less do not like the policy. In addition, one principal recalled much lobbying to influence the WSF and said that complex areas and schools on Oahu got more out of the WSF because they could more easily attend the meetings on Oahu.

Funding allocation changes

- *When asked about recent changes in funding allocations, half the respondents spoke about the transition process to protect schools from sudden losses in funds during phase-in. Others reported additional sources of funds available to schools outside the WSF.*

Ten of the 16 respondents were asked how funding allocations have changed in the last 5 years. Five reported other funds available to schools, including the superintendent's reserve fund, which a legislator referred to as a "contingency fund." However, the state superintendent clarified that this fund is not new: "Well first of all, the reserve has always been there. It's always been a reserve." When describing other funding available to schools, one of the state staff members mentioned a separate WSF fund at the complex area level, the RTTT fund, and Title IIA money for professional development. Five respondents spoke about the transitional funding period and noted that the 2012–13 school year was the first without a loss threshold.[24] As staff in the budget office explained:

> *I think the first three years were really looked at as a transitional period. So I believe the first year was like 10 percent… We looked at what they would've gotten had we remained categorically funded versus what they would get based on the formula at a certain point in time. And we were slowly over the first couple of years progressing so they would get 10 percent distributed by formula and then 25 percent by formula. But come the third year, we were supposed to move to 50 percent and instead we went to 100 percent because instead of using a transition based on a previous point in time a couple years ago, what it would've been, we did something where we used the loss threshold adjustment, which looked at what they had the previous year and just tried to ease the transition. So we kind of capped their year-to-year loss that they would get based on the formula.*

Two respondents—one from the state and one legislator—noted that fringe benefits were included in the WSF pot, and one legislator said that ROTC funding was extremely close to being included.

[24] The loss threshold was implemented for the first few years after WSF implementation to "cushion the blow" for schools scheduled to receive dramatically less funding under the new policy.

Changes in the planning and budgeting process

- *The most salient change to the planning and budgeting process in recent years seems to be adjustments in the Academic and Financial Plans timeline and process.*

Ten respondents were asked how the planning and budgeting process has changed during the last five years. Six of them reported changes in the timeline and Academic and Financial Plans process. Budget office staff members described how the time frame for planning has changed:

> *The first seven years, it was basically the financial and the academic plans were due at the same time right around the calendar new year. … Schools would start meeting on their academic plans to define what are their hopes, dreams, goals, initiatives, what were they going to try to do. And then the financial plan would come out, and then they would do the best they could to fund the academic plan with the resources that they had. Basically, they'd have like two months to finish their financial plan and turn it in to the CAS either before the Christmas break the first three years or so and then the next three years it was due after the Christmas break. So then this year we changed the process a little bit. So financial and academic plans were still released October time frame, and we asked this year that personnel … be submitted by the end of December and approved by the CAS [Complex Area Superintendent]. And then we reopened the plan and are allowing them to do…the nonpayroll expenditure plans from now until March time frame. … So we've changed that process a little bit this year to give the principals more time on their academic plans because with all of our initiatives there were complaints that they didn't have enough time to implement and see how the results were coming back before they were already planning their next academic plan. So this has allowed them six, seven, eight months of implemented new initiatives in their schools to see if they've made any difference on the test scores or any other things they've implemented for this school year, to see what kind of adjustments they need to make.*

The principal survey echoes this sentiment, as 71 percent of principals agreed or strongly agreed that recent changes in the Academic and Financial Plans timeline have improved their ability to plan their school's budget for the next school year.

One state staff member said that the biggest change has come this year:

> *In terms of the academic financial plan for the schools, there weren't a lot of changes until this past year. And the big change there was more around assuring that our strategic plan goals and measures and our six focus strategies, the nonnegotiable strategies, are embedded in the AcFin.*

Key Contributors

- *Respondents pointed to a variety of stakeholders as playing key roles in implementing the WSF.*

Four respondents were asked who they considered to be the key contributors to WSF implementation. One legislator said the Committee on Weights: "they decide what's in and what's out," adding that the principals are important but that there is "not enough understanding at the school level to really effectively use it. The other part of that is it never resulted in significant enough resources that would allow the average principal to really do something different." Respondents also mentioned the district, complex area staff, and the legislature as being key contributors. As one state staff member said, "To me it's actually the leg[islature] because they're going to appropriate how much money based on the whole state needs…depending on the economy…"

Findings 2 – Sufficiency and Autonomy

Sufficiency of WSF

- *About half of the respondents said that WSF funding was not sufficient to achieve desired student outcomes.*

All 16 respondents either were asked directly the extent to which they perceived that WSF funding was sufficient to achieve desired student outcomes or elaborated on the theme when discussing related topics. Eight of the respondents said funding was insufficient, including five of the principals. One legislator said that WSF funding was not sufficient because the DOE was keeping a large percentage of funding. One principal said that funding has never been sufficient and that schools have always been underfunded. Four of the respondents seemed neutral about funding sufficiency, with comments such as, "You do with what you can get with what you're given" and "I think we can always do better … I think if we could give more I'd love to give more." Four more said it was sufficient, though not enthusiastically; for example, one principal said that funding was sufficient in the sense that it could cover the basic goals. One legislator made the distinction between sufficiency in terms of equity and sufficiency in terms of adequacy:

> *The weighted student formula was never and is never designed for adequacy. It's designed for equity. Are schools funded today all inadequately … but with a formula that at least reflects the need of that individual school? In my mind, the answer is yes. Is it enough? The answer is no.*

This finding is aligned with the results from the principal survey, in which more than half (57 percent) of principals agreed or strongly agreed that the WSF allocation for the current 2012–13 school year is appropriate to meet the needs of their students. However, fewer than half (42 percent) agreed or strongly agreed that the projected WSF allocation for 2013–14 would be sufficient, and 48 percent agreed or strongly agreed that the funds their school receives through the WSF and other sources is sufficient for school operations.

- *More than half of those interviewed seemed to suggest that funding for small and isolated schools may be insufficient.*

More than half of the respondents acknowledged that funding for small schools might not be sufficient, including respondents from all three groups (state DOE, legislators, and school staff). Two of the principals said that 98 percent of their budget is spent on the very minimum personnel they need to run a school, and one state staff member noted:

- *"I think that it works for many schools if not most schools but it does not work for small schools and rural schools…I think it helps if the last COW set some baselines on what is essential for every school to have. Every school needs a principal. And every school needs certain other key personnel depending on the level."*

As one legislator put it, it's hard to "pay the bills when the weighted student formula comes to $180,000."

At various points during the interviews, nine respondents across all three stakeholder groups highlighted funding issues for small and rural or isolated schools. All nine stated that the WSF does not provide enough funding for small schools; specifically, they said that it does not provide enough staff to fulfill the needs of the student population and achieve the Academic Plan goals. A state staff member gave the example of Canyon Middle School, which needs $534,000 to achieve its goals but is allotted only $187,000. One principal said that she spends 98 percent of her funding on personnel, and another principal said that the student/teacher ratio (26:1) allocates him 3 teachers for a school with 14 grade levels. A different principal pointed out that having one teacher teach three subjects affects the quality of teaching, yet small schools are expected to reach the same benchmarks as other schools do.

Five respondents elaborated on the superintendent's reserve fund to assist small schools; one of the state staff members explained that a committee of five complex area superintendents reads over applications and decides which schools are allotted funds from the reserve. A principal said that the application has big flaws and that the questions asked are not insightful, citing the example of a low student-to-teacher ratio at small schools not necessarily meaning that there is sufficient staffing. Five of the nine respondents pointed out problems of isolation; for example, one principal noted that the isolation of Neighbor Islands makes it hard for schools to pool resources with other schools, and a state staff member noted that isolation makes it hard for schools to obtain resources from the DOE. Three of these respondents cited Hana as an example of a small, isolated school. Finally, two of the principals felt strongly that small schools should have a minimum base (or flat) amount of funding.

Alignment of Academic and Financial Plans With Resource Allocation

- *Principals reported that they do their best to align their Academic and Finance Plans with their allocations of resources.*

Eleven respondents were asked about the alignment of Academic and Financial Plans with resource allocations. All seven of the principals reported that their schools' Academic and Financial Plans are aligned with resource allocations, and state staff said that reviews are done by SCCs or principals' peers. One state staff member said that principals should be working together with their CASs to align plans from K–12 "so that a student moving from elementary to middle to high can see the alignment in the curriculum and programs." Two of the principals mentioned that principals are held accountable by teachers for this alignment: "It's got to be aligned, and the teachers hold you accountable to why are we buying this, where is it in our academic plan that it says that we need this." Three of the principals said that their schools' Academic and Financial Plans must be aligned even if they lack resources; as one said, "whether we get funded for it or not is not even paid attention to." Another explained, "but for whatever little meager amount that we get, we try to make sure it's tied to our academic plan in terms of meeting the goals to help student achievement." The third principal said that he has a generous community support base to fund the extra things his school needs.

Autonomy of School Leaders

- *Respondents were split on whether school leaders have the autonomy to make a difference in student learning; some examples of limits to real autonomy are a lack of funds and the inability to hire and fire teachers.*

Thirteen respondents were asked about whether school leaders have the autonomy to make a difference in student learning. Six of these, including one legislator and two principals, said there is sufficient or increased autonomy under the WSF. The findings from the interviews are mirrored in the results from the principal survey, in which 89 percent of principals agreed or strongly agreed that they have discretion concerning how the dollars in their school budget are spent, and 70 percent agreed or strongly agreed that they have sufficient autonomy to implement an instructional program that meets the needs of students in their school. One interviewed principal gave the example of being able to implement a unique schedule and reduce certain staff positions. Similarly, 34 of the 82 principals who responded to an open-ended survey question cited hiring staff as an example of how the WSF has permitted them to implement an innovative program at their school.

However, some of these respondents added the caveat that there is a lack of sufficient funding to make autonomy effective. As one principal said, "I believe there are no problems with autonomy. The problem is with you can't be too creative when you don't have too much money to start with in the first place." Another principal said that schools have many choices in programs (e.g., Achieve 3000 or Read 180) but that he would like more autonomy with the Common Core curriculum. One of the state staff members explained that procurement policies hinder autonomy because of the paperwork it takes to obtain certain materials, and one of the legislators noted that autonomy over funding is a balance of different types of flexibility for different funds, especially as it relates to personnel and union issues.

Seven respondents, including the five principals not quoted earlier, said there is not enough autonomy under the WSF. One principal rated his autonomy as a 4 out of 10, noting that he does have autonomy with areas such as hardware, technology, and rules about student conduct at the school. Four respondents said autonomy is limited because there is not enough funding: one principal said he has a certain degree of autonomy but cannot exercise it because of lack of funds, another principal noted the many mandates she must fund, and a third principal explained that since the WSF was implemented "the school leaders never really saw the resources to make a significant difference." One state staff member also added that small schools have limited money to fund programs. Three respondents described issues related to flexibility of personnel management. One principal said that the Hawaii State Teacher's Association has a staff reduction provision, and another principal explained that although schools have autonomy to add personnel, they cannot hire and dismiss specific teachers:

The problem that we've always had is that we've never had true autonomy to be held accountable, and the number one thing we don't have is the autonomy to hire and fire who we need. Every principal will tell you that.

In addition, one principal explained that there is a contradiction between autonomy and the centralized adoption of the Common Core curriculum.

Findings 3 – Capacity

- *Most respondents reported that state and Complex Area staff have the necessary capacity to implement WSF, but only half felt the same way about school staff.*

Ten respondents were asked about the capacity of state and complex area staff to successfully implement the WSF. Seven of these said that state and CA staff have the necessary capacity, mentioning the complex area business managers, the administrative service assistants, and the school renewal and educational specialists funded from ICAA. One principal noted, however, that there is a lack of practical experience in isolated areas and that "people in Honolulu who are making these decisions are completely unaware of that stuff." Another principal was neutral about capacity but emphasized how each community is different: "It's very difficult to know one size fits all…But I think the state does its best to try to make sure that there is a process and the process is streamlined to the best of their capabilities." In contrast, two respondents said that capacity at the state and complex area is lacking: One principal gave the example of the competing goals of Common Core standards and decentralized funding, and a state staff member related that the new school board has not closed small schools yet has not funded them enough to stay open.

Ten interviewees were asked about the capacity of school staff and the school community to successfully make decisions about program planning, budgeting, and resource allocation. Five of the 10 said that schools have the necessary capacity: One principal noted that schools are gradually becoming capable but that "there's a pretty steep learning curve," and another principal noted that his school has capacity because he personally has training and experience. One of the state staff members explained that schools definitely have capacity on the curriculum side but perhaps not on the business side, though they do have training programs for administrators (Administrator Certification for Excellence, or ACE) and school administrative service assistants (SASAs). Four of the 10 were neutral about school capacity, with 3 mentioning that capacity varies greatly among schools. One legislator noted that some Academic and Financial Plans are robust and others lack detail, one state staff member described uneven SCC involvement throughout the state, and one principal said that the information is overwhelming but that most schools know the basics of budget and spending decisions. Finally, one school staff member did not believe that schools had the necessary capacity and emphasized the need for training to understand the complexity of the budget:

I've had a situation at my school—stakeholders put pressure on the principal, hey, we want to see where [you are] spending the money. The principal gets all bent out of shape, comes in and throws on the table at the SCC a three ring binder three inches thick…with all the different codes…There will be other principals that try, but there is no official *training process statewide that ensures a consistent understanding by all the stakeholders in every single school, what's going on, that's a problem.*

Findings 4 – Support and Communication

Professional Development Training and Support

- *Principals reported receiving support from the Complex Area office in aligning their Academic and Financial Plans.*

Three respondents were asked about the state's role in supporting the alignment of schools' Academic and Financial Plans with resource allocation decisions. Staff from the budget office noted that the state provides PowerPoint presentations about the WSF, implementation manuals, checklists, and references in a Lotus Notes database and that they answer questions about the WSF, monitor and track timelines, provide updates and supports to the Complex Area superintendents, provide new principals with PDERI (Professional Development and Educational Research Institute) training, and are developing more training for SASAs. One of the principals said that the state is streamlining the academic review process and providing schools with a template:

> *The state sends down guidelines, plans; they put the strategic plan online. So they've done everything they can to make it as streamlined as possible for you to be able to put in what your school would like to do to achieve the strategic goals. And then they've recently started a new academic review team to where you're going to see what the Board of Education's goals are and what the state's strategic plan is. And see how what you put into the school matches that. So there's a template now for the academic review team to look at how much aligned are you to hitting any of the Board of Education and strategic plan targets.*

In contrast, the other principal said that he does not find the state supports helpful and that he has instead hired outside providers for support:

> *To me, sometimes the best thing is for them is to stay out of our way. You have them set targets for us then just get out of our way because a lot of times they impede a lot of things that the school does by putting all these restraints and guidelines and strings attached to stuff that they give us.*

Eight respondents were asked about support from the CAS and his or her office. Three noted that there is a lot of support coming from the complex area business manager, and two principals said that their CAS or CAS's office helps to advocate for small schools and rural or isolated schools. As an example, one of these principals said that her CAS provided her school with additional funds to supplement WSF funding. Two other principals said that their CAS helps schools with Academic and Financial Plans: One said that the CAS discusses and reviews the Academic and Financial Plans to make sure they are focused before submission to the state, and the other described peer reviews of Academic and Financial Plans to ensure K–12 consistency, which the CAS monitors and then submits to the state. Finally, one of the state staff members noted that she is attempting to provide trilevel (school, complex area, state) training to ensure statewide consistency.

Five respondents, including four principals, were asked about other supports for school leaders. Two of the principals said they get support from their PTAs and PTOs: Both cited fundraising, and another added that the PTO also helps to rally volunteers and is trying to start a group of parent tutors. Two respondents cited support from the SASAs, and one also mentioned the administrators training program (ACE) as being a good support. One principal said that the state budget people are very supportive, another principals said that staff development is a very useful support, and a third principal said that there is no other support for school leaders except him.

Communication

- *Information about the WSF comes from a variety of sources.*

Thirteen respondents were asked what the state has done this year with regard to communicating about the WSF. Six said that the state has been communicating about the WSF in some way: One principal said that he knew about the budget allocation per head and the ELL, special education, and free reduced-price lunch percentages; another principal said that she learns about WSF funding at the Educational Officers' (EO) meeting during the summer; another principal heard about the new timeline and breakdown of the Financial Plan from memos and conversations at principal meetings; and one other principal cited a lot of back-and-forth memos about the WSF. One of the state officials noted that everyone has access to the biennium proposal to the legislature. In contrast, six respondents, including two legislators and two principals, said there has not been much communication from the state about the WSF. A state official noted that the WSF is mostly an internal process with no formal communication about the formula.

Findings 5 – Transparency, Understanding, and Involvement of the School Community

Understanding of the WSF

- *Most respondents reported that the HIDOE staff and the complex area superintendents have a good understanding of the WSF but that the legislature generally does not. Respondents were split in their assessment of the school community's understanding of the WSF.*

Eleven respondents were asked about the understanding of the WSF by state-level staff. Five of these reported that the HIDOE staff have a good understanding of the WSF, one qualifying this by saying that the budget office has a good understanding but that she was not sure about other offices. Two respondents, both principals, spoke about understanding by the new board: One said that the new board does not understand the WSF because "they all come from the business sector," and the other said that the board has a "clear basic understanding" of the WSF but did not know the details. Five of the 11 respondents—including two of the legislators themselves—said that the legislature does not have a good understanding of the WSF. One state staff member noted that there is high turnover in the legislature, and another state staff member noted that few legislators understand the WSF but that the education chairs clearly do. One legislator reported that members of the legislature understand the WSF conceptually but not which funds are in the WSF and which are categorical, and another legislator explained that his peers have not spent time looking at the budget. Two other respondents were either not sure about the legislature's understanding of the WSF or felt that it varied among members. Finally, one of the legislators noted that there is a misconception about why the WSF was developed and was hoping that this evaluation would shed light on "why it was developed in the first place and what the possibilities can really be as we move forward."

Eight respondents were asked about the understanding of the WSF by the CASs, and all eight said that the CASs understand the WSF well. Twelve of the 16 respondents were asked about the understanding of the WSF by the school staff and community members. Five said that the school staff and community have a good understanding of the WSF, though one of these respondents, a principal, said that her SCC understands it but that parents do not care. Four respondents, three principals and a state staff member said that the school staff and community do not have a good understanding of the WSF. One principal said they have an outsider's knowledge but not a working knowledge of the WSF, another principal said he does not believe that parents understand WSF, and a third principal thinks that his school community does not care. The state staff member explained that some principals cannot effectively explain the WSF to their SCCs, "so several school community council chairs came to argue that they could not lose money, most of them from smaller schools." Finally, the remaining three respondents said that understanding at the school level varies: One said that it varies depending on training, another said that the principal understands the WSF but that teachers do not, and the third said that the SCC understands the WSF but that the community as a whole does not and that staff understanding depends on their length of employment.

- *Respondents reported that misconceptions about the WSF at the school level appear to be connected more with the insufficiency of the available funds than with the WSF approach itself.*

Finally, a few of the respondents cited misconceptions about the WSF at the school level. One state staff member said there is a misconception regarding the base amount of funding for a school, and another said that there are a lot of misconceptions about the WSF because of decreasing funds. As she put it:

> *Actually there probably are misunderstandings just because the dollars change. And it wouldn't be so bad if the dollars were stable or going up. But I think a lot of the misunderstandings will arise because the dollars are going down. And people see those budget reductions and blame it on the formula but may not realize that it's based on the fact that their student population has gone down.*

One principal said there is a misconception that the WSF will ensure adequate funding for needs:

> *I guess to a certain extent people think that okay, because students are weighted differently because they have different educational needs, somehow or another WSF will always be able to fund everything that they want or need to service kids and that's not necessarily true.*

Another principal noted the problem at small schools:

> *I think the one complaint that I always hear is that our budget is being cut every year and that we're being bled to death…Large schools used to say that the small schools steal money from them, and small schools, every single principal that I talk to are talking about how they're being bled dry. There's just not enough money to even fulfill what the academic financial plan is meant to do.*

Transparency

- *Almost all respondents said that the WSF calculations and process are transparent.*

Thirteen respondents were asked about the transparency of the WSF calculations and implementation process, and 11 of those 13 said that the calculations and implementation were transparent. A few provided caveats, though, including not being sure if it was transparent at the state level, stating that the federal funds were not transparent and should be published online, and knowing of extra funds that are being held at the state level ("contingency funds for lawsuits, unexpected special education enrollment increases, and those kinds of things"). One legislator was not sure about transparency but suspects that "it's probably pretty good," and only one principal said that the process is not transparent but that "they'll give you all the information you need." This finding is echoed in the principal survey, in which most principals agreed or strongly agreed that they understand the WSF, can explain it, and know whom to ask for more information if needed.

Involvement of the School Community

- *About half of the respondents indicated that there was community involvement in the budgeting and planning process, though the level and value of that involvement varies.*

Thirteen respondents were asked about school community involvement in the budgeting and planning process. Six, including five school staff, said that their communities are involved, though the level of involvement varied. One principal said that his SCC volunteers and provides input but does not know enough to make budgeting and staffing decisions, whereas another principal said that his SCC helps make tough staffing decisions and plays a major role in facilities and maintenance. Another principal said that he has two budget meetings with his SCC and that they must sign off on the plan. In contrast, five respondents said that their communities are not heavily involved. For example, one legislator said that the SCC was "disconnected…nobody believes that they can make a change through how the funds are spent." A principal said that having SCC involvement now is of no use and "more of a trivial thing," whereas another principal said that ultimately he is just sharing information because of the lack of funding. The principal survey reflected similarly mixed SCC involvement: 10 percent of principals reported making key resource allocation decisions together with the SCC, 40 percent of principals reported that they are in two-way communication with the SCC about key resource allocation decisions, 33 percent reported that they consult with the SCC about key resource allocation decisions, and 17 percent reported that they make key resource allocation decisions and then inform the SCC.

One of the state officials described the SCC as "supposed to be part of the collaborative decision making" but some principals and CAS "can't articulate what WSF is and what the impact of that is. Then it just perpetuates the idea that this big, bad, terrible committee on weights is not distributing money properly." Another state official noted that it varies, depending on how the SCCs were trained and how well they understand the Academic and Financial Plans process.

Findings 6 – Accountability and Innovation

Accountability

- *Although most respondents said that strong accountability measures are in place, some questioned whether accountability had any impact.*

Ten respondents were asked about the accountability mechanisms in place for the WSF. Seven respondents said there are strong accountability measures in place. Four mentioned having many audits, two cited federal accountability programs, and two mentioned having to report to the legislature. One of the state respondents described a hierarchy of accountability in which principals report to CASs and CASs report to the deputy superintendent. This finding generally mirrors the results from the principal survey, in which the principals overwhelming agreed that they are held accountable for student performance by the State Board of Education, the State Superintendent, the SCC, and the Complex Area Superintendent, while 79 percent agreed or strongly agreed that the Complex Area Superintendent is held accountable for student performance.

In contrast, three interview respondents said that there are not many accountability mechanisms in place: One legislator said that it's just "accounting" and that not much has changed, noting, "My guess would be if you looked at what the school did prior to WSF and what they do today, I would say you would only find a handful of schools that actually look very different today than what they looked like before WSF." A principal described accountability as a "pretty archaic system" and said that he does not think anyone is checking on what he is doing with the money. One of the state respondents said that schools must report on activities in the Academic Plan every quarter but that she does not "really see very many financial accountability pieces."

Innovation and Efficiency

- *Less than half of the respondents felt there was an increase in innovation and efficiency as a result of the WSF, and some suggested that limits on funding were playing a role in hampering innovation.*

Fourteen respondents were asked whether the WSF has created more of a culture of innovation and efficiency in schools. Seven said that they have seen an increase in innovation and efficiency, though two of those (both principals) did not attribute innovation to the WSF. One said that schools have always had to innovate since the "start of the one room schoolhouse," and the other attributed innovation to other, non-WSF funds. In contrast, one of the state respondents said that principals are now making wise purchases instead of "arbitrary decisions" while working in isolation. As an example, one of the principals explained that he had created technology coordinator positions instead of converting a teacher's role into that position:

What the WSF allowed me to do was to create positions of true technicians, to purchase technicians for this school. I was the first one to do it in the state of Hawaii…to create my technology coordinators as true technicians versus teachers.

Four respondents said that innovation and efficiency varies among schools; one state respondent said that some principals are still in the "position count mentality" but that the problem was becoming less widespread. One of the legislators noted, "There's a difference between innovation and creativity versus just scraping by and surviving. And I have a feeling that some have just survived, and some have been absolutely innovative." One of the principals said that innovation is probably not based on budgeting practices but rather on the culture of the school, and a state official listed examples of innovative actions by principals that included implementing STEM programs, project-oriented team teaching, investing in technology, getting more computers, and implementing more professional development days for teachers.

One respondent was not sure whether innovation and efficiency had increased, explaining that schools have more control over their budgets now but that there is less money. Finally, two respondents (one principal and one legislator) said there has been no increased innovation or efficiency. That principal said that schools are bound by mandates and union agreements, and the legislator seemed unsure, explaining that "you can see them [principals] examining different alternatives and trying to make decisions and then hopefully funding…" but that there is very little funding to do what is needed.

This finding about limits on innovation and efficiency is mirrored in the principal survey, in which fewer than one third of principals agreed or strongly agreed that they have sufficient flexibility to implement innovative approaches or try new instructional programming at their school, one third agreed or strongly agreed that the WSF funds allocated to their school provided sufficient flexibility to try new instructional programming, and fewer than half agreed that they have sufficient flexibility to operate their school efficiently. Similarly, 44 of the 107 surveyed principals who said that the WSF has not permitted them to implement an innovative program at their school reported that it was because WSF funding is insufficient.

Successes, Challenges, and Recommendations

General Reflection on the WSF

Toward the end of the interview, 15 respondents were asked what they most like and dislike about the WSF. Thirteen of these spoke about what they like about the WSF, as follows:

- *Equity based on enrollment.* Five of the 13—three state staff members and two principals—like that the WSF is based on enrollment and applied equitably throughout the state so that everyone can anticipate what the budget is going to be. One state staff member said that she likes knowing where the money is coming from, and a principal liked that "if people get more it's for different reasons, they've got more students."
- *School-level empowerment*. Three respondents—two legislators and a state staff member—like that schools are empowered to increase student achievement.

- *Collaboration with the school community*. Two state staff members like the collaboration with the school community, and one of these respondents further elaborated that she likes the autonomy given for collaboration:

  > "I like the fact that a principal, the instructional leader of a school, can work collaboratively with their school community based on their needs and have autonomy to make decisions about positions and types of positions and programs and how many and all those things… You have a lot more flexibility to make adjustments in instructional decisions for the kids that you have."

- *Flexibility and autonomy.* Three respondents—one principal, one legislator, and one state staff member—said that they like the flexibility and autonomy that schools now have, and that principal specifically said that he likes the flexibility to purchase personnel positions, although he often cannot hire or fire specific personnel.
- *General philosophy.* One other principal said, "I like the philosophy of it [WSF]."

Fourteen respondents spoke about what they dislike about the WSF, as follows:

- *Insufficient funding.* Nine respondents, including six of the seven principals, said they would like to see more funding under the WSF.
- *Inadequate funding implies no flexibility.* One principal said he would like to see more funding to have the flexibility to start new programs, and another explained that "when you don't get any money, then there's no flexibility."
- *Small schools get inadequate funding.* Five respondents, including three principals, said that small or isolated schools do not have adequate funding under the WSF and need a base amount to cover basic costs. One principal noted that the WSF does not account for economies of scale, another emphasized the lack of resources at isolated schools, and a third said, "I think if I was in a school where finances were okay, then I would have no problem with it, but because I'm in a school where it's making my job almost impossible to do, I don't really care for it. It does not support student learning."
- *Lack of stability.* Two of the 14 respondents dislike the lack of stability and how the funding allocations can fluctuate from year to year, and two others citing difficulties on the part of school leadership in being able to adapt to changes in the budgeting timeline process including working with new templates and planning salaried staffing needs versus casual staffing and other resource needs at different stages in the process.
- *Miscellaneous issues.* Respondents cited additional aspects of the WSF that they do not like, including the lack of transparency when funds are taken out of categorical funds and put into the WSF (principal), too much freedom in the procurement process when principals lack an understanding of that process (principal), outdated systems of mandatory instructional hours and school days (legislator), difficulty in pushing out statewide initiatives under WSF funding (state staff member), and "viewing kids as walking dollar signs" (legislator).

Successes

Eight respondents were asked what they considered the biggest successes of the WSF:

- *Equity.* Three respondents said that the WSF is consistently and equitably applied to all schools.
- *Earlier budgeting*. Two respondents said that the earlier budgeting process gives principals more time to plan.
- *Increased collaboration.* Three respondents cited increased collaboration during the budgeting process, with a principal saying that the creation of SCCs "brought the conversation about school budgeting to that group of people, which is representative of the community… Even though I said earlier that most of the community is not aware of the school budgeting issues, the people who do sit on the council are, and I think that's a good first step towards more widespread understanding of it."
- *More autonomy and flexibility.* Two respondents, both principals, said that principals now have more autonomy and flexibility with school budgeting: "Knowing what funds you truly have control over and how you can influence your school with that. That's been the biggest success." One legislator said that principals are now more creatively allocating funds:

  > "They [principals] do at least look at the broader picture and the schools that are doing a good job of embracing the curriculum responsibility and trying to live the whole performance-based instruction."

- *Potential for increased accountability.* Finally, one state staff member said that although she hopes the WSF brings about more accountability and less waste, there is not enough money to see that happening right now.

Policy Barriers

Fourteen respondents were asked about policy barriers to WSF implementation and achieving the WSF goals:

- *State barriers.* Five respondents described state barriers: One legislator said the state is not following the 75 percent WSF statute and believes it has been funded at 49 percent for five years.[25] Two said that state procurement processes are a hindrance, and one state official said that principals' flexibility is inhibited by state mandates that do not come with separate funding streams.
- *Federal barriers.* Seven respondents described federal barriers, including five who cited NCLB mandates, federal compliance, or standardized tests; one who suggested aligning

[25] The official language of the statute reads as follows: "Not less than seventy per cent of appropriations for the total budget of the department, excluding debt service and capital improvement programs, shall be expended by principals." (see http://www.capitol.hawaii.gov/hrscurrent/Vol05_Ch0261-0319/HRS0302A/HRS_0302A-1301.htm). While the statute points to the requirement that 70 percent of the education appropriation be spent at school sites ("expended by principals"), it seems the respondent in this case may have interpreted this 70 percent as dollars flowing through the WSF (over which principals have the most discretion). Therefore, this finding may say more about the challenge in the understanding and interpretation of the statute on the part of stakeholders.

the Academic and Financial Plans and all funding streams instead of having separate plans for Titles I and II; and one who cited federal categorical funds.

Challenges and Critical Next Steps

Twelve respondents were asked to describe what they thought were challenges and critical next steps for the WSF:

- *Lack of funding, especially for small schools.* Seven of the 12, including 5 school staff members, said that lack of funding was a big challenge. Five of those seven specified that small schools need enough funding for essential personnel. As one principal explained, at her school positions were created to meet certain mandates but the funding is not enough to staff them. Consequently, she has to combine positions, which leaves her shorthanded, and if she has no one to fill that spot she has to "do the custodial work, my job, and whatever else is required of me." She does not want to cut teacher positions because combining grades will result in parents pulling their children out of mixed curriculum classes and, thus, further lower her enrollment.
- *Special education funding.* Two of the 12 respondents spoke about the challenge of pushing more of the budget, including special education, onto schools. One of these, a legislator, said that he wants to see principals empowered because they are closest to the children and can make the best decisions. However, he knows the dangers of adding expensive special education into the WSF and the difficulties in decentralizing funding in this fiscal climate. A principal echoed this sentiment, saying that one special education case "at $350,000" would wipe away the budget.
- *Miscellaneous challenges*. Two of the 12 respondents would like to see better understanding of the WSF and finance training for principals[26], one state staff member wants to see the enrollment numbers released to match with the budgeting process timeline in order to avoid large deviations between projected and official enrollment counts, a legislator wants to get more data and good information out to stakeholders, and a principal sees the challenge of fluctuating funding and the lack of experienced teachers as needs increase.

Suggestions for Improving the WSF or Its Implementation

Finally, 15 respondents were asked for suggestions to improve the WSF or its implementation:

- *More funds in the WSF.* Three respondents want to see more funds going to the WSF.
- *Additional changes to the timeline.* Two respondents want to tweak the timeline of the WSF process.
- *More support for small and isolated schools.* Five respondents suggested extra support for small and isolated schools: One principal wants to see a flat amount for small schools, whereas another principal voiced the need for a base amount to cover basic costs at each

[26] Note that this may seem in contrast to the principal survey analysis finding presented earlier where most principals reported that they understood the WSF and know where to go for additional information. However, the sentiment of these two stakeholders merely suggests that principal knowledge could be improved and points specifically to training in finance.

schooling level (e.g., a K–6 school needs one teacher for every grade). Another principal would like to see more funds for isolated schools (e.g., extra funds for facilities because minor repairs and maintenance are part of the WSF funds), whereas another wants to see higher weights for isolated schools and travel funds for isolated school staff to fly to Oahu for professional development. One state staff member suggested that addressing the issue with small schools should be a priority.

- *Better transparency and communication.* Four of the 15 respondents would like more transparency about the WSF and more communication about COW decisions about the formula and weights.
- *More autonomy and flexibility.* Three respondents—including two legislators—suggested more autonomy and flexibility for schools. As one said, "I've always believed that it's really trying to get the resources closest to the people closest to the students and [having] them make most of those decisions would be in the best interest of the student." One state staff member elaborated on autonomy by suggesting that teachers should be able to use PCards for purchasing (currently, only principals have PCards) and that the base amounts for the procurement process should be reexamined.
- *Special education funding.* Two respondents had opinions about special education and the WSF but in opposite directions. One, a legislator, wants special education included in the WSF: "I would say that the simplest and most direct might be high functioning special needs kids. I talk to principals, they don't know, they get assigned how many special ed teachers show up and how many educational assistants and all of that. It's a separate kind of thing, and they don't seem like they have any input into what happens… From year to year…I don't know how many SPED teachers are going to show up, I don't know how many EA's [Educational Assistants] I'm going to have." The other, a principal, wants to keep special education as categorical funding: "…we need to keep that categorical because, depending on your clientele that you have at your school, one lawsuit could eat the entire budget up and that's something that I think at the state level as a central categorical fund, I think that's one of the things I feel safer that the schools not touch and I think most of the principals agree with that, even though it would give you autonomy to buy more special education teachers or EAs or whatever you want to do, I think it's dangerous in the sense that now what the state is going to do is say you know we got no money, you guys have to pay for it out of your own budget."
- *Miscellaneous suggestions.* Additional suggestions for improvement included the following: multiyear weights for multiyear Academic and Financial Plans would be more effective and logical (state staff member), bring back professional development days when the budget allows (state staff member), training for principals to learn how to budget (school staff member), a survey of other jurisdictions that use average daily attendance in their WSF (state staff member), and getting the legislature more involved with the COW (state staff member).

Chapter 6 - Changes in Equity After Implementation of Hawaii's WSF

As discussed earlier, a key motivation behind the implementation of a WSF is to improve the *equity* with which resources (dollars) are distributed to schools. Two additional and equally important motivations were also presented. First, WSF policies can improve the *efficiency* with which money is spent by shifting the discretion over resources from the central office to school leaders who, because of their proximity, are arguably more knowledgeable about how best to serve the unique needs of their students. Second, WSF policies often involve increasing the degree to which parents and members of the local community are empowered to participate in the decision making concerning educational programming at their schools, and this engagement also takes advantage of this group's proximity to help meet the needs of the students being served.

The preceding chapters touched on all three of these motivations. The overview in Chapter 2 described the development and evolution of the WSF currently in place in Hawaii and the establishment of SCCs under Act 51. Chapters 4 and 5 investigated principal and stakeholder perceptions and the extent to which they understood the WSF and felt it increased the equity with which dollars are distributed, the flexibility principals have in how resources are used and whether any innovative programs have been implemented as a result of the formula, and the extent to which the SCCs have been engaged in the decision-making process. In contrast, this chapter focuses solely on the equity motivation by using statistical analysis to explore whether there were changes (improvements) to funding equity since the WSF was implemented. Specifically, it addresses the following research question:

> *Did the relationship between dollar allocations to schools and student need in terms of student socioeconomic disadvantage become stronger after implementation of the WSF?*

The following chapter addresses this question through a series of statistical analyses involving demographic and fiscal data on student and school characteristics and dollar allocations to schools under the WSF. The chapter first provides an overview of the data used and then presents the methodology and results of descriptive analysis that shows over time the average WSF per-pupil dollar allocations across schools serving students with various levels of socioeconomic disadvantage (SED). A second analysis goes on to show the general relationship between per pupil allocations and SED and how this may have changed since implementation of the WSF. Finally, a more rigorous regression analysis is then presented that estimates the relationship between both WSF and overall per-pupil allocations and SED, while controlling for the influence of school scale of operations.

Fiscal Data

The HIDOE provided all of the fiscal data used in the analyses presented in this chapter. These data were used to generate school-level measures of allocations per pupil as detailed below. It is important to note that although the allocations made through the WSF come strictly out of General Fund dollars, our analysis also makes use of all dollar allocations that can be linked directly to schools in our sample, including those supported by the General, Federal, Special, and Trust Funds.

Allocations Data

Data on the dollar allocations made to school sites for the school years 2000–01 to 2012–13 were provided to the research team by the HIDOE. Two types of files were provided for each fiscal year: *position* allocation files, which included the number (in FTE counts) and type of staff positions allocated to each school in the state supported by the various available funding sources, and *transactional* allocation files, which included allocation amounts from funds distributed through the WSF, as well as all nonpayroll allocations from non-WSF–related funds. Although the position allocation files contain the bulk of the resources made up by staffing costs that was spent at school sites, the transactional allocation files account for funds carried over from previous years, as well as adjustments for enrollment fluctuations and interprogram transfers, which help generate a more accurate measure of the resources made available to schools over the full course of the school year.[27]

Identifying WSF versus Non-WSF Dollar Allocations

In both the position and transactional allocation files, the program ID code identifies the source and purpose of fiscal resources. This data element was used to identify fiscal resources that were eventually distributed through the WSF versus those that were not. Specifically, for all years in our analysis—both those prior and subsequent to implementation of the WSF policy—the research team separated allocation dollars into three categories: (1) those that were eventually distributed by the WSF exclusively after 2006–07, (2) those that were never distributed by the WSF, and (3) those that were distributed by the WSF for only a portion of the post-WSF period.

When the formula was introduced, multiple programs were retired and consolidated into the program IDs currently used to identify WSF resources.[28] The HIDOE provided a list of program IDs that currently identified WSF program IDs and a crosswalk between these current IDs and the retired IDs that were eventually consolidated into WSF program IDs in the 2006–07 school year or later. This information allowed the research team to compare the distribution of the fiscal resources that were associated with the WSF both before and after they were allocated through the formula.[29]

For the analyses presented in this chapter, we examine overall allocations per pupil, as well as allocations broken out by WSF status (i.e., those distributed through the WSF versus those distributed outside of the WSF). In the scatter plots and regression analysis, allocations are coded as WSF if they were associated with a WSF program ID in 2006–07 or later. Prior to 2006–07, allocations are coded as WSF if they were associated with a retired program ID that was

[27] More information about the position and transactional allocation files and how these were combined to create the analysis data set is included in Appendix E.

[28] For a comprehensive list of current and retired Program IDs associated with the WSF and their corresponding allocations, see Appendix E (Exhibits E.2, E.3, E.4, and E.5).

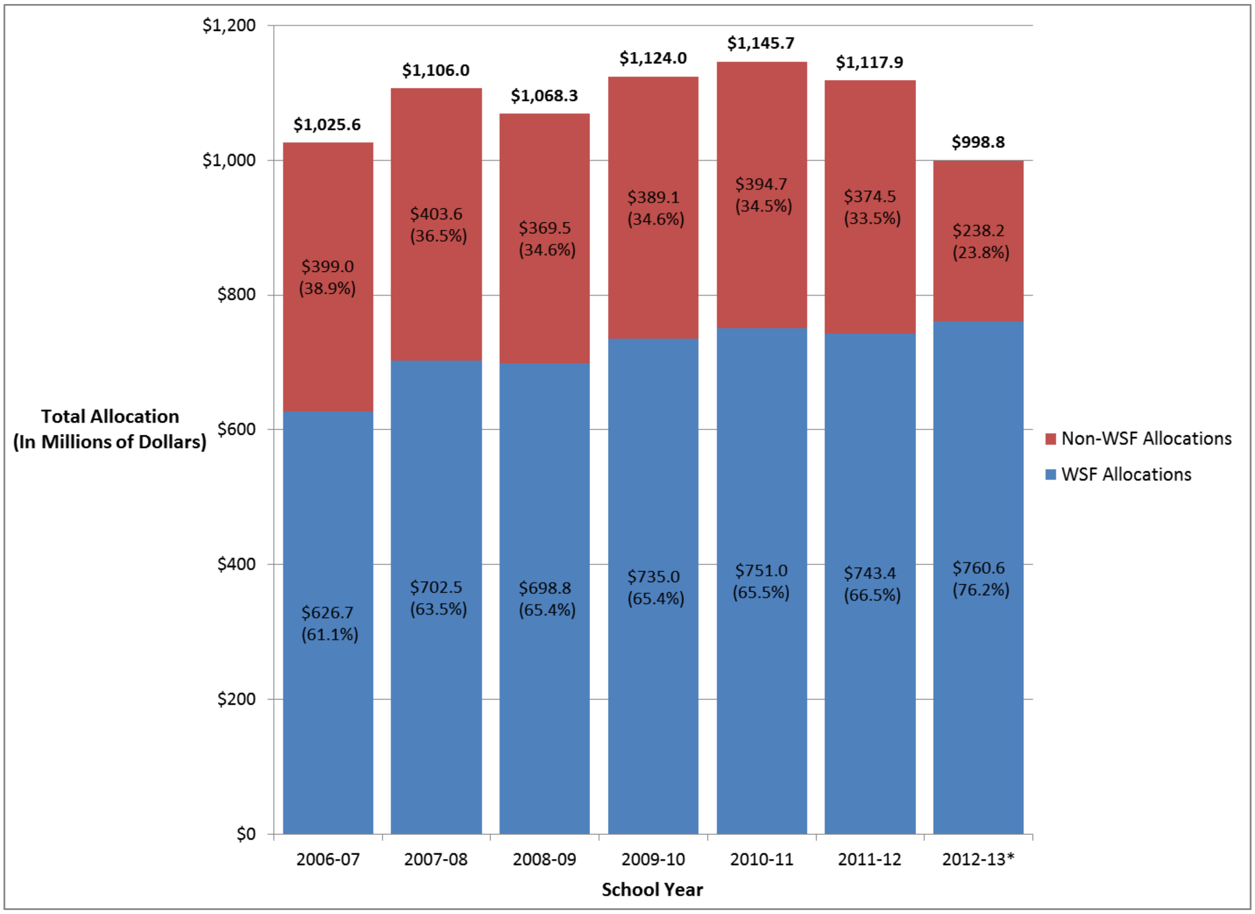
[29] Additional necessary adjustments were made to account for retired programs that were split between WSF and non-WSF programs after the WSF was implemented and to exclude allocations for fringe benefits that were included in selected years of data. Details on these adjustments can be found in Appendix F.

consolidated into the WSF in 2006–07.[30] In the bar charts, however, to take into account the fact that additional program IDs were distributed through the WSF some years after the initial implementation in 2006–07 (beginning in 2009–10), allocations under these additional programs are coded as "Ever WSF," in contrast to those that were introduced through the formula in the first year, which are coded as "Pure WSF."[31]

Exhibit 6.1 shows the total dollar allocations and corresponding shares received by school sites in the analysis sample between 2006–07 and 2012–13 broken out by WSF status. The lower portion of each bar indicates allocations that were distributed through the WSF, and the top portion denotes those that were distributed outside of the WSF. Both the level and share of WSF dollar allocations are relatively stable after increases in the first two years and until the final year in the period (from 2008–09 to 2011–12). During this period, WSF allocations constituted approximately two thirds of total allocations from the HIDOE. In the most recent year, the results show that there was a sharp increase in the share of WSF allocations, largely because of the decrease in non-WSF dollar allocations; the reader will note that the absolute level of dollars allocated through the WSF in 2012–13 has not changed appreciably since 2009-10.

[30] Because schools can carry over a portion of funds from the previous year, a handful of retired program IDs appeared in the 2006–07 file; these were coded as WSF.
[31] The amount of funding contained in programs labeled as "Ever WSF" is quite small and mostly corresponds to dollars supporting high schools.

Exhibit 6.1 – Dollar Allocations to Schools by WSF Status from 2006–07 to 2012–13 (Total Dollar Allocations in Bold)



*Note: 2012–13 allocations are preliminary.

Source: Historical fiscal data obtained from the HIDOE Budget Execution Section.

Demographic Data

The research team assembled a data set containing school-level information pertaining to student needs and enrollment. HIDOE provided electronic data files for the post-WSF years (2006–07 to 2012–13) which contained the official school-level demographic and enrollment measures that were used in conjunction with the WSF weighting factors to calculate dollar allocations for schools.[32] These data included SED (proxied by students eligible for or receiving free or reduce-price lunch), English language learner status, and enrollment by grade range. Student counts by grade level, special education status, and eligibility for free or reduced-price lunch were provided separately for all years in which the fiscal allocation files were made available (2000–01 to 2012–13) allowing us to fill in the years prior to WSF implementation. Counts by ELL status were also provided; however, they were unavailable for the 2000–01, 2001–02, and 2002–03

[32] See Chapter 2 for an in-depth description of the WSF weighting factors.

school years. For these years, school-level ELL counts were generated by using data from the National Longitudinal School-Level State Assessment Score Database.[33]

The analyses in this chapter make use of the following school-level characteristics across the study period (2000–01 to 2012–13): enrollment, percentage of students who are eligible for or receiving FRPL, and percentage of students who are ELLs. Percentages for the latter two variables were generated by taking the total number of students in each group and dividing by the school's total enrollment.

Analyses in this chapter are performed separately by schooling level (elementary, middle, and high). To determine schooling level, each school's grade-level student counts were summed into three mutually exclusive grade ranges: K–5 (elementary), 6–8 (middle), and 9–12 (high). These counts were then divided by total school enrollment. The category that had the largest share of a school's enrollment was then assigned to that schooling level. For example, if the school's largest share was K–5, then it was designated as an elementary school.

Study Sample of Schools

The HIDOE provided a list of schools that received allocations through the WSF. Any schools that did not receive allocations through the formula were excluded from the analyses presented in this chapter. Appendix H lists schools that appeared in the fiscal files but were excluded in the analyses (see Exhibit H.1). The majority of schools that were excluded serve special populations and, accordingly, were funded through special programs. In addition, one school was removed from the file because of its conversion to a public charter school after the WSF was implemented, as was a handful of charter schools occasionally appeared in the fiscal files in years prior to the introduction of the WSF.

Exhibit 6.2 contains descriptive statistics for the variables included in the analysis for selected years (2005–06, 2008–09, and 2012–13).[34] Across all schooling levels, on average, there has been a noticeable increase in both FRPL percentage and ELL percentage during the period. For all schooling levels, the average FRPL percentage increased by more than 10 points from the 2005–06 to the 2012–13 school year. It appears that the major shift occurred between 2008–09 and 2012–13 and was largest for high schools. Among the increases in the average ELL percentage that occurred at all three schooling levels, the sharpest was found at the middle school level, where the average ELL percentage more than doubled between 2005–06 and 2012–13. For enrollment, it appears that the size of the average elementary school fluctuated, exhibiting a u-shaped pattern during the three study years, and showed an increase between 2005–06 and 2012–13. In contrast, the average enrollment at middle and high schools has declined during the period.

[33] For more information about how the ELL rates were generated, see Appendix G.
[34] For sake of brevity, we limited this analysis to three years. The specific years were chosen to provide a comprehensive spread of results spanning from before to after the WSF was implemented.

Exhibit 6.2 – Characteristics of Analysis Sample of Schools (2005–06, 2008–09, and 2012–13)

Variable	Year	Elementary Schools				Middle Schools				High Schools			
		Average	Min	Max	Count	Average	Min	Max	Count	Average	Min	Max	Count
FRPL Percentage	2005–06	47.1%	1.6%	100.0%	176	43.5%	11.7%	75.5%	37	35.7%	8.2%	67.1%	39
	2008–09	47.3%	1.9%	99.5%	177	44.7%	12.9%	80.7%	37	37.8%	10.7%	70.8%	39
	2012–13	57.5%	4.5%	99.5%	174	56.5%	17.3%	84.8%	38	50.6%	16.3%	89.1%	39
ELL Percentage	2005–06	9.9%	0.0%	53.8%	176	7.4%	1.3%	28.8%	37	6.5%	0.6%	20.5%	39
	2008–09	11.1%	0.0%	47.7%	177	7.8%	1.13%	25.6%	37	6.6%	1.6%	22.3%	39
	2012–13	15.5%	0.0%	75.0%	174	16.4%	3.0%	45.8%	38	11.9%	2.7%	30.4%	39
Total Enrollment	2005–06	520	57	1,452	176	811	181	1,872	37	1,420	285	2,579	39
	2008–09	508	61	1,381	177	781	151	1,742	37	1,344	285	2,565	39
	2012–13	552	76	1,459	174	767	174	1,731	38	1,288	258	2,818	39

Source: Historical demographic data obtained from the HIDOE Budget Execution Section.

Analysis of Funding Allocations by SED Category

Methodology

The first analysis investigates how overall pure WSF, ever WSF, and non-WSF allocations varied with school SED over time. Examining the relationship between school per-pupil allocations and student SED across multiple years provides insight into how the distribution of school allocations has changed from before to after the WSF was implemented. If schools with higher levels of SED receive larger per-pupil allocations relative to schools with lower levels of SED, and this difference increases over time, then it suggests that the distribution of fiscal resources may have become more equitable. To demonstrate how this relationship may have changed during the study period, the analysis results are presented for the 2005–06 school year, the year immediately prior to the introduction of the WSF, as well as for 2011–12 and 2012–13, the two most recent years for which data are available.[35]

To perform this analysis, for each year all schools within a particular schooling level (e.g., elementary) were sorted by FRPL percentage and then divided into 10 groups of equal size (deciles). Decile 10 contains schools with the highest FRPL percentage, whereas decile 1 contains schools with the lowest FRPL percentage. The average overall, pure WSF, ever WSF, and non-WSF per-pupil allocations for each decile were then charted by school year.[36] Proportions of average allocations by WSF status were also included on the bar charts to observe changes in relative shares of allocation by the various types over time. Treating the data in this fashion allows us to evaluate the general patterns of per-pupil allocations across levels of SED and assess whether the relationship between allocations and disadvantage has become more systematically positive over time.

[35] Note that the analysis was performed for all study years (2000-01 through 2012-13), however, for sake of brevity we have chosen to present the findings from this sample of years, which provides a good contrast between the period before the WSF was implemented and the most recent years.
[36] Overall allocations may not match the sum of the WSF and non-WSF allocations due to rounding.

Results

- *Descriptive analysis of patterns of average per-pupil allocations across levels of SED suggest that the relationship between funding and student need at all schooling levels has become consistently more positive and stronger since implementation of the WSF.*

Elementary Schools

The findings for elementary schools suggest that there has been a more consistent and positive relationship between average WSF per-pupil allocations and school SED (average percent FRPL) since the introduction of the WSF. To see this, consider the shape of the leftmost portion of the bars that run from higher to lower SED in Exhibit 6.3; they denote average per-pupil allocations just prior to WSF implementation (2005–06) from programs that were distributed by the WSF in the following year (WSF allocations per pupil).

In the year prior to WSF implementation (2005-06), per-pupil allocations from program funds that were eventually included as part of WSF did not show a consistently positive relationship with the proportion of SED students in the school. Average WSF allocations per pupil did decrease, albeit unevenly, from the 9th to the 4th deciles of FRPL.[37] However, average allocations then *increased* for successively lower levels of SED, suggesting possible inequity in the manner in which these dollars were distributed prior to WSF implementation.[38] For example, the average per-pupil allocation of WSF dollars for the least disadvantaged elementary schools (FRPL decile 1) of $3,821 was *higher* than the $3,463 average found for more disadvantaged elementary schools (FRPL decile 4).[39] Similarly, the per-pupil allocation of WSF dollars for the most disadvantaged elementary schools (FRPL decile 10) is *lower* on average than that of elementary schools with lower proportions of disadvantaged students (FRPL deciles 7, 8, and 9).

For a more comprehensive picture of the relationship between funding and student need, it is also important to look at the *overall* per-pupil dollar allocations (i.e., from all sources of funding including both programs eventually distributed within and outside the WSF) across levels of SED. The overall per pupil allocations in 2005-06 did reveal a somewhat positive relationship that was largely driven by the non-WSF funding. The relationship is best described as following a sawtooth pattern—going up at some points in the distribution of FRPL and down at other points. For example, we observed successive average funding increases associated with lower FRPL deciles followed by unexpected decreases at particular FRPL deciles (e.g., at deciles 3, 6, and 10).

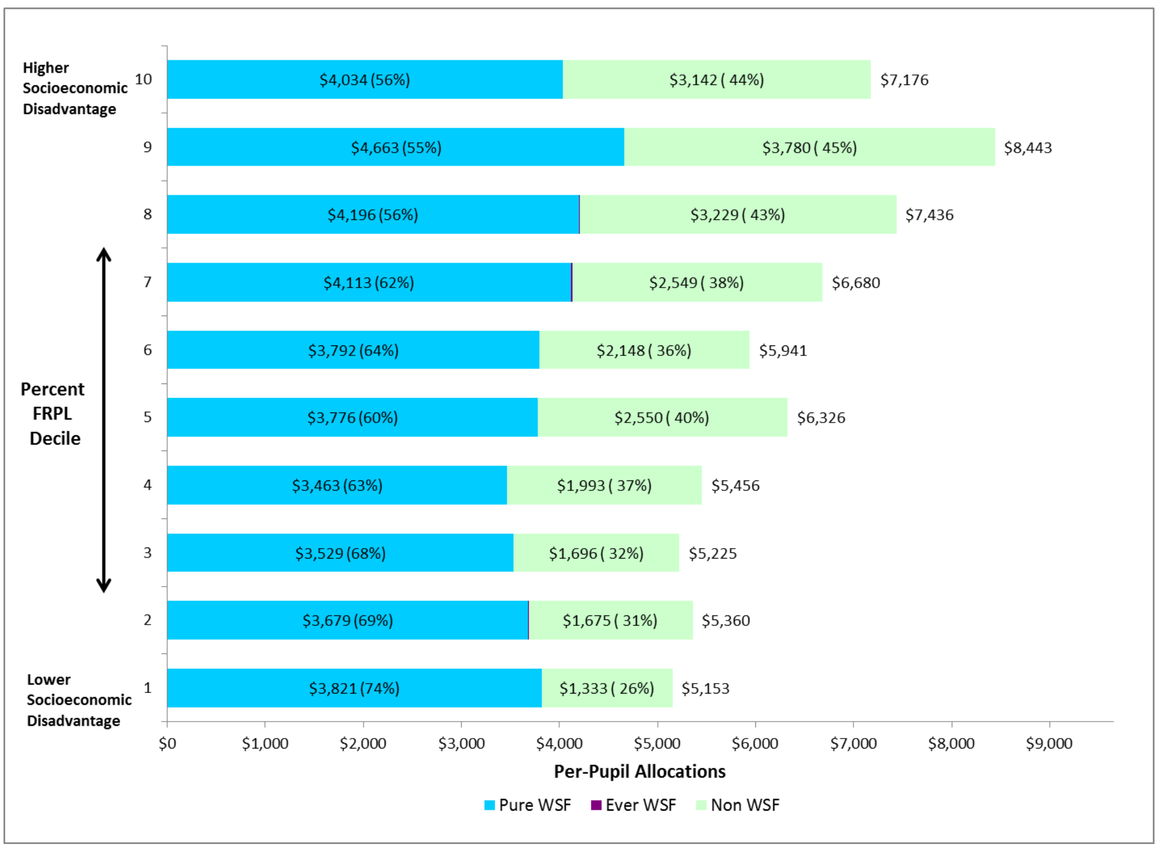
It is important to emphasize that the analysis presented in this section is purely descriptive. The variation in average allocations per pupil shown in this analysis may be influenced by many factors in addition to SED. For example, schools in FRPL decile 9 may receive larger per-pupil

[37] The within-FRPL decile average WSF allocations per pupil decreased unevenly in the sense that there were relatively large drops between deciles 9 and 8, 7 and 6, and 5 and 4, respectively.
[38] It should be noted that SED is only one specific, albeit key, factor that might explain variation in per-pupil allocations. Specifically, other factors responsible for driving funding to schools, but were not related to SED, could also explain inconsistent patterns of average per-pupil allocations across FRPL decile.
[39] Note that the average FRPL percentage in elementary decile 1 was 10.4 percent, compared with an average of 38.1 percent in decile 4 (see Exhibit H.2 in Appendix H).

allocations on average than those in decile 10 because of other cost factors (e.g., average enrollment in decile 9 schools may be smaller, their incidence of ELLs may be higher, and so on). Similarly, the non-WSF allocations per pupil may be larger for less versus more disadvantaged schools because of additional cost factors such as incidence of special education students.

To put these results in context, the reader is referred to Appendix H, which provides tables detailing average student needs (percentages of FRPL, ELL, and special education students) and school characteristics (enrollment) within each FRPL decile for all three schooling levels (elementary, middle, and high) across the years presented in the bar charts (2005–06, 2011–12, and 2012–13). A scan of the average characteristics in Exhibit H.2 (Appendix H) shows that some of the observed patterns might indeed be explained by other cost factors. For example, the enrollment among schools is lowest in FRPL deciles 7, 8 and 9, which also could help explain the relatively high per-pupil allocations in these deciles. Analysis presented later in this chapter attempts to control for other factors that might potentially further explain these variations.

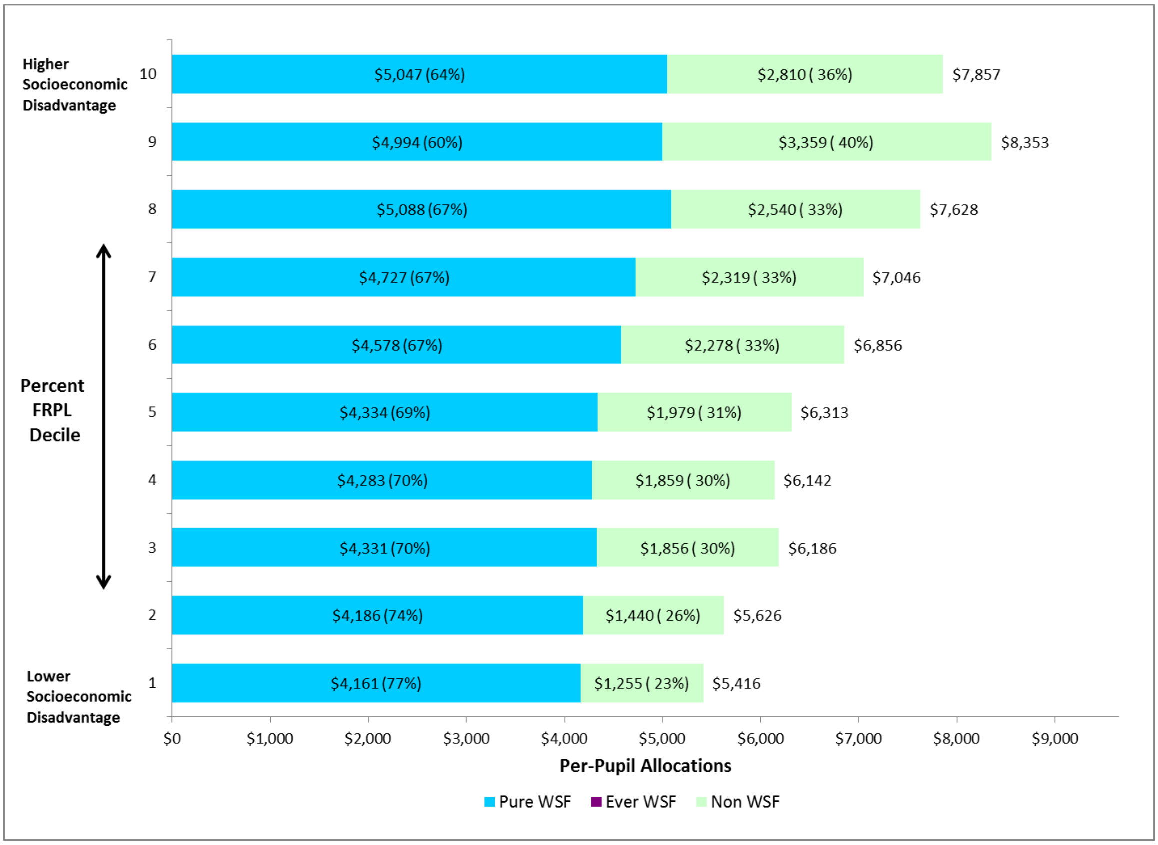
Exhibit 6.3 – Average Per-Pupil Allocations by Category: Elementary Schools, 2005–06



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Moving to the post-WSF period, we find that the average WSF allocations per pupil appear to be more consistently and positively related to SED. Exhibit 6.4 shows average WSF per-pupil allocations by category of SED in 2011–12, which suggests that a smoother relationship emerged. Specifically, average per-pupil allocations of both WSF and non-WSF dollars (and, hence, overall dollars) generally increased with higher levels of SED. Exceptions to this general rule are relatively few and usually correspond with relatively small increases in per-pupil funding.[40]

Exhibit 6.4 – Average Per-Pupil Allocations by Category: Elementary Schools, 2011–12



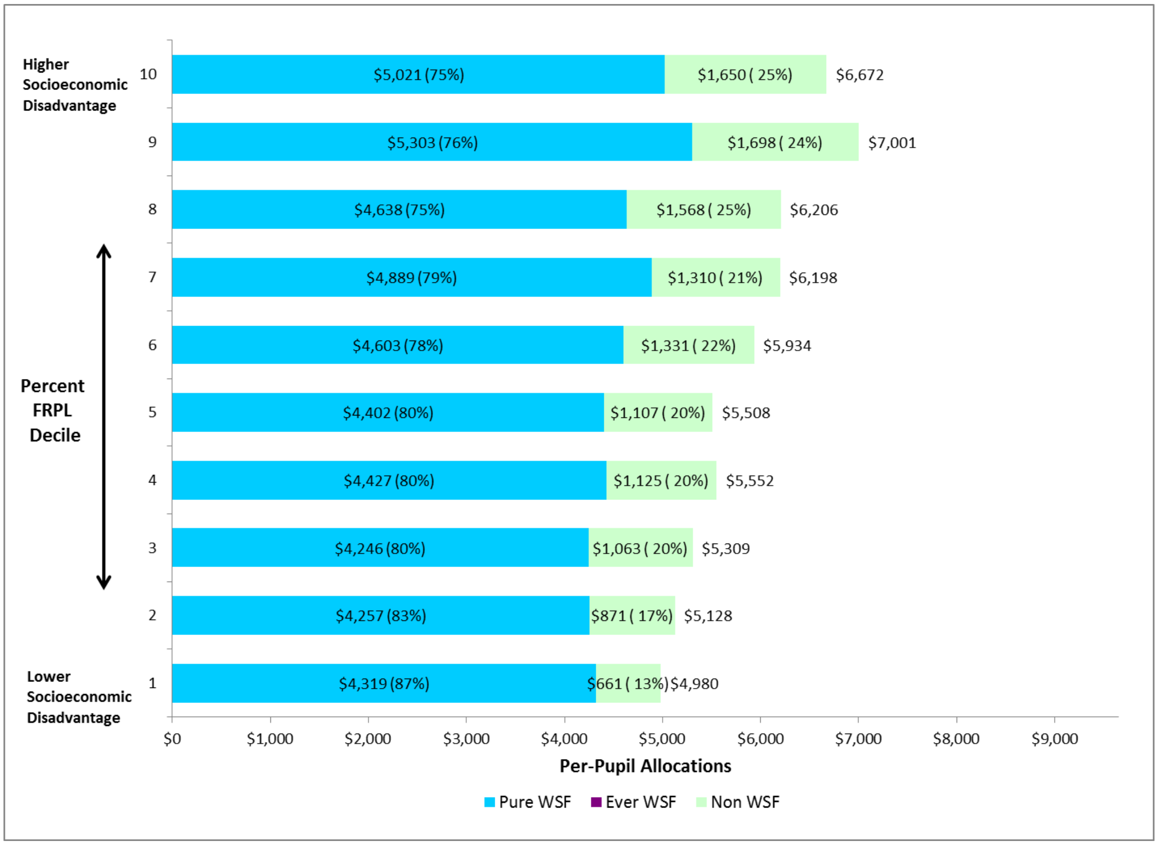
Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.5 provides the distribution of average per-pupil allocations by SED for the most recent year: 2012–13. Here we find that the positive pattern between WSF dollar allocations per pupil and SED has become slightly less consistent than in 2011-12. Notably, the average WSF per-pupil allocation for FRPL decile 9 is larger than that of decile 10 by $102, whereas that of decile 7 is larger than that of decile 8 by approximately $251. In addition, we observe small decreases in WSF per-pupil allocations associated with increases in FRPL from deciles 1 to 2, 2 to 3, and 4 to 5 on the order of -$62, -$11, and -$25, respectively. The average non-WSF per-pupil allocations also follow a general pattern of consistent increases corresponding with higher SED. The resulting pattern of overall per-pupil allocations across disadvantage is similar to that found in the preceding year (2011–12), exhibiting consistent increases in average overall per-pupil

[40] The exceptions to this for the WSF allocations are between the following FRPL deciles: deciles 8 ($5,088) and 9 ($4,994) and deciles 3 ($4,331) and 4 ($4,283). The exceptions to this for the non-WSF allocations are between the following FRPL deciles: deciles 9 ($3,559) and 10 ($2,810) and deciles 3 ($1,856) and 4 ($1,859). The exceptions to this for overall allocations are between the following FRPL deciles: deciles 9 ($8,353) and 10 ($7,857) and deciles 3 ($6,186) and 4 ($6,142). The increase in non-WSF and overall allocations per pupil from FRPL deciles 10 to 9 stands out as a nontrivial exception.

allocations with higher levels of disadvantage. However, the levels of non-WSF allocations, and, hence, overall allocations, are dramatically lower than in 2011–12.

Exhibit 6.5 – Average Per-Pupil Allocations by Category: Elementary Schools, 2012–13



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

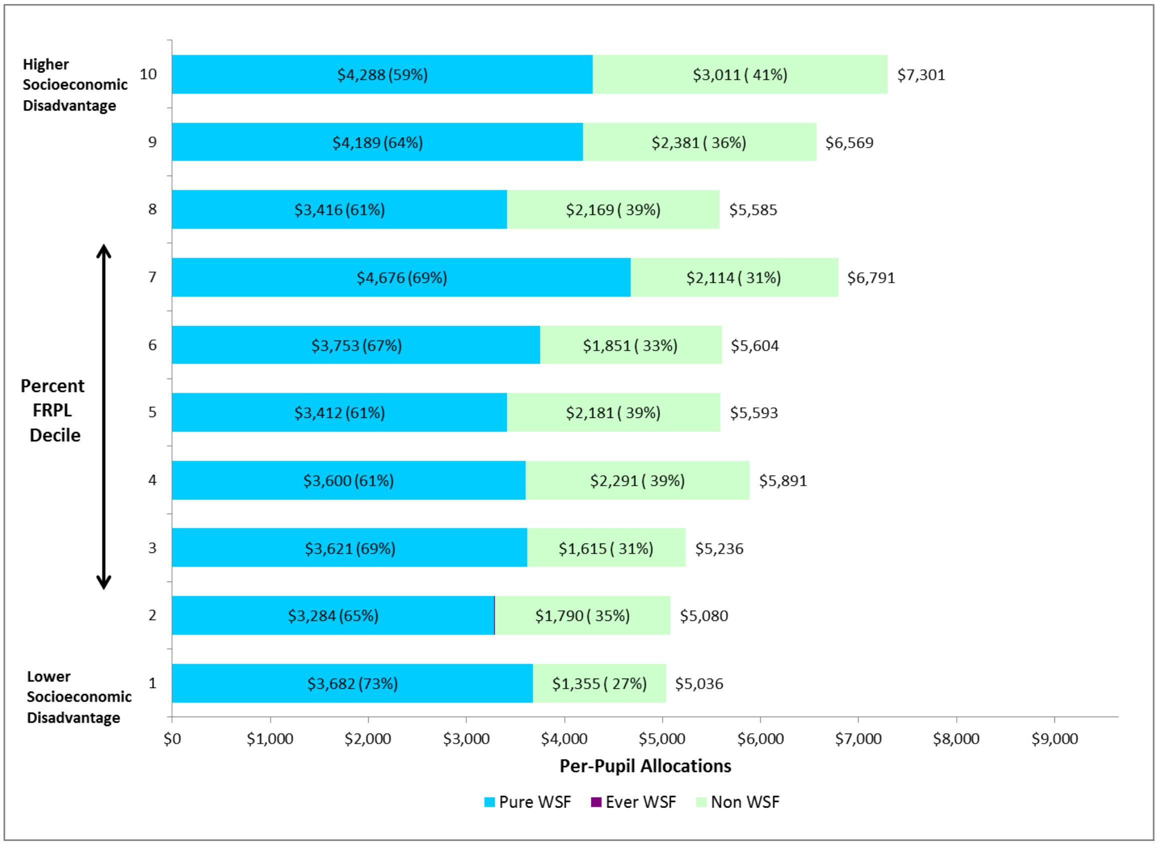
Middle Schools

The pattern of average WSF allocations per pupil across SED for middle schools in 2005–06 was less consistent than for elementary schools. That is, the average relationship between WSF allocation per pupil and FRPL decile was not as consistently positive for middle schools. Exhibit 6.6 shows decreases in average WSF allocation per pupil associated with increasing disadvantage categories at FRPL deciles 2, 4, 5, and 8. Moreover, the apparent divergence from a consistently positive funding/student need relationship is also found when comparing per-pupil allocations across relatively high and low deciles of FRPL. For instance, the average WSF dollar allocation per pupil for middle schools with the lowest disadvantage (decile1) is $266 more than that of schools with much higher levels of disadvantage (decile 8).[41] There are also notable discontinuities in the increasing pattern associated with average non-WSF allocations per pupil at

[41] The average FRPL percentages in deciles 1 and 8 are 15.0 percent and 50.9 percent, respectively (see Exhibit H.3 in Appendix H).

deciles 3, 5, and 6. The resulting shape with respect to overall per-pupil allocations again similarly represents a familiar uneven sawtooth pattern.

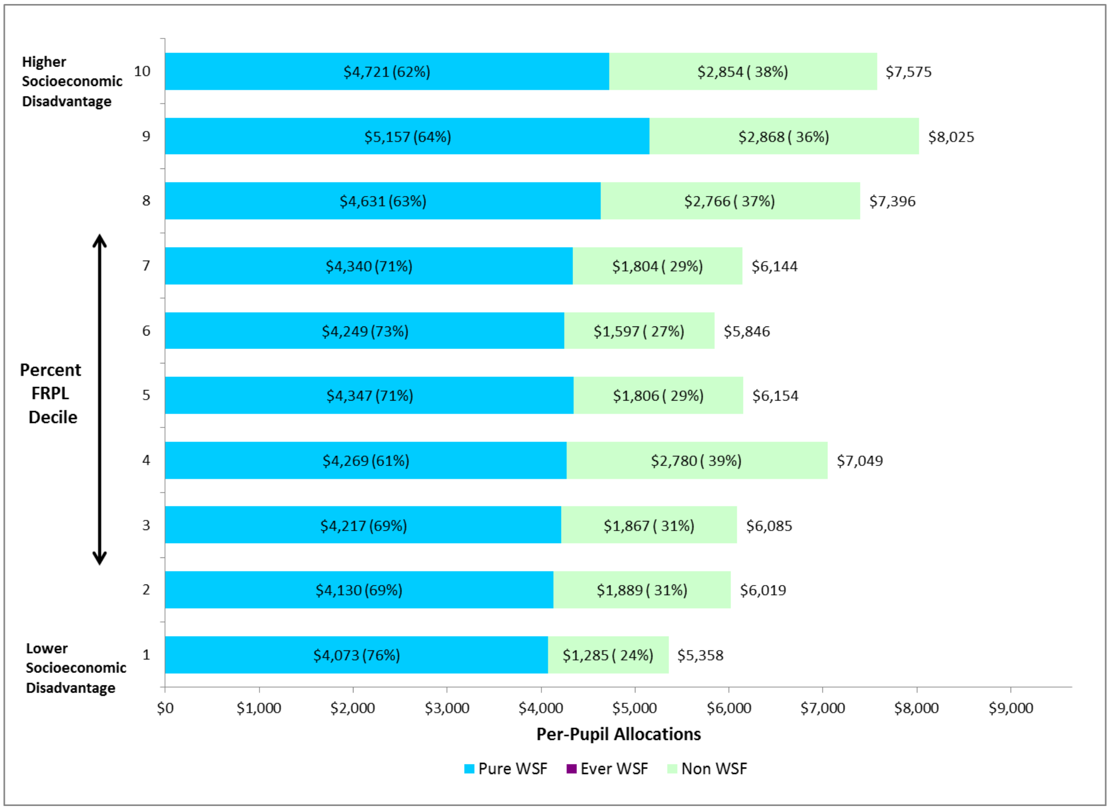
Exhibit 6.6 – Average Per-Pupil Allocations by Category: Middle Schools, 2005–06



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Moving to the post-WSF period, Exhibit 6.7 shows the pattern of average middle school WSF per-pupil allocations across varying levels of SED in 2011–12 to exhibit a more consistent positive relationship than in 2005–06, suggesting the dollars allocated through the WSF may have been distributed in a more equitable manner after it was implemented. With only two exceptions (the differences between deciles 9 and 10 and between deciles 5 and 6, respectively), the WSF allocations per pupil tended to be higher for schools in higher poverty deciles. The pattern of average non-WSF allocations per pupil across school disadvantage is similar to that for 2005–06, with four breaks in the positive funding/student need relationship (between deciles 2 and 3, 4 and 5, 5 and 6, and 9 and 10). Therefore, the resulting sawtooth pattern with respect to overall per-pupil allocations we observe is driven by the distribution of non-WSF dollars.

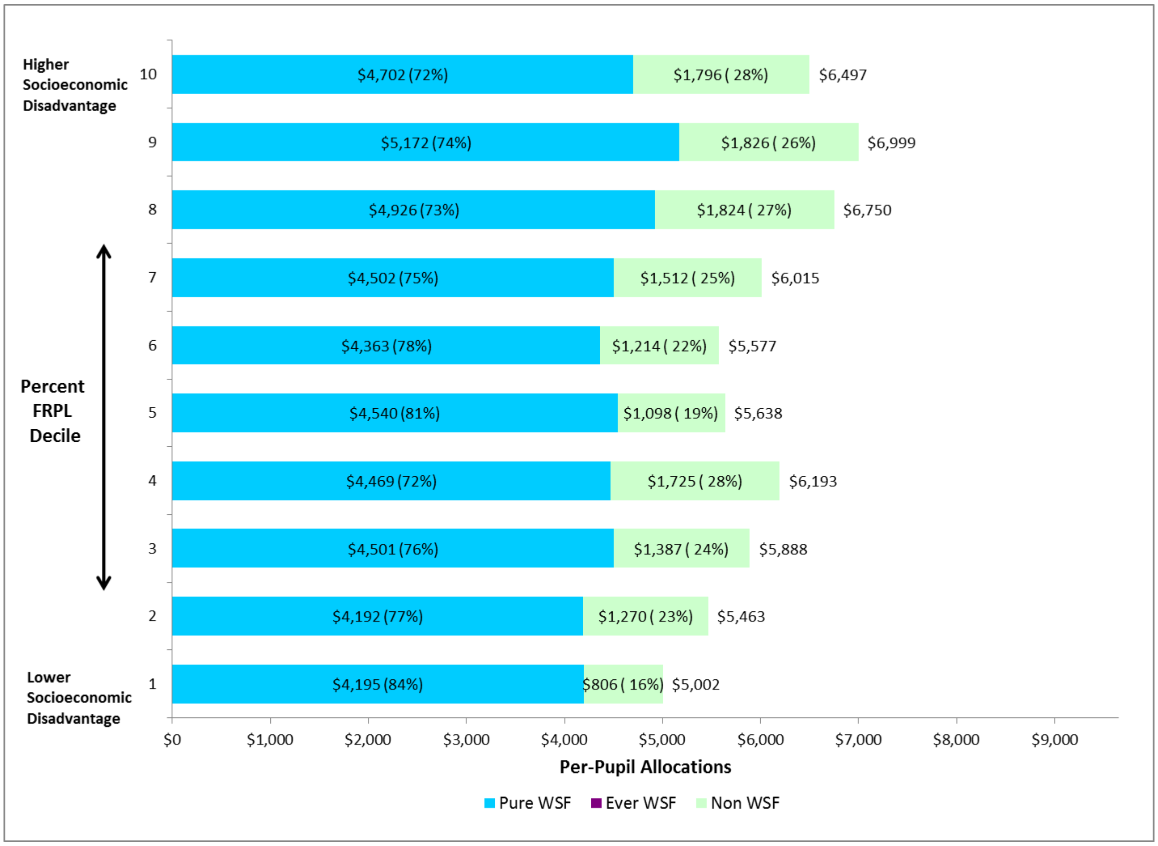
Exhibit 6.7 – Average Per-Pupil Allocations by Category: Middle Schools, 2011–12



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Examining the middle school results (Exhibit 6.8) for the most recent year (2012–13), we find that the pattern of WSF allocations per pupil is slightly less consistent and positive than that in the preceding year (2011–12). Specifically, the average per-pupil WSF allocation in decile 6 is less than in deciles 3, 4, and 5 (by as much as $177 comparing deciles 5 and 6). We again find that the pattern of non-WSF allocations exhibits discontinuities similar to those in 2011–12, which are largely responsible for the sawtooth-shaped pattern found for overall allocations. Also, we note that funding levels from non-WSF allocations and overall in 2012–13 are markedly lower than those of the prior year.

Exhibit 6.8 – Average Per-Pupil Allocations by Category: Middle Schools, 2012–13



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

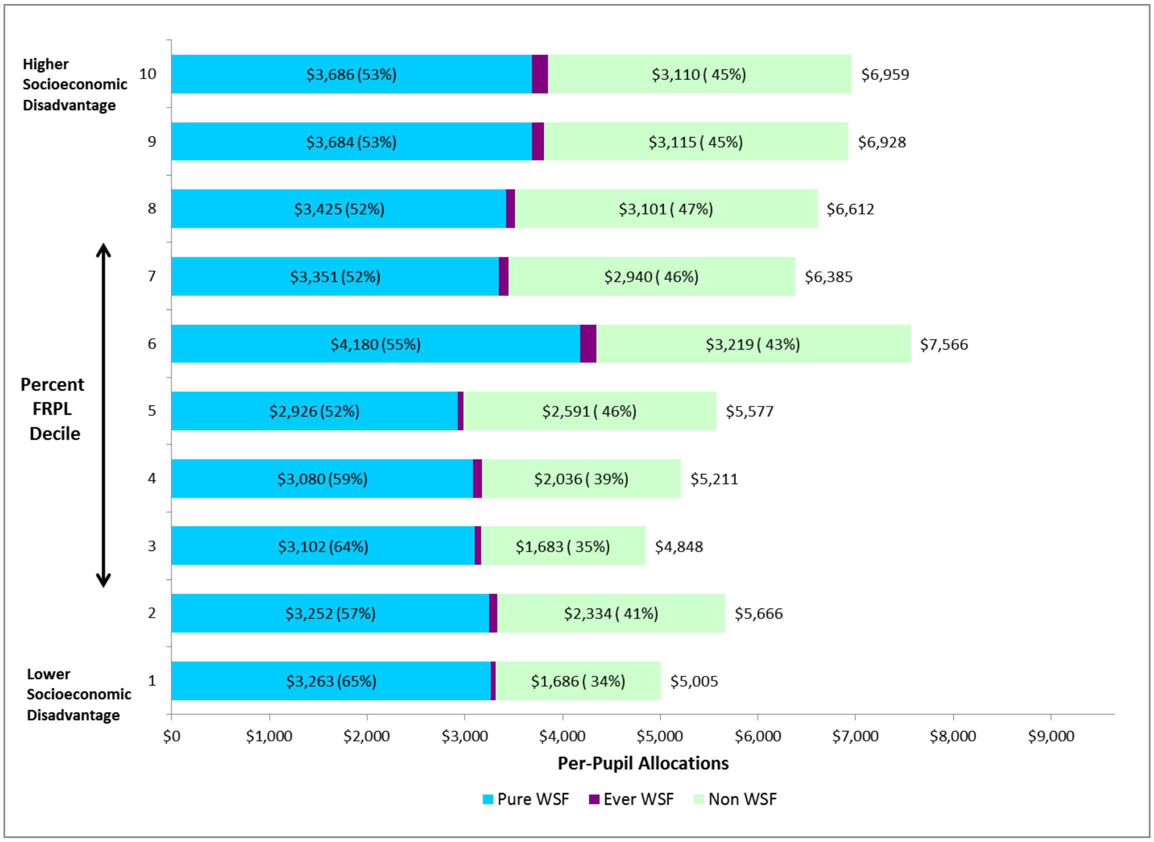
High Schools

Exhibit 6.9 contains the average per-pupil allocations across SED category for high schools in the year prior to WSF implementation (2005–06). The reader will notice that a third category of dollar allocations (ever WSF) appears, which represents program dollars that were distributed through the WSF after its initial implementation (in 2009–10) and are relatively small. Inspection of the chart shows an interesting u-shaped pattern of WSF and ever WSF allocations suggestive of both equitable and inequitable relationships between allocations and SED across specific ranges of FRPL: (1) average per-pupil dollars become larger from the decile 7 SED schools up to the highest SED schools (FRPL decile 10), and (2) average per-pupil dollars become smaller from lowest SED schools (FRPL decile 1) to the decile 5 schools. The exception to this is the spike in average WSF per-pupil allocations for schools in FRPL decile 6. Further investigation shows that this can be at least partially explained by the fact that schools in this decile are much smaller than those in all other SED categories.[42] In contrast, the allocation of non-WSF funding follows a more consistent positive pattern across SED but still exhibits large breaks at FRPL deciles 2 and 6. The combination of the WSF and non-WSF allocations results in a pattern of

[42] The average enrollment in 2005–06 for schools in FRPL decile 6 was 768 compared with the next larger average enrollment of 1,131 for decile 9 and largest average enrollment of 1,660 in decile 3 (see Appendix H, Exhibit H.4).

overall dollar allocations that systematically declines with SED across all categories except for FRPL deciles 2 and 6.

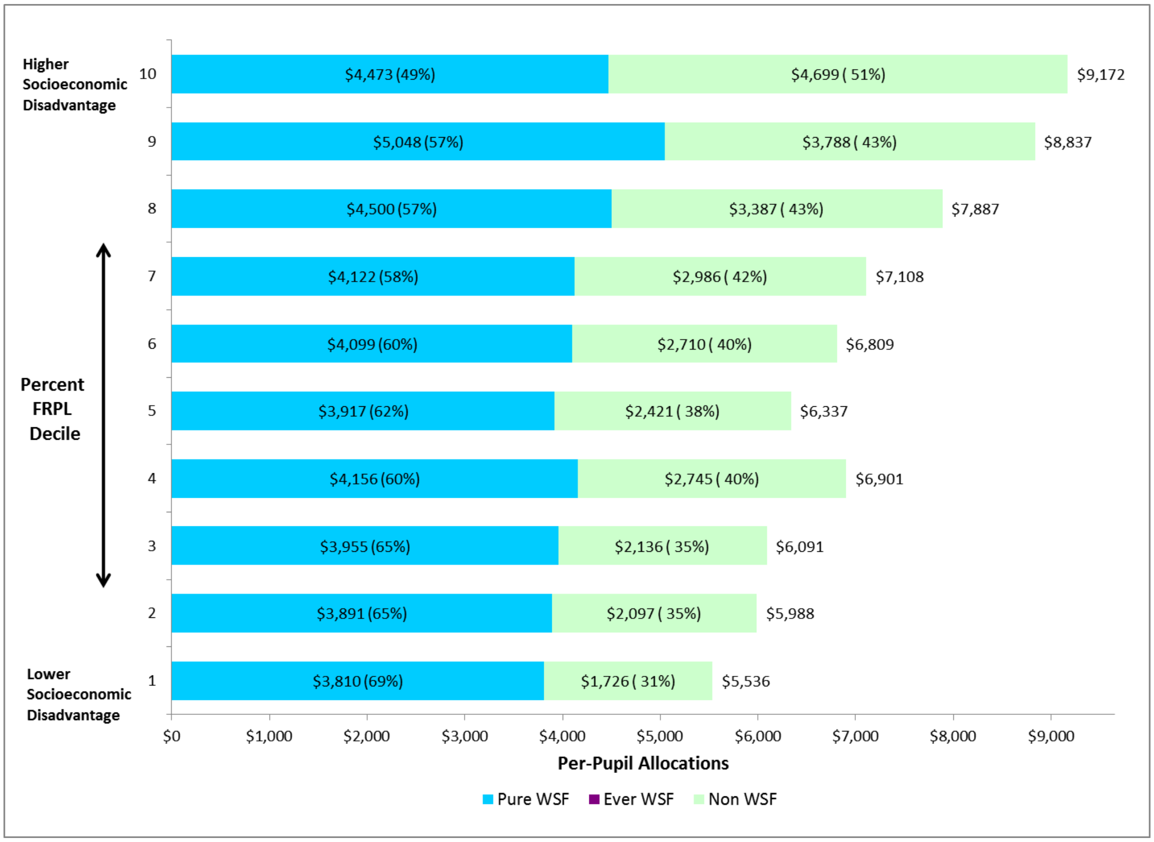
Exhibit 6.9 – Average Per-Pupil Allocations by Category: High Schools, 2005–06



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibits 6.10 and 6.11 show the allocation patterns for the two most recent years of the post-WSF period. By this time, the allocations listed as ever WSF were being distributed through the formula and, therefore, are part of the WSF allocations (leftmost portion of each bar). Reviewing the results for 2011–-12, we find that the WSF per-pupil allocations follow more of a consistent pattern in which they tend to increase with higher levels of disadvantage. There is the familiar exception to this increasing pattern between FRPL deciles 9 and 10 and a smaller one between deciles 4 and 5. The increasing pattern of non-WSF allocations is even stronger, with a single exception between FRPL deciles 4 and 5. Similarly, the pattern of overall allocations follows this increasing trend across the full range of disadvantage except for the break at decile 5.

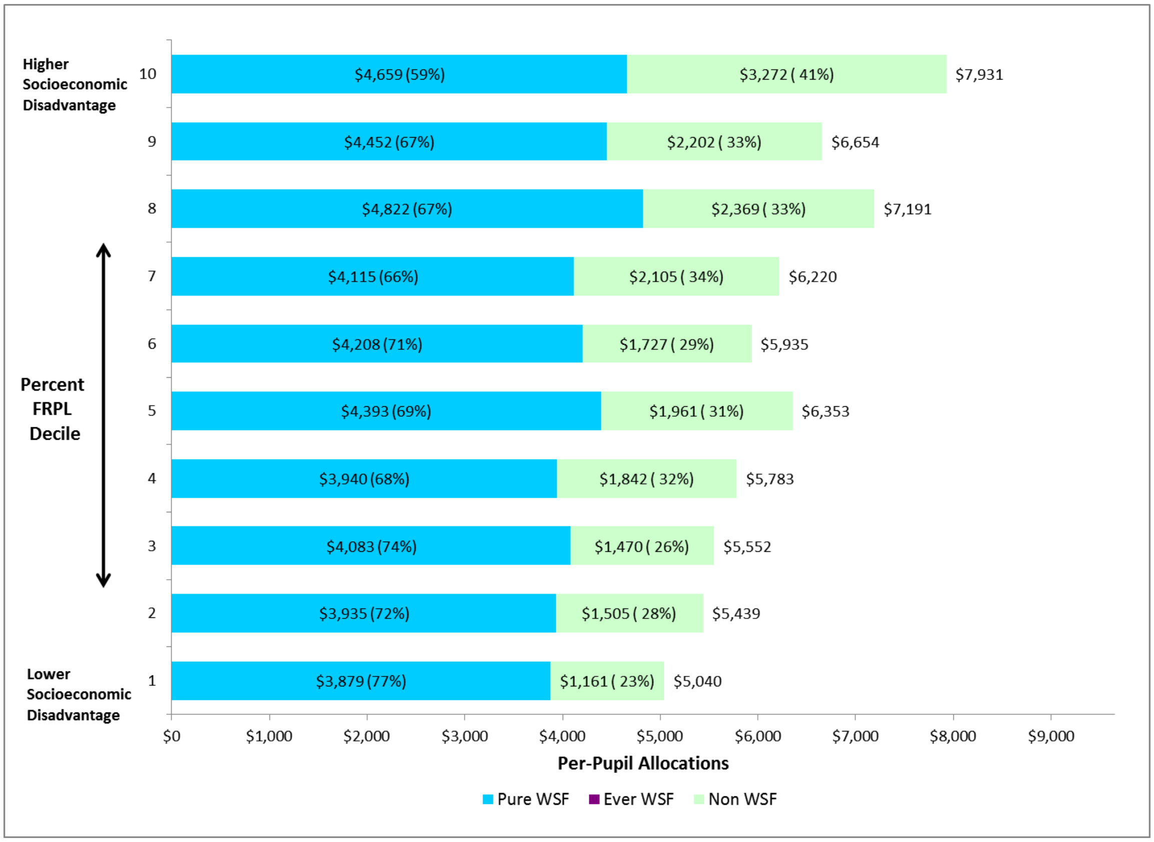
Exhibit 6.10 – Average Per-Pupil Allocations by Category: High Schools, 2011–12



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

The patterns of both the WSF and non-WSF allocations across disadvantage category became less systematic in 2012–13, which resulted in two noticeable breaks in the increasing pattern of overall allocations at FRPL deciles 6, 7 and 9. However, the observed shape suggests that despite the more erratic patterns found for this year compared to 2011-12, funding equity may have improved since before the WSF was implemented.

Exhibit 6.11 – Average Per-Pupil Allocations by Category: High Schools, 2012–13



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Scatter Plot Analysis of WSF Funding Allocations Across SED

Methodology

Although the bar charts provide a simple method of showing the basic relationship between average allocations and levels of SED and how that relationship has changed over time, there are certain disadvantages associated with analyzing data in an aggregated form. Specifically, the grouping of schools into categories of SED defined by deciles of FRPL percentage and reporting the group averages mask the variation in funding allocations within each decile. An alternative method to explore the basic relationship between school allocations and levels of SED that does not mask the variation in funding allocations across schools is to simply use the data to generate scatter plots, with each pair of coordinates representing a school's per-pupil dollar allocation (measured on the *y* axis) and percentage of FRPL (measured on the *x* axis).

The scatter plots can also be used to detect systematic patterns of per-pupil allocations across levels of SED. A line can be fitted through the plotted points by using the method of ordinary least squares that best describes the data to provide predictions of per-pupil allocations as a function of FRPL percentage. A positively sloped line indicates that schools with higher FRPL percentages tend to receive larger per-pupil allocations, implying some level of equity with which funding is distributed to schools. If the fitted line is positively sloped and becomes steeper over time (for instance, since the implementation of the WSF), this suggests a stronger relationship between per-pupil allocations and SED and, hence, an improvement in funding equity. In turn, our analysis reports the slopes of lines fitted through scatter plots from before and after the WSF was implemented; that is, we present results from the year just prior to the implementation of the WSF (2005–06) and the most recent year (2012–13). Our hypothesis is that the WSF has strengthened the relationship between WSF dollar allocations per pupil and SED, which should be reflected in steeper (more positively sloped) fitted lines after implementation of the WSF.

The scatter plots and fitted lines can also be used to evaluate how well SED predicts per-pupil allocations, as well as whether this has changed since implementation of the WSF. To this end, our analysis also reports the share of total variation in per-pupil allocations explained by SED or the *R*-squared statistic associated with each fitted line. We hypothesize that after implementation of the WSF, we should also expect to see SED explaining more variation in per-pupil WSF allocations as measured by a higher *R*-squared statistic.

In the scatter plots, in addition to plotting each school's per-pupil allocation and FRPL percentage, an indication of each school's ELL percentage is displayed. Schools are classified into one of three groups: low, medium, or high ELL percentage. To determine a school's classification, schools were sorted by ELL percentage and divided into three equal groups. If a school's ELL rate was in the top third, then it appears on the scatter plot with a square, the middle third are plotted with a triangle, and schools in the bottom third of the ELL distribution are displayed with a circle. In this way, the scatter plots add ELL as a third dimension with which to visualize schools. Because ELL percentage and FRPL percentage are often strongly correlated, we expect to see more high-ELL schools denoted by squares on the right-hand side of the scatter plot (at higher FRPL percentages) and low-ELL schools denoted by circles on the left-hand side (at lower FRPL percentages).[43]

Results

- *Scatter plot analysis of per-pupil WSF allocations and school SED shows that the relationship between these two measures has become stronger and more predictable since implementation of the WSF, suggesting an increase in the equity with which funding allocated by the WSF has been distributed.*

Each pair of exhibits presented below contains the scatter plots for 2005–06 and 2012–13, respectively, across the three schooling levels (elementary, middle, and high school). The equation of the fitted line on each chart includes an estimated slope that shows how much additional funding per pupil a school was expected to receive for each percentage point of FRPL. The results suggest that the relationship between per-pupil WSF allocations and SED may have become stronger after implementation of the WSF. For the elementary and high school levels, the slope of the fitted line was steeper in the most current year (2012–13) than in the year immediately before the introduction of the WSF (2005–06). For example, Exhibit 6.16 shows that in 2012-13 each percentage point increase in high school FRPL was expected to generate an

[43] For a table of correlations between ELL and FRPL for the years presented in the scatterplot, see Appendix H, Exhibit H.5.

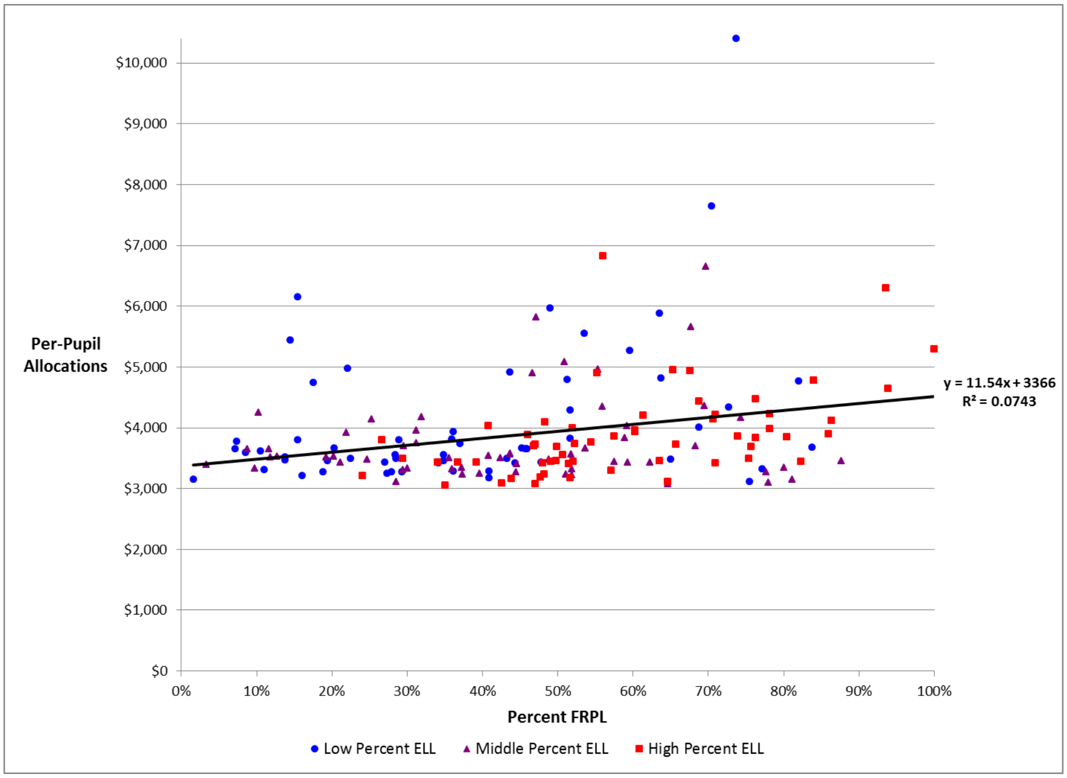
additional $14.20 in per-pupil funding compared to $11.81 in 2005-06. Therefore, a high school in which 50 percent of its students were eligible for FRPL was expected to receive $710 per pupil more due to SED in 2012-13 compared to $591 per pupil more in 2005-06, for a difference of $119 per pupil.[44]

Moreover, between the two years, the *R*-squared statistic more than doubled for all three schooling levels, suggesting that the relationship between WSF per-pupil allocations has become more predictable. This is an important finding, as the report by Chambers and Levin (2009) lists predictability as a desirable property of a well-functioning school funding mechanism. The increase in the *R*-squared statistics observed across all three schooling levels may suggest that the introduction of the WSF has made funding to schools more predictable and consistently related to pupil needs.

Note that at any given level of FRPL percentage, there is variation in the observed per-pupil allocations around those predicted by the fitted line, which is likely attributable to a host of factors other than SED. For example, other weighting factors included in the WSF, such as ELL percentage and school size, will contribute to this variation not explained by SED. As mentioned above, in analysis presented below we attempt to explicitly control for additional factors that might further explain the remaining observed variation in allocation.

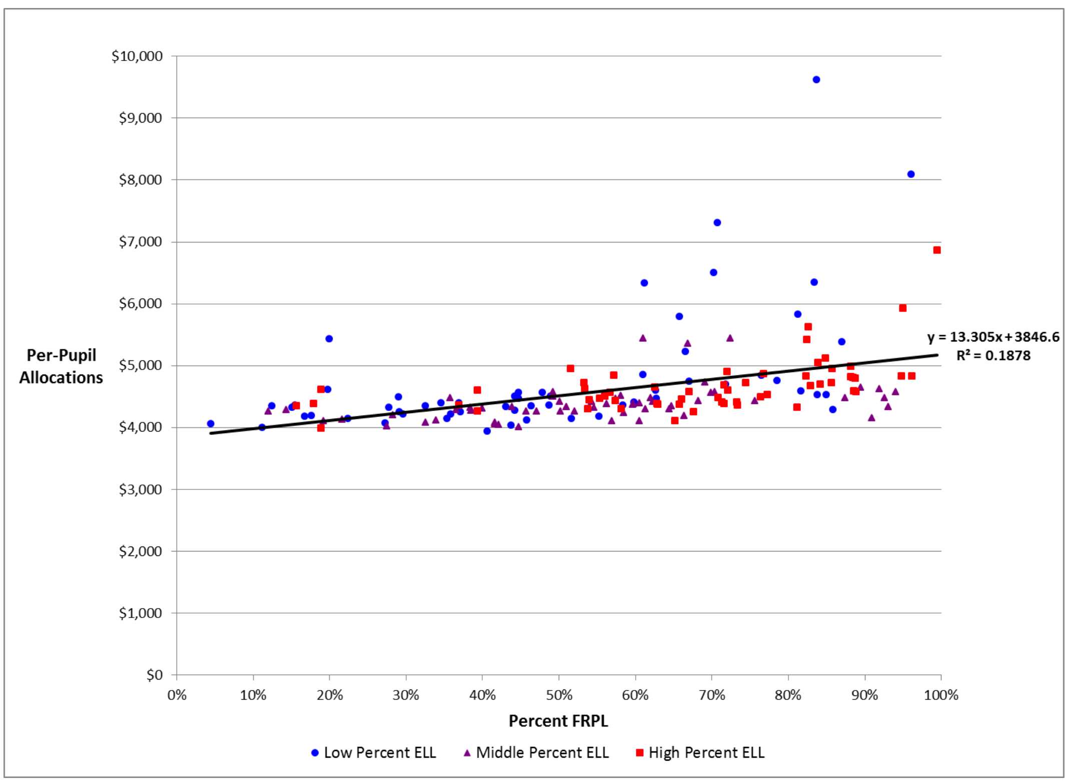
[44] To make this calculation, simply multiply the high school slope coefficients in 2012-13 ($14.20) and 2005-06 ($11.81) each by the 50 FRPL percentage points and take the difference of these products [e.g., ($14.20×50) - ($11.81×50) =$119.50].

Exhibit 6.12 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii Elementary Schools (2005–06)



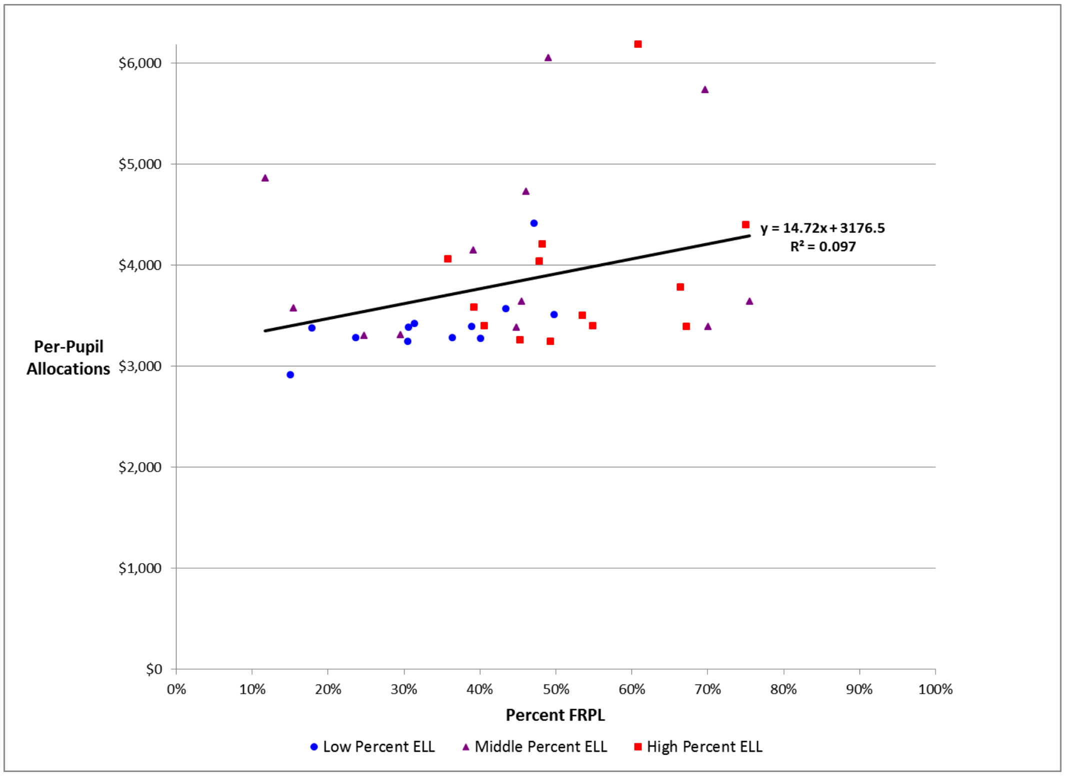
Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.13 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii Elementary Schools (2012–13)



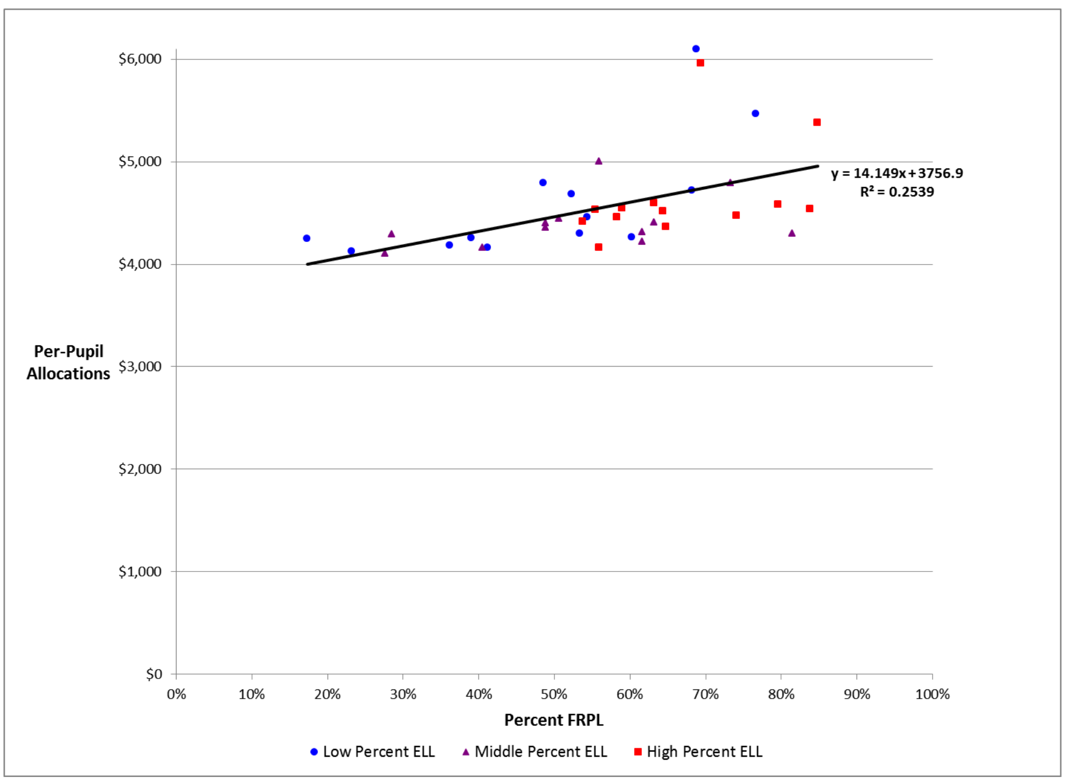
Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.14 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii Middle Schools (2005–06)



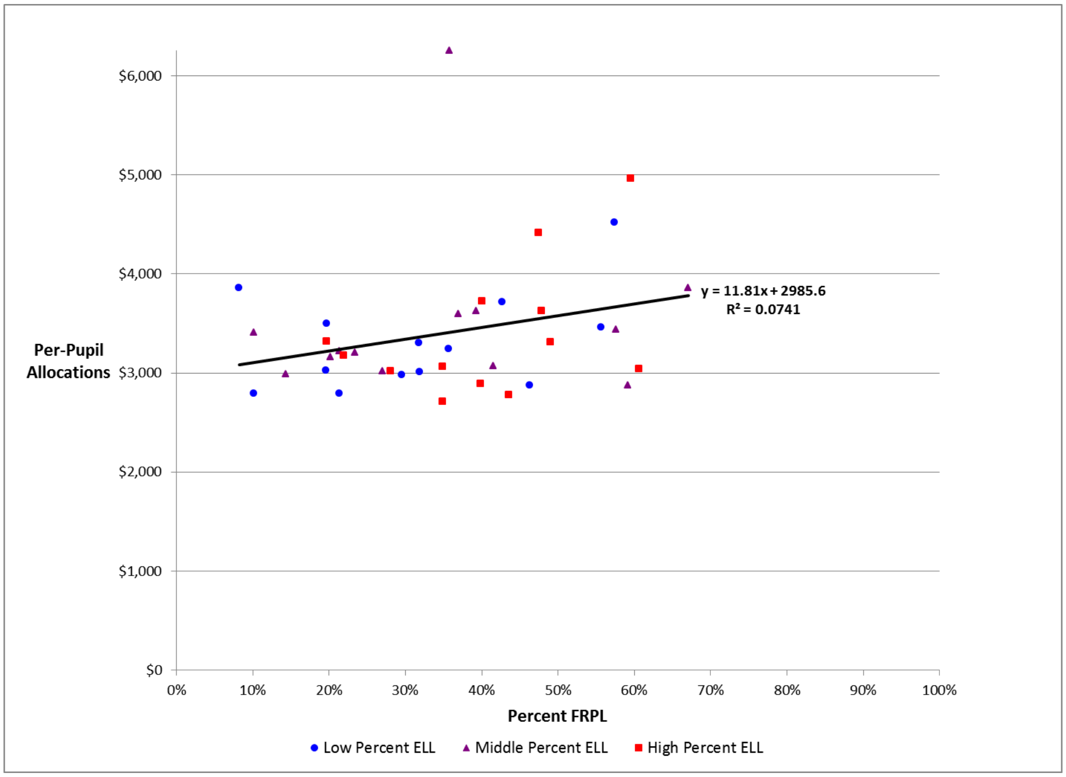
Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.15 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii Middle Schools (2012–13)



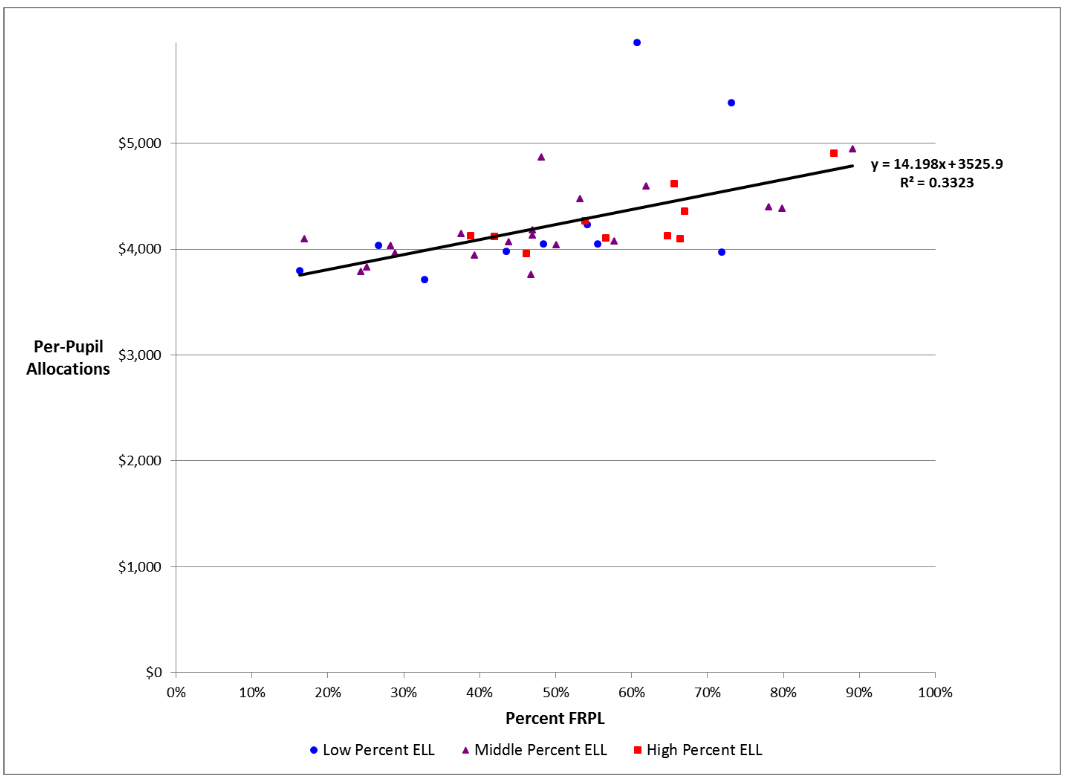
Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.16 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii High Schools (2005–06)



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Exhibit 6.17 – WSF Per-Pupil Allocations by FRPL Percentage for Hawaii High Schools (2012–13)



Source: Historical fiscal and demographic data obtained from the HIDOE Budget Execution Section.

Implicit Weight Analysis of WSF Funding Allocations

Methodology

The descriptive analysis earlier presents a basic story of the relationship between allocations and SED by relying on average per-pupil allocations within FRPL decile and simple scatter plots. To develop a more sophisticated understanding of how allocations vary by SED, we used regression analysis, which allowed us to estimate *implicit funding weights* associated with FRPL while controlling for the influence of other cost factors. In this particular regression analysis, we control for school size (enrollment) to account for the extent to which economies of scale played a role in the allocation of resources to schools.[45,46] The basic model used is as follows:[47]

(1) *School-Level Per-Pupil Allocation = f(FRPL Percentage, School Enrollment)*

All regressions have been run separately by schooling level (elementary, middle, and high school) to account for the different cost structures associated with the use of self-contained versus departmentalized classes by elementary and high schools, respectively. In addition, we estimated the relationships between per-pupil allocations and the cost factors (FRPL and enrollment) during a 13-year period spanning both before and after the WSF was implemented (2000–01 to 2012–13). We used the magnitude of the estimated relationship between per-pupil allocations and FRPL percentage to derive implicit funding weights to gauge how equitably resources have been allocated across schools in a given year. We define the implicit FRPL weight as follows:

- Implicit FRPL Weight – A value representing the relative per-pupil allocation of a school with 100 percent FRPL to that of a school with 0 percent FRPL, holding enrollment constant.

For example, an implicit FRPL weight of 1.20 indicates that a school with all of its students eligible for or receiving FRPL is allocated about 20 percent more per pupil than is a school of identical size with no students eligible for or receiving FRPL. The implicit FRPL funding weight can also be interpreted as the relative difference in allocations, on average, generated by a student eligible for or receiving FRPL. Using the above example of 1.20, a student eligible or

[45] As discussed in Chapter 3, scale of operations is a key factor that determines the cost of delivering education. Specifically, very small schools often face higher costs for achieving the same outcomes because of the diseconomies associated with the small scale of operations.

[46] We also experimented with more inclusive regressions that also controlled for ELL percentage, but the model was unable to accommodate this measure because of its high positive correlation with FRPL percentage. Specifically, including ELL percentage along with FRPL percentage in the regression model resulted in multicollinearity, affecting our ability to isolate the separate impacts of poverty and ELL status on per-pupil allocations. Given the inability to include both the FRPL and ELL percentages due to their correlation, it is important to recognize that the model estimate of the implicit weight associated with FRPL may be upwardly biased because it will also account for part of the effect of ELL which was omitted. However, because the purpose of this model is to test whether the relationship between allocations and student needs has become stronger over time, if we make the plausible assumption that the degree of correlation between percentage FRPL and ELL is relatively stable over time, this should not affect our results.

[47] A more technical discussion of the regression procedure used can be found in Appendix I.

receiving FRPL would generate 20 percent more funding for their school than a non-FRPL student.

Using the magnitude and statistical significance of implicit FRPL weight estimates we test the formal hypothesis that the relationship between per-pupil allocations and SED became stronger after the implementation of WSF, which would indicate an increase in the equity with which resources are allocated.

Results

- *Regression analysis suggests that implementation of the WSF has improved the equity with which funding is allocated to schools at all grade levels.*

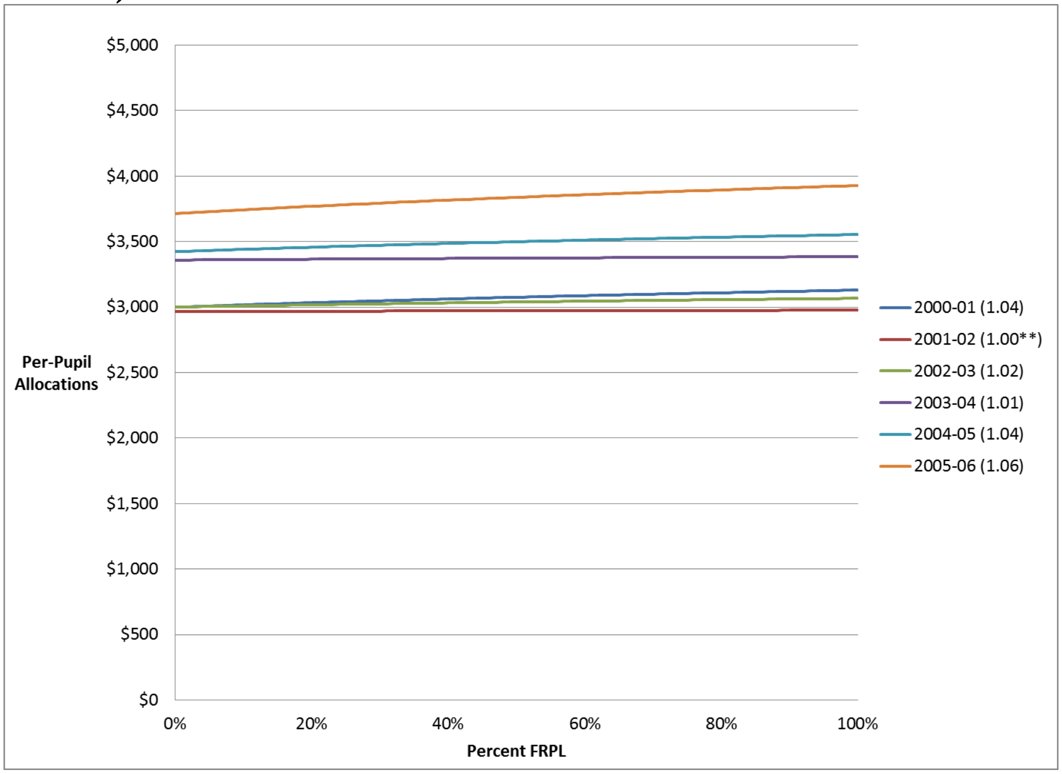
The exhibits in the following section depict the responsiveness of school-level WSF per-pupil allocations to FRPL percentage. More precisely, each chart contains a series of year-specific profiles that each show within a given year how the predicted WSF allocation per pupil changes across FRPL percentage, controlling for the influence of (holding constant) school size. In the chart legend, we include the calculated implicit FRPL weight for each year, and asterisks that denote whether the underlying estimated relationship between the per-pupil WSF allocation and FRPL percentage for a given year was significantly different from the reference year of 2005–06 (the year prior to WSF implementation).[48]

Elementary Schools

Exhibits 6.18 and 6.19 show the WSF allocation profiles for the pre- and post-WSF periods, respectively. In the pre-WSF years (2000–01 to 2005–06) the charted profiles are rather flat, as indicated by the low implicit FRPL weights that reach a maximum of 1.06 in the reference year (2005–06). In 2001-02, the estimated implicit FRPM weight was 1.00 denoting no relationship between per pupil allocations and the percent FRPL, and this was the only estimate that proved statistically different from the implicit weight of 1.06 estimated for the reference year (2005-06). However, the profiles for the post-WSF period (2006–07 through 2012–13) show steeper slopes and correspondingly higher implicit FRPL weights, ranging from 1.12 to 1.17, suggesting that there was an improvement in the equity with which WSF dollars were allocated after the WSF was implemented. Furthermore, in all post-WSF years other than the first year of implementation (2006–07), the difference in the estimated allocation profile was significantly different from the that of the reference year.

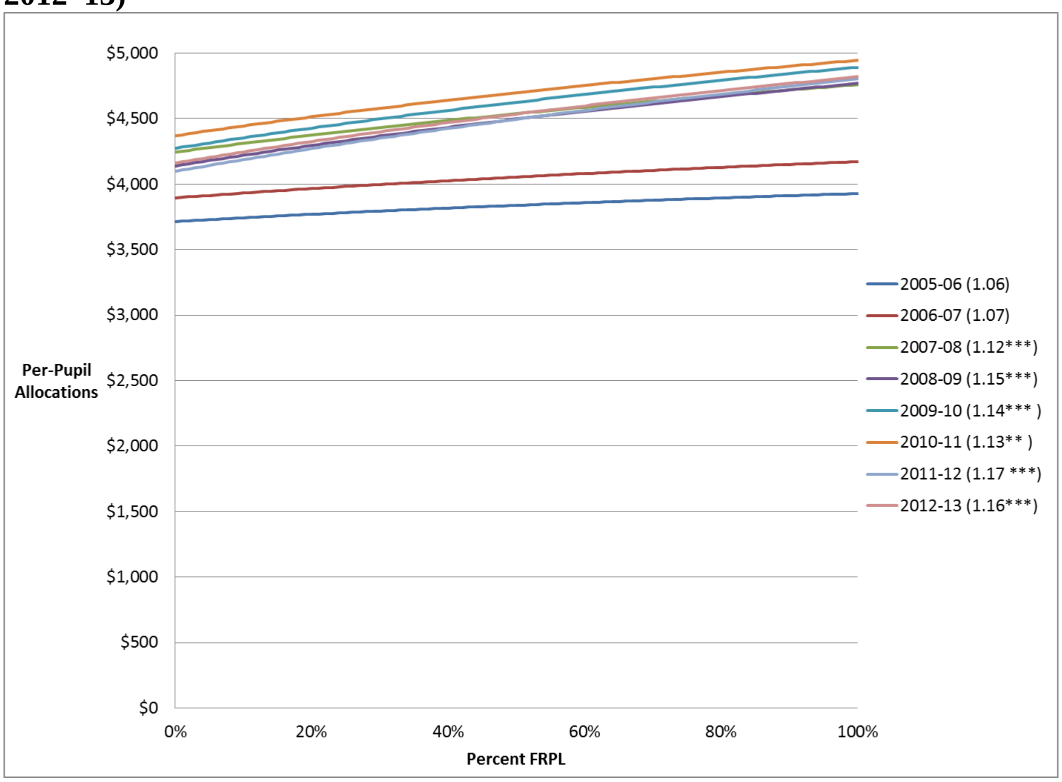
[48] The term *statistically significant* indicates that the magnitude of the difference in estimated per-pupil allocation and FRPL relationship from that of the reference year (2005–06) is larger than would be expected merely by chance.

Exhibit 6.18 – Estimated WSF Allocation Profiles for Elementary Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively

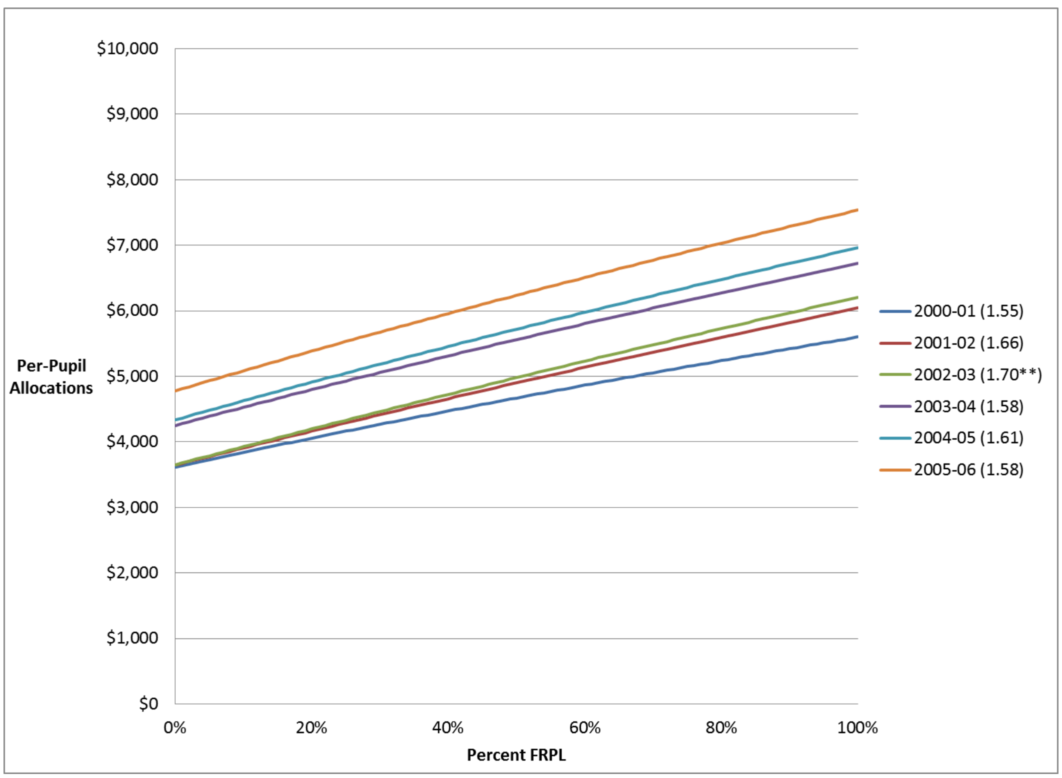
Exhibit 6.19 – Estimated WSF Allocation Profiles for Elementary Schools (2006–07 to 2012–13)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

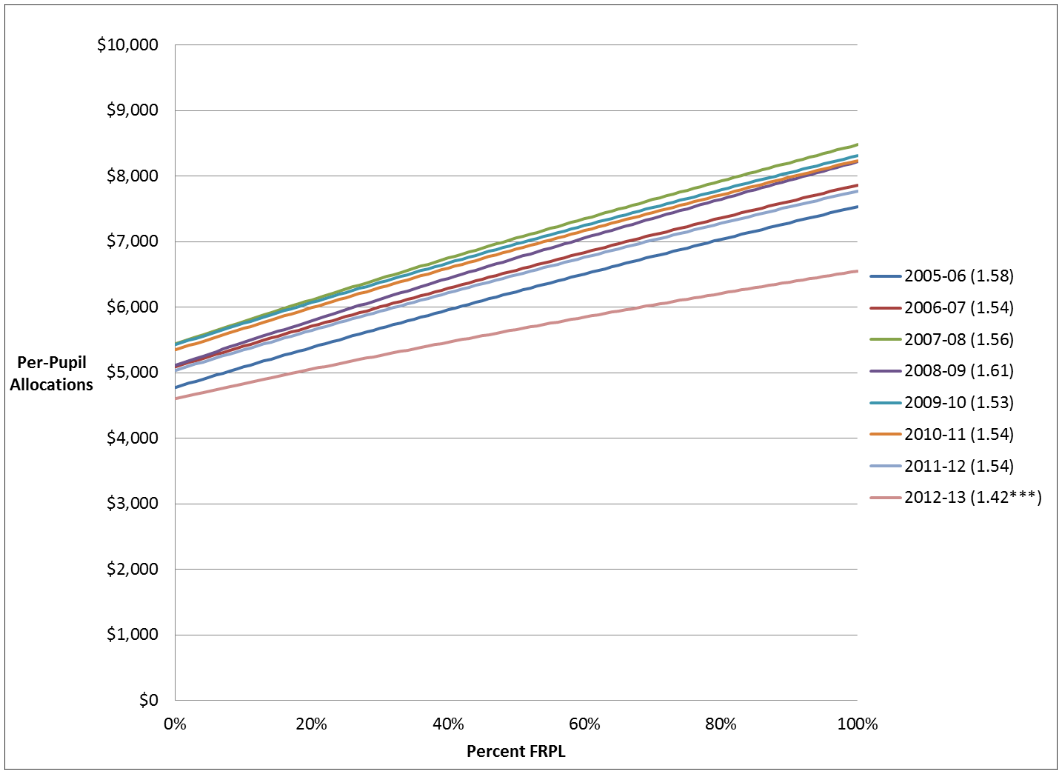
It is also instructive to ask what happened to the equity with which overall resources (WSF and non-WSF dollars) were allocated to schools. Our analysis addresses this by running the regression model by using overall per-pupil allocations rather than WSF per-pupil allocations as the dependent variable. Exhibits 6.20 and 6.21 show the estimated elementary school overall allocation profiles for the pre- and post-WSF years, respectively. The slopes of the pre-WSF year profiles for overall allocations are much steeper than for those corresponding to WSF allocations, ranging from 1.55 to 1.70; however, only the value for 2002–03 proved statistically different from that of the reference year. This finding of steeper slopes is driven by the fact that the overall allocations also include non-WSF funding, which is made up of many categorical funds that are necessarily distributed according to various student needs, including and/or correlated with SED (e.g., Title I, Title III, and IDEA). Moving to the post-WSF profiles, we find a general decrease in the estimated implicit FRPL weights, with a minimum value of 1.42 in 2012–13 that proves to be statistically significant from that corresponding to the pre-WSF reference year (2005-06). This finding suggests that overall funding equity experienced a significant decline between 2005-06 and 2012-13. However, this decline cannot be attributed to the WSF, which showed statistically significant equity improvements with respect to the portion of overall funding it allocates.

Exhibit 6.20 – Estimated Overall Allocation Profiles for Elementary Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Exhibit 6.21 – Estimated Overall Allocation Profiles for Elementary Schools (2006–07 to 2012–13)



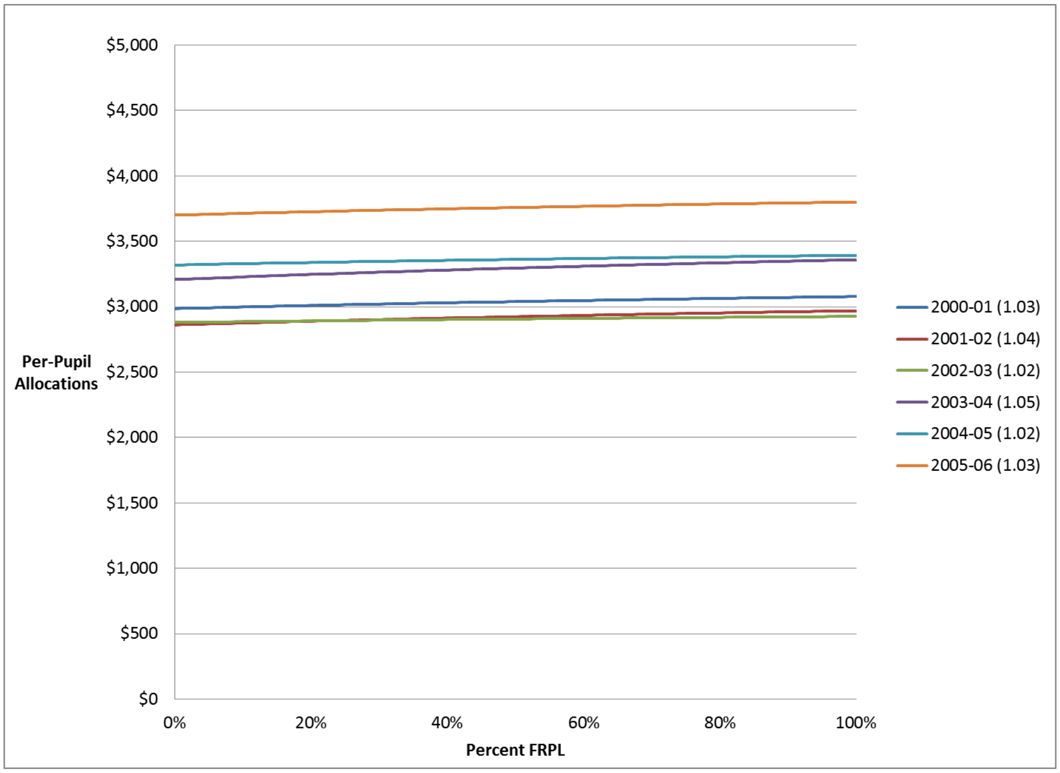
Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Middle Schools

The middle school WSF allocation profiles for the pre- and post-WSF years are charted on Exhibits 6.22 and 6.23, respectively. Similar to what we found for elementary schools, the profiles in the years prior to WSF implementation were also relatively flat with implicit FRPL weights ranging from 1.02 in 2002–03 to 1.05 in 2003–04, and none proved to be statistically different from the 1.03 calculated for the reference year. Turning to the post-WSF years, the slopes again became steeper, with higher implicit FRPL weights ranging from 1.09 in 2006–07 to 1.19 in 2011–12, the latter of which proved to be statistically different from the reference year at conventional significance levels. The implicit FRPL weights for 2007–08 (1.13), 2008–09 (1.15), and 2010–11 (1.17) also stand out, but because of less precision of the regression estimates underlying these figures, their differences from the implicit weight for the reference year can only be considered significant at the 10 percent level.[49] Nevertheless, the findings suggest that there were equity increases with respect to the dollars allocated by the WSF to middle schools after the formula was implemented.

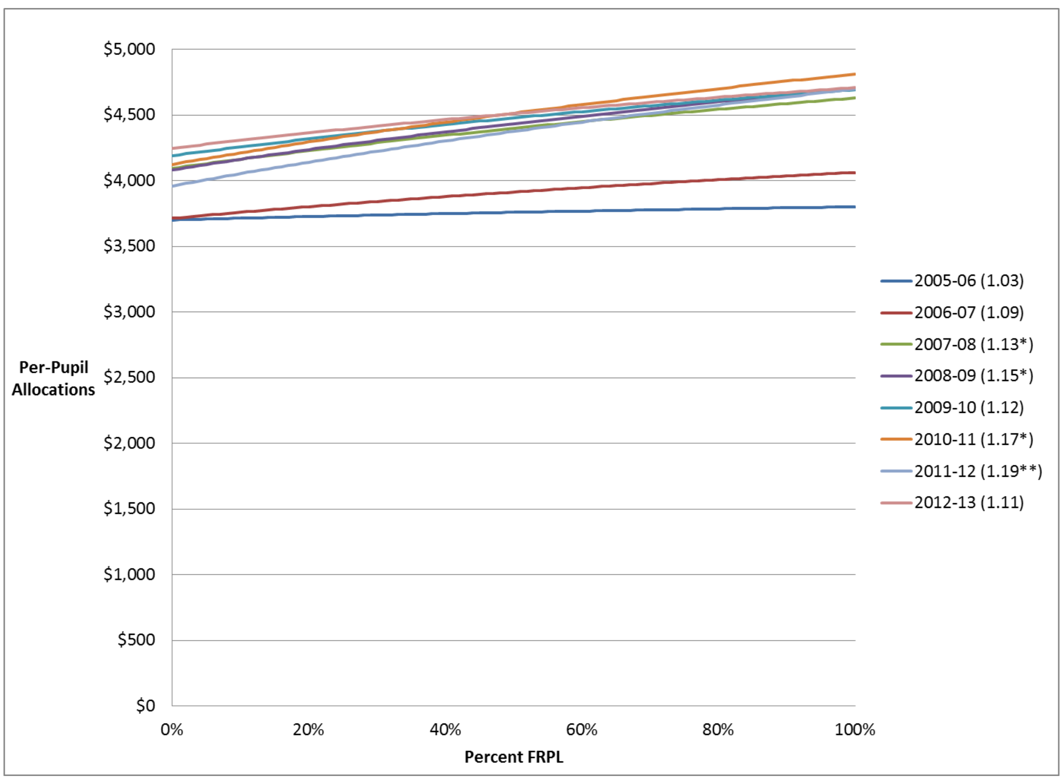
[49] Note that the statistical precision of regression estimates tends to decrease as the number of observations goes down. This may have played a role in the drop in precision of the middle and high schools estimates compared to those generated for elementary schools.

Exhibit 6.22 – Estimated WSF Allocation Profiles for Middle Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Exhibit 6.23 – Estimated WSF Allocation Profiles for Middle Schools (2006–07 to 2012–13)

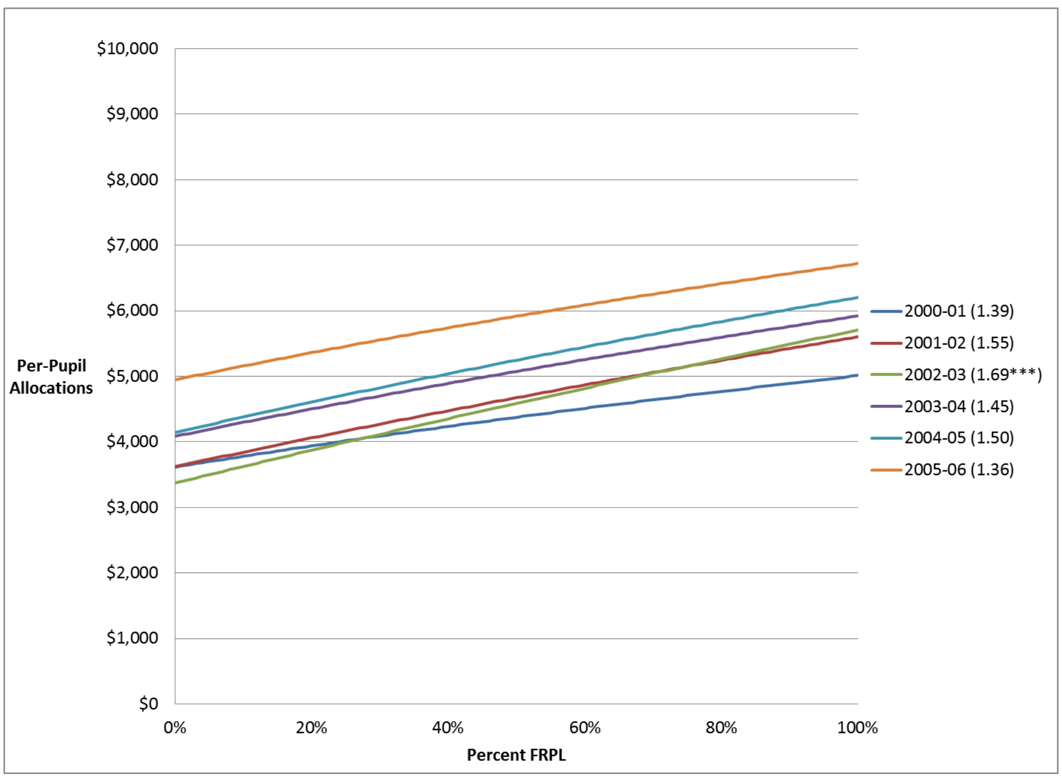


Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

The estimated profiles corresponding to overall allocations in the pre- and post-WSF years are graphed in the following two exhibits (Exhibits 6.24 and 6.25). Again, because of the role of categorical funds in the non-WSF portion of these allocations and their strong link to measures of student need, the implicit FRPL weights were much larger than those based on WSF allocations. For the pre-WSF years, the weights ranged from 1.36 (2005–06) to 1.69 (2002–03), with the difference between these extremes being statistically significant. The estimated allocation profiles in the post-WSF years tended to be lower than those in the pre-WSF period, and most did not differ significantly from the reference year (the exception being 2006–07, with an implicit weight of 1.49).

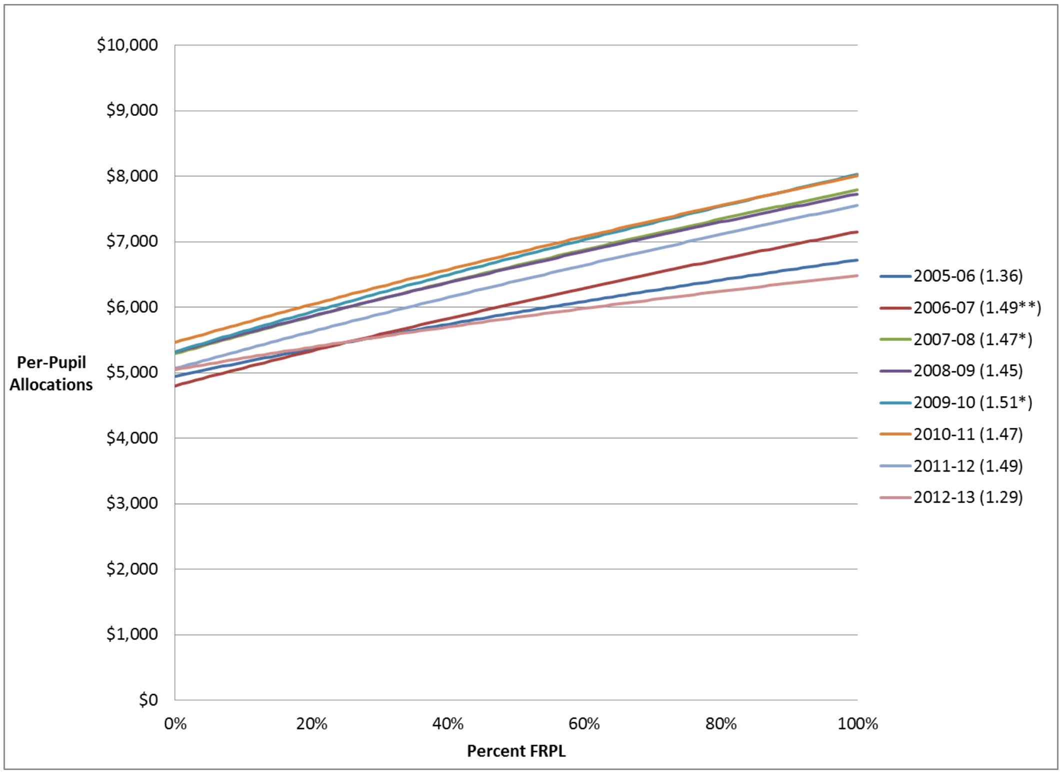
Therefore, the results with respect to WSF allocations are similar to those found for elementary schools but are not as strong. While the estimated implicit FRPL weights suggested that WSF allocations were distributed more equitably after the WSF was implemented, they were not as precise as those generated for elementary schools. Moreover, there was little evidence to suggest that equity with respect to overall allocations changed significantly from the pre- to post-WSF period. These two findings imply that allocations made by the WSF helped mitigate the decrease in overall funding equity that occurred over the period.

Exhibit 6.24 – Estimated Overall Allocation Profiles for Middle Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Exhibit 6.25 – Estimated Overall Allocation Profiles for Middle Schools (2006–07 to 2012–13)

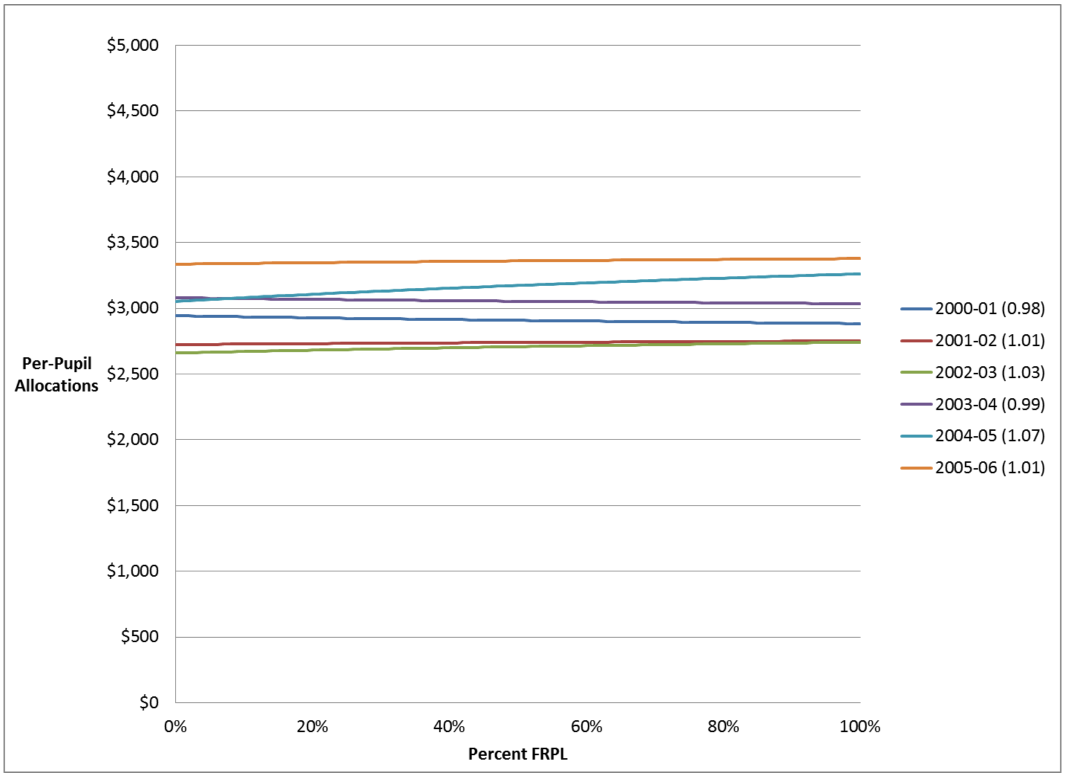


Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

High Schools

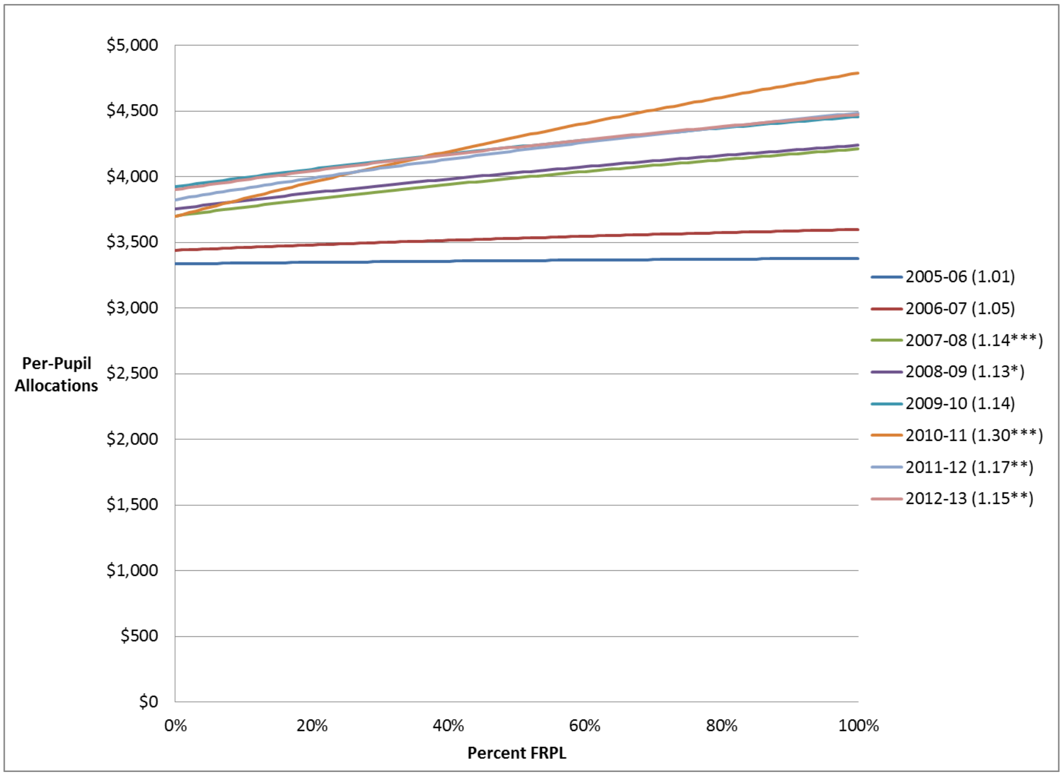
Profiles of the high school allocation profiles for the pre- and post-WSF years are charted in Exhibits 6.26 and 6.27, respectively. The profiles for the pre-WSF years were exceedingly flat, with implicit FRPL weights ranging from 0.98 to 1.07 and none proving statistically different from the reference year value of 1.01. There was a dramatic increase in the profile slopes across the post-WSF years during which the range of the implicit FRPL weights went from 1.05 in 2006–07 to 1.30 in 2010–11; in addition to this latter figure, those for 2007–08 (1.14), 2011–12 (1.17), and 2012–13 (1.15) proved to be significantly different from that for the reference year. Therefore, the findings strongly suggest that implementation of the WSF had a significant positive influence on the equity with which the funds directed through it were allocated.

Exhibit 6.26 – Estimated WSF Allocation Profiles for High Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

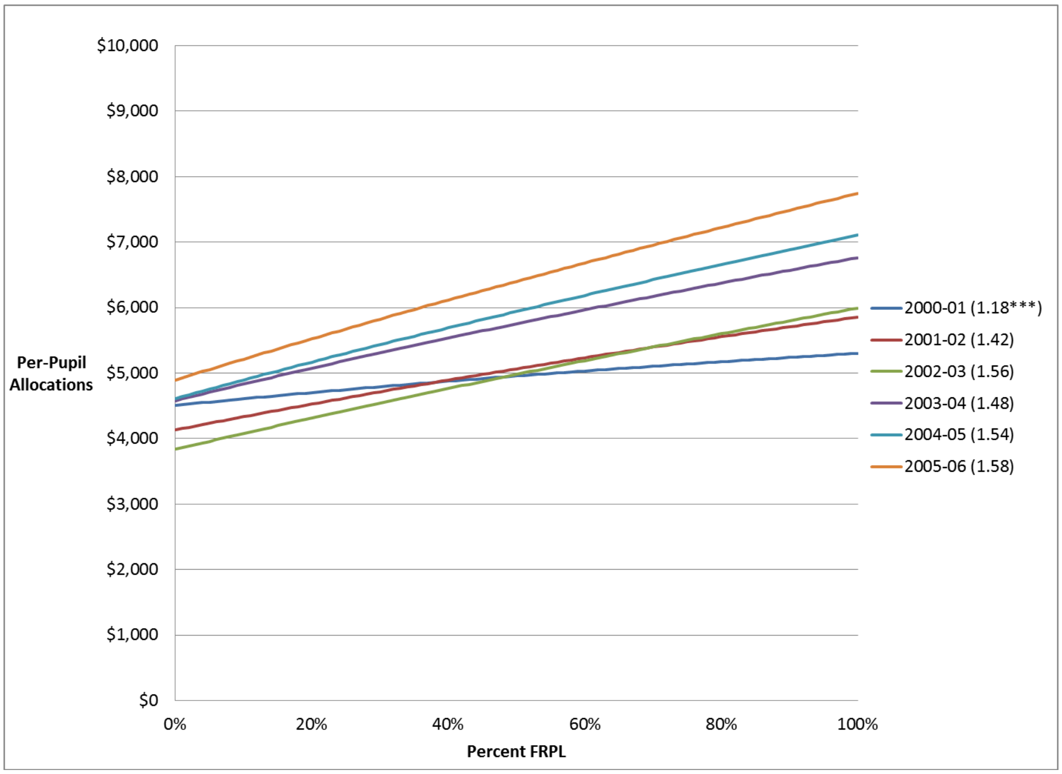
Exhibit 6.27 – Estimated WSF Allocation Profiles for High Schools (2006–07 to 2012–13)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

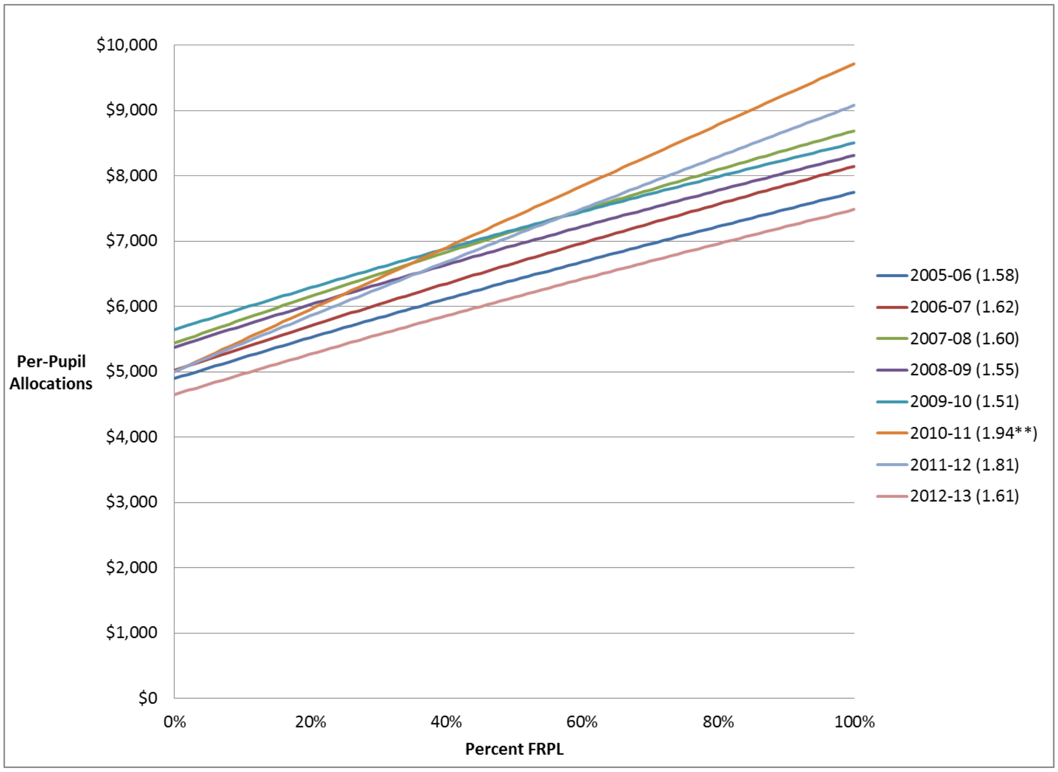
The final exhibits (6.28 and 6.29) contain the estimated high school profiles of overall allocations in the pre- and post-WSF years. While the results show increases in the magnitude of the implicit FRPL weights, there were very few that were considered significantly different from the reference year. In the pre-WSF period the implicit FRPL weight ranged from 1.18 in 2000–01 to 1.58 in 2006–07, with only the earliest year in the period proving statistically different from the reference year. The profiles for the post-WSF years tend to be steeper, with higher implicit weights ranging from 1.51 in 2009–10 to 1.94 in 2010–11, the latter of which was the only one that proved significantly different from the reference year.

Exhibit 6.28 – Estimated Overall Allocation Profiles for High Schools (2000–01 to 2005–06)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Exhibit 6.29 – Estimated Overall Allocation Profiles for High Schools (2006–07 to 2012–13)



Note: Implicit FRPL weights shown in parentheses. ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively.

Comparing Hawaii's Implicit Weights on SED with Those from Other States

> *Our best estimates of the implicit SED weights for Hawaii are of the same order of magnitude as the highest found for other states.*

The model described in equation (1), above, serves two main purposes. First, we want to see if the allocations from programs that were eventually distributed using the WSF became more closely related to SED after the formula was put in place. Second, we are also interested in how the relationship between overall funding and SED may have changed over the same period. In turn, it is appropriate to use an identical model that only includes controls for SED and school enrollment.

However, as a next step, we are interested in comparing the implicit weights for SED in Hawaii with those obtained from other states which we presented in Chapter 3 (see Exhibit 3.5). For this purpose, we require a slightly more detailed model similar to the one used to estimate implicit weights in other states. Specifically, we need to control for additional student characteristics that account for some of the Non-WSF funding streams. Moreover, if the Non-WSF portion of overall allocation is driven by student needs that are positively related to the percentage of students classified as FRPL, our estimates of the implicit SED weight will be biased upward.[50]

[50] Put another way, if there are student needs positively related to SED which help determine overall allocations and these are excluded from the model, the implicit SED weight will to some extent also reflect the effect of the excluded needs.

With this in mind and for the purpose of comparing estimated implicit SED weights between Hawaii and other states, we run a slightly more comprehensive model that controls for the school percentage of special education students who generate some portion of the allocations of Non-WSF funds to each school.[51] The enhanced model therefore will take on the following form:

(2) *School-Level Per-Pupil Allocation = f(FRPL Percentage, Special Education Percentage, School Enrollment)*

If the percent of FRPL and special education are positively related, then inclusion of the latter in the model is expected to generate more accurate (less biased) estimates of the implicit SED weight that are lower than those produced by the earlier model.

Exhibit 6.30 provides the resulting implicit SED weights of the more comprehensive model of overall per-pupil dollar allocations that also controls for the percentage of special education students served. Indeed, comparison of the results from the more comprehensive model and original model show that the estimated implicit SED weights for overall allocations have decreased from our original estimates as a result of including special education in the model.[52] In other words, the estimated implicit SED weight was accounting for some of the influence in overall allocations associated with the percentage of special education students. Additionally, virtually all of the estimates are measured with enough precision to be deemed statistically significant (the exception being the estimate for high schools in 2000-01). However, there is very little evidence that the implicit SED weights for overall funding in the post-WSF years differed statistically from the year prior to implementation; only the estimate for middle schools in 2006-07 proved to be significant from the reference year (2005-06).

Exhibit 6.30 – Estimated Implicit Weights for Socioeconomic Disadvantage Using Enhanced Model (2000–01 to 2012–13)

Period	Year	Schooling Level		
		Elementary	Middle	High
Pre-WSF	2000-01	1.35	1.23	1.03***
	2001-02	1.47	1.34	1.35
	2002-03	1.54**	1.30	1.45
	2003-04	1.45	1.27	1.37
	2004-05	1.49	1.39	1.39
	2005-06	1.43	1.28	1.46
Post-WSF	2006-07	1.38	1.42**	1.50
	2007-08	1.34*	1.40*	1.44
	2008-09	1.40	1.37	1.35
	2009-10	1.36	1.40	1.35
	2010-11	1.41	1.36	1.71*
	2011-12	1.39	1.48*	1.52
	2012-13	1.34	1.30	1.38

[51] Note that funding for special education services is included in the Non-WSF portion of overall allocations.
[52] Across the study period, the implicit SED weights decreased by as much as 0.22, 0.39 and 0.29 for elementary, middle and high schools, respectively.

Note: ***, **, and * denote statistical differences from reference year (2005–06) at the 1 percent, 5 percent, and 10 percent significance levels, respectively. All implicit weight estimates differ from 0 at the 1 percent significance level except that for high schools in 2000-01.

Exhibit 6.31 provides the averages of the estimated implicit SED weights associated with the pre- and post-WSF periods, respectively. The resulting averages weakly suggest that the equity with which overall dollars have been allocated tended to decrease for elementary schools and increase for middle and high schools. Given the prior findings where WSF allocations for elementary schools became more equitable after implementation, one might be apt to conclude that the way in which non-WSF resources were distributed to elementary schools may have inhibited any equity improvement in overall allocations at this schooling level. Nevertheless, there is reason to be skeptical about this finding. As shown in Exhibit 6.30, very few of the year-specific implicit SED weight estimates in the pre- or post-WSF periods proved to be different from the reference year and, therefore, it is unlikely that the pre-WSF and post-WSF averages in Exhibit 6.31 statistically differ from one another.

Exhibit 6.31 – Average Estimated Implicit Weights for Socioeconomic Disadvantage Over Pre- and Post-WSF Periods

Period	Elementary	Middle	High
Pre-WSF	1.45	1.30	1.34
Post-WSF	1.37	1.39	1.46

Nevertheless, virtually all of the year-specific implicit SED weight estimates did differ statistically from 0. Therefore, it makes sense to put these results in context by comparing the weights estimated here to those for the 10 states with the largest weights (from Chambers et al., 2012) presented in Chapter 3 (see Exhibit 3.5). While a direct comparison of these results is not perfect given differences between what was included in the two models, it still can help to put the findings here in context.[53] Comparison of the results shows that the estimated implicit SED weights for overall allocations in Hawaii are of the same order of magnitude as the highest found in the earlier study which compares these implicit weights across all states. Specifically, the estimated implicit SED weights for Hawaii elementary, middle and high schools in 2012-13 range between 1.30 and 1.38 while the highest implicit weight for poverty found in the previous study was 1.34 (for the state of Minnesota).

Allocations Versus Expenditures

We note that the analysis presented in this chapter has all been performed using funding allocations as distributed by the WSF as well as outside of the formula. However, allocations may not provide the whole story in terms of how equity plays out across all schools. An alternative approach is to evaluate how per pupil *expenditures* vary according to student need. Indeed, it can be argued that the expenditure realized at a school is a more accurate reflection of the resources that students have access to and therefore a more meaningful measure with which to evaluate equity.

[53] For instance, the model used in the report by Chambers et al. (2012) only examined state and local (not federal) dollars and included an additional control for geographic differences in resource (staffing) prices, neither of which were accounted for in the current model. Moreover, the models in this report were run on district-level information, while the current model is run on school-level data.

There are several reasons why the results from an expenditure analysis of Hawaii public school equity may differ from those found using funding allocations. The most obvious reason lies in the fact that while schools are effectively charged the average teacher salary against their funding allocation budgets (regardless of the take home salary of their instructors), the actual salaries paid out will vary according to teacher seniority. Therefore, schools with teachers that earn above-average salaries will have less than the realized cost of their instructors deducted from their budgets, while the schools with below-average salaried teachers will have their budgets docked by more than what their teachers actually cost. In essence, this means that schools are not facing the realized costs of their instructors and that schools with large numbers of more costly senior teachers are in fact subsidizing those with few higher paid teachers. Given that more senior teachers who are more highly paid tend to gravitate to low-need schools, while less senior lower-salaried teachers tend to be placed in more needy schools, the application of average salaries to school budgets in and of itself can result in significant inequities across schools within a district (see Roza, 2009). In the same vein, the analysis of funding allocations may mask underlying inequities across schools and therefore provide different results from an analysis of expenditures.

Chapter 7 – Conclusion

Motivating Factors Behind the Implementation and Evaluation of Hawaii's WSF

A key motivation behind the implementation of a weighted student formula (WSF) is to improve the *equity* and *transparency* with which resources (dollars) are distributed to schools. Additional and equally important motivations that regularly underlie WSF implementation include improving the *efficiency* with which dollars are spent to provide educational services and increasing the degree to which parents and the local community are *empowered* to participate in the decision making concerning educational programming at their schools. All of these motivations drove the adoption of the WSF in Hawaii under the historical legislative Act 51.

Given these motivations, it is only natural to ask how well this reform has performed in terms of achieving its goals. The preceding chapters investigated this question by providing a detailed evaluation of the state's experience in developing and implementing their WSF. Specifically, Chapter 2 provided an in-depth description of the development and evolution of the WSF since its inception in 2006–07. Chapter 3 described the emergence of cost-based funding and how this has influenced both state and district policies that weight funding according to cost factors (e.g., student needs, scale of operations, and geographic differences in resource prices). Chapters 4 and 5 investigated principal and stakeholder perceptions and the extent to which they understand the WSF and feel it has delivered on its goals of promoting equity/transparency in school funding, improved the effectiveness and innovation of school programs through enhanced school discretion over dollars, and increased the degree of stakeholder empowerment. Chapter 6 provided a statistical analysis of funding allocations to explore whether there were significant improvements in the equity with which resources have been distributed since implementation of the WSF.

The purpose of this final chapter is to highlight the main findings of the various analyses and to use these findings to help characterize the major successes realized and the challenges faced over the course of implementing the WSF. In addition, it draws on this material to list and discuss a detailed set of policy considerations that the state should take into account as it moves forward to refine the implementation of the WSF.

The remainder of the chapter is organized as follows. The first two sections summarize the key findings from the principal survey and stakeholder interview analyses presented in Chapters 4 and 5, respectively. The third section provides the main results from the equity analysis of the state's WSF (Chapter 6). The fourth section presents an overview of noted successes and challenges in implementing the WSF, as well as important policy considerations for policymakers—such as the Committee on Weights (COW)—as Hawaii moves forward with the WSF.

Findings 1 – Principal Attitudes and Perspectives Surrounding Hawaii's WSF

To investigate principal attitudes and perspectives pertaining to the WSF and the effectiveness with which it is meeting its goals, a survey was administered to all public school principals (excluding charters). The survey's high response rate (83 percent) is evidence of how interested school leaders are in the WSF policy and in expressing their views about it.

Findings From Aggregate Analysis

The main findings from the aggregate analysis (across all schools) are summarized below.

Equity and Transparency of Funding

- Most principals agreed that WSF funding is equitably allocated to schools, but they did not agree that the amount of funding is sufficient.
- Most principals understand the WSF and know where to go for more information if required.

Discretion Over Funding and Innovation

- Most principals agreed that they had discretion over how funds were spent in their schools, but less than one third of principals agreed that they had sufficient flexibility to be innovative or to try new instructional programs.
- A majority of the principals responded that they exerted control over a wide variety of programmatic components, such as use of data, parental involvement, support for students with additional needs, extracurricular or after school programming, classroom technology, curriculum offerings, professional development, and numbers and types of classroom teachers and other staff at their school. The only exception was that fewer than one fifth of the principals indicated they had control over extending the school day or year.
- About half of the principals said that the WSF has permitted them to innovate, including hiring staff, providing extra support, and implementing new programs.
- More than half of the principals said that the level of funding allocated via the WSF has not permitted them to innovate and that the (insufficient) funding under the WSF supports only basic staff and operations.

Empowerment and Accountability for Results

- Principals reported that they are holding regular SCC meetings and that they are communicating—and often also consulting—with the SCC and with faculty about resource allocation decisions.
- Principals agreed that they are held accountable for student performance, but most do not agree that the SCC is held accountable.

Suggestions for Improving the WSF

- More than half of the principals suggested ways to improve the WSF, and more than one third of those suggested increasing the formula weighting factors or adding specific categories of student need.

Differences in Responses Across School Type

Although most response items were consistent across all schools, we did notice some differences in attitudes and perspectives on a limited number of survey items across various types of schools. Analysis of the survey data by school type showed the following:

- *Neighbor Island Schools.* Principals at the 70 Neighbor Island schools generally responded similarly to principals on Oahu. If anything, principals at Neighbor Island schools reported more agreement that WSF funding is sufficient and that it affords them sufficient flexibility.
- *Mixed Grade Level Schools.* The 12 principals at mixed schools (i.e., those not classified as elementary, middle, or high schools) reported less agreement than did other principals on survey questions related to WSF equity, sufficiency, and flexibility.
- *Small Schools.* Principals at small schools—particularly small elementary schools and small high schools—generally reported less empowerment and flexibility than did principals at large schools.
- *Schools by Need.* Few differences in responses were found between principals at schools serving high, medium, and low percentages of English language learners or students eligible for free or reduced-price lunch.
- *Schools by Locale Type and Isolation.* Few differences were found between principals serving schools in city, suburban, town, or rural settings. However, differences were found in survey responses between the principals at the seven schools deemed geographically isolated and those at the non-isolated schools. The isolated principals tended to report less agreement that WSF funding was sufficient and offered enough flexibility to allow innovation.

Findings 2 – Stakeholder Attitudes and Perspectives Surrounding Hawaii's WSF

To gain a broad understanding of attitudes and perspectives about the goals of the WSF, the implementation process, and the extent to which the policy is achieving its intended outcomes, we conducted a limited number (16) of semi-structured interviews with stakeholders. It should be noted that not all interview questions were asked of every stakeholder interviewed (i.e., some questions were only asked of a subset of the 16 stakeholders who were interviewed). The findings, presented here by theme, are summarized in this section.

Understanding of WSF Background, Goals, and Implementation Process

- Almost all respondents were aware of the goals of the WSF policy; roughly two thirds thought that equity was a goal of the policy, and about half thought that a goal was autonomy and flexibility for school leaders.
- Respondents suggested that the WSF policy was grounded in a desire to create more local control.
- There was wide variation in stakeholders' understanding of how much of a school's resources come from WSF funds.

- Respondents provided useful context and descriptions of how the WSF weighting factors have changed over the years, the use of the superintendent's reserve fund, and the use of average instead of actual salaries in the calculation of teacher compensation.
- Half of the respondents who were asked spoke about the transition process to protect schools from sudden losses in funds during phase-in.

Sufficiency, Autonomy, and Alignment of Academic and Financial Plans with Resource Allocation

- About half of the respondents said that WSF funding was not sufficient to achieve the desired student outcomes.
- More than half of those interviewed seemed to suggest that funding for small and isolated schools may be insufficient.
- Respondents were divided on whether school leaders have the autonomy to make a difference in student learning; examples of limits to real autonomy include a lack of funds and the inability to hire and dismiss specific teachers.
- Principals reported that they do their best to align their Academic and Financial Plans with their allocations of resources.
- The most widely reported change to the planning and budgeting process in recent years was adjustments in the Academic and Financial Plans timeline and process.

Capacity, Support, and Communications

- Most respondents who were asked about site capacity reported that state and complex area staff have the necessary capacity to support school-level implementation of the WSF program, but only half of the respondents felt the same way about school staff.
- Principals reported receiving support from the complex area office in aligning their Academic and Financial Plans.

Transparency, Understanding, and Involvement of the School Community

- Most respondents reported that the HIDOE staff and the complex area superintendents have a good understanding of the WSF, and about half said that the legislature does not. Respondents were divided in their assessment of the school community's understanding of the WSF.
- Respondents reported that school-level misconceptions about the WSF appear to be connected more with the insufficiency of the available funds than with the WSF approach itself.
- Almost all respondents said that the WSF calculations and process are transparent.
- About half of the respondents who were asked about community involvement indicated that the community was involved in the budgeting and planning process, though the level and value of that involvement varied.

Accountability and Innovation

- Although most respondents who were asked about accountability measures said that strong measures are in place, some questioned whether accountability had any impact.
- Less than half of the respondents felt that there was an increase in innovation and efficiency as a result of the WSF, and some suggested that limits on funding were playing a role in hampering innovation.

Successes, Challenges, and Recommendations

What Stakeholders Liked About the WSF

- *Equity is based on enrollment and student needs.* Stakeholders like that the WSF is based on enrollment and applied equitably throughout the state so that everyone can anticipate what their budget is going to be.
- *School-level empowerment*. Stakeholder interview respondents like the fact that schools are empowered to increase student achievement.
- *Collaboration with the school community*. Stakeholders like the collaboration with the school community.
- *Flexibility and autonomy.* Stakeholders said that they like the flexibility and autonomy that schools now have, and the flexibility to purchase personnel positions, despite not being able to hire or fire specific personnel.

What Stakeholders Did Not Like About the WSF

- *Insufficient funding.* A majority of the stakeholder respondents said that they would like to see more funding under the WSF.
- *Inadequate funding implies no flexibility.* Stakeholders reported that more funding is necessary to have the flexibility to start new programs.
- *Small schools get inadequate funding.* Several respondents said that small or isolated schools do not have adequate funding under the WSF and that the formula does not adequately account for diseconomies of scale associated with small schools or for additional costs due to geographic isolation.
- *Lack of stability and process administration.* Some respondents dislike the lack of stability and the fluctuations in funding allocations from year to year, while others cited difficulties on the part of school leadership in being able to adapt to changes in the budgeting timeline process including working with new templates and determining salaried versus casual staffing needs at different stages in the process.
- *Miscellaneous issues.* Respondents cited a number of additional aspects of the WSF that they do not like, including the lack of transparency when funds are taken out of categorical funds and put into the WSF, the disproportionate amount of freedom that is afforded to principals in the procurement process when they lack an understanding of how this process works, difficulty pushing out statewide initiatives under WSF funding, and treating children as though they are “walking dollar signs.”

Successes

There were several items that stakeholders reported as being the biggest successes of the WSF:

- *Equity.* The WSF is consistently and equitably applied to all schools.
- *Earlier budgeting*. The fact that the budgeting process occurs earlier in the school year gives principals more time to plan.
- *Increased collaboration.* The creation of SCCs means that representatives of the community are included in the conversation surrounding school budgeting.
- *More autonomy and flexibility.* Under the WSF, principals have more autonomy and flexibility with school budgeting.
- *Potential for increased accountability.* The WSF has the potential to bring about more accountability and less waste.

Challenges to WSF Implementation

Stakeholders reported the following challenges in implementing the WSF:

- *State policy barriers to WSF implementation.* The state has not been following the legislative statute in terms of the amount of funding that should be directed to the WSF (e.g., one stakeholder claimed that the "75 percent goal of the statute has not yet been met; at present, it is closer to 50 percent").[54] The state procurement processes are a hindrance, and principals' flexibility is inhibited by state mandates that do not come with separate dedicated funding streams.
- *Federal policy barriers to WSF implementation.* A number of federal barriers exist, including mandates under No Child Left Behind (NCLB), federal compliance, and standardized testing. There should be alignment with all funding streams in the Academic and Financial Plans instead of having separate plans for Title I and II funding.
- *Lack of funding, especially for small schools.* Lack of funding is a major challenge, especially for small schools that need to support essential personnel.
- *Special education funding.* Providing schools with more budgetary discretion over special education poses a serious challenge. While providing discretion to principals because they are closest to the students and can arguably make the best decisions regarding their school's instructional program, there are risks involved with adding special education to the WSF and difficulties in decentralizing funding for these services.

[54] The official language of the statute reads as follows: "Not less than seventy per cent of appropriations for the total budget of the department, excluding debt service and capital improvement programs, shall be expended by principals." (see http://www.capitol.hawaii.gov/hrscurrent/Vol05_Ch0261-0319/HRS0302A/HRS_0302A-1301.htm). While the statute points to the requirement that 70 percent of the education appropriation be spent at school sites ("expended by principals"), it seems the respondent in this case may have interpreted this 70 percent as dollars flowing through the WSF (over which principals have the most discretion). Therefore, this finding may say more about the challenge in the understanding and interpretation of the statute on the part of stakeholders.

- *Miscellaneous challenges*. There is a need for a better understanding of the WSF and finance training for principals[55], improved alignment between the timing of the release of enrollment figures and the budgeting process timeline in order to avoid large deviations between projected and official enrollment counts, and improved data and information for stakeholders. Funding fluctuations inherent in the WSF can also pose a challenge.

Suggestions for Improving the WSF and Its Implementation

Stakeholders offered a number of suggestions for improving the WSF and its implementation:

- *Increased funding.* More funding should be directed to the WSF.
- *Timeline changes.* The timeline of the WSF process needs to be modified.
- *Support for small and isolated schools.* Extra support should be provided for schools that are small or isolated.
- *Better transparency and communication.* There needs to more transparency about the WSF and better communication about COW decisions concerning the formula and its weighting factors.
- *Autonomy and flexibility*. The level of autonomy and flexibility for schools should be increased.
- *Special education funding.* Two stakeholders had opposing opinions about whether discretion over special education should be given to schools under the WSF or kept centralized. The argument for decentralizing special education was that school leadership is in the best position to provide special education services, many of which are for relatively low-severity students. The contrasting argument against decentralization was that many schools would not be able to afford the specialized services necessary for the high-severity pupils.[56]
- *Miscellaneous suggestions.* Additional suggestions for improvement included providing multiyear weights for multiyear Academic and Financial Plans, providing training for principals to learn how to budget, exploring the possibility of using average daily attendance as a WSF weighting factor, and increasing legislature involvement with the COW.

Findings 3 – Changes in Equity Associated With the WSF

Chapter 6 detailed an in-depth statistical analysis of how the equity with which resources are distributed to schools has changed since the WSF was implemented. The main findings were as follows:

[55] Note that this may seem in contrast to the principal survey analysis finding presented above where most principals reported that they understood the WSF and know where to go for additional information. However, the sentiment of the stakeholders merely suggests that principal knowledge could be improved and points specifically to training in finance.

[56] Clearly, the solution might not be an all-or-nothing case in which the provision of special education as a whole is pushed out to school discretion. Perhaps schools could be given discretion over the services (and corresponding funding) provided to low-severity special education students.

- *Funding equity has increased with the WSF.* Our analysis of the patterns of average per-pupil dollar allocations across different levels of school socioeconomic disadvantage suggests that the relationship between funding and student need has become stronger (i.e., schools with higher socioeconomic disadvantage have tended to receive higher funding allocations) across all grade levels since implementation of the WSF, implying an increase in funding equity.
- *Funding has become more predictable with the WSF.* Scatter plot analysis of per-pupil WSF allocations against school socioeconomic disadvantage suggests not only that the relationship between these two measures has become stronger since implementation of the WSF, but also that funding under the WSF has become more predictable as a function of student need.
- *There have been statistically significant improvements in the equity with which WSF funding has been distributed since implementation of the formula.* More rigorous regression analysis (which controls for differences in school size) of the relationship between per-pupil allocations made to schools through the WSF and school socioeconomic disadvantage suggests that the implementation of the formula has been associated with statistically significant improvements in the equity with which these dollars have been distributed. Moreover, the results show that prior to implementation of the WSF, no statistically significant pattern existed between socioeconomic disadvantage and the dollars from revenue sources that would eventually be directed through the formula.
- *Our best estimates suggest that the equity with which overall funding has been distributed in Hawaii since implementation of WSF is among the highest found across all states.* The regression analysis that looked at the relationship between overall allocations (allocations made both within and outside of the WSF) and socioeconomic disadvantage produced 2012-13 estimates of the implicit socioeconomic funding weight ranging from 1.30 to 1.38 across the three schooling levels. An interpretation of this finding is that, on average, Hawaii allocates 30 percent to 38 percent more for each socioeconomically disadvantaged student than for a student with no socioeconomic disadvantage.[57] Further investigation showed that this range compares favorably against states that exhibit among the highest implicit weights for socioeconomically disadvantaged students.

Successes, Challenges, and Key Considerations for Refining the WSF Policy

As is clear from the preceding chapters and the summarized findings presented in this chapter, implementation of Hawaii's WSF has been met with a host of major successes and significant challenges that should be reflected upon to inform future changes to the policy. The following section synthesizes the main findings into successes and the remaining challenges and provides a discussion around key policy considerations that should be taken into account as the state moves forward with the formula.

[57] Formally, this finding suggests that schools with the greatest socioeconomic disadvantage (i.e., where all students are eligible for free or reduced price lunch) are funded between 30 percent and 38 percent higher than those with the least socioeconomic disadvantage (i.e., where no students are eligible for free or reduced price lunch).

Successes

Success 1 – Significant and Sustained Commitment to Funding the WSF

As was shown in Chapter 2, there has been a sustained commitment to directing significant funding through the WSF since its inception in 2006–07. This can be seen in the absolute level of revenues, as well as the shares of both the overall and General Fund education appropriations that have been allocated to schools through the formula. In the seven-year period that the WSF has been in place, the amount of dollars allocated to schools through the formula has increased by 11.3 percent (from $655.4 million in 2006–07 to $729.7 million in 2012–13). Over the same period, the share of the state's education appropriation supported by General Fund dollars has ranged from 49 percent (in 2007-08) to 54 percent (in 2011-12 and 2012-13), while the share of the overall appropriation (including both General Fund and other revenues) ranged from 39 percent (in 2009-10) to 43 percent (in 2011-12 and 2012-13). While this commitment to the WSF stands out as a key success and a signal of the significant political support this policy enjoys, it is important to note that stakeholders remain concerned about whether the statute requirement that 70 percent of state dollars for education is provided to schools has been met, and, more generally, if a sufficient amount of this funding is being allocated through the WSF (see Challenge 1, outlined below).

Success 2 – School Flexibility and Discretion Over Funding and Innovation

Results from both the principal survey and the stakeholder interviews suggest that under the WSF principals have had significant flexibility and discretion over spending at their schools, which they have appreciated. At the same time, however, the results suggest that there are limits on principals' ability to exert this discretion. Specifically, serious concerns were raised about the sufficiency of funding allocated via the WSF and the extent of principal discretion over staffing and other programmatic decisions (see Challenges 1 and 2, below).

Success 3 – Empowerment of Local Stakeholders and the Community

The results of the principal survey analysis suggest that the creation of the SCCs under the WSF has been associated with local community involvement in resource allocation decisions at their schools. The stakeholder interviews partially corroborate this finding, with many respondents reporting that under the WSF the community has been involved in the school budgeting and planning process (however, the value and level of involvement was varied).

Success 4 – Improvement in the Equity and Transparency of Funding Under the WSF

Results from the statistical analysis that investigated the relationship between per-pupil WSF funding and school-level socioeconomic disadvantage suggest that the equity with which dollars are distributed by the WSF significantly increased in the years following implementation of the formula. Moreover, both the principal survey and stakeholder interview analyses provide suggestive evidence that the goals of the WSF and the process by which dollars are distributed to schools on the basis of the formula are well understood.

Challenges

Challenge 1 – Providing Sufficient Amounts of Funding Through the WSF

The most significant remaining challenge concerns the level of funding allocated by the WSF. The results of both the principal survey and stakeholder interview analyses showed that there was a clear perception that the level of available funding distributed under the WSF, to be used at the school's discretion, was not sufficient to allow them to cover their minimum operational costs and still have funds left to implement additional innovate programming. This challenge was especially emphasized for small and isolated schools. This suggests that any efforts to increase student outcomes through more innovative and better tailored programs that meet the unique needs of each individual school have been hampered by a lack of discretionary funding. That is, the WSF framework alone is not enough. While providing additional school discretion over how funding is used may be a *necessary* condition, it is not *sufficient* to ensure that innovative programming can take place; that is, there must be available funding that covers more than a school's minimal operational costs.

It is vitally important to recognize that the challenge of insufficient funding in no way represents a fundamental design flaw in the WSF. The WSF is merely a mechanism for equitably distributing a predetermined amount of funding in a transparent manner and, in this respect, the WSF is working exactly as intended. Instead, the issue of funding insufficiency should be viewed somewhat independently. There are two factors that have limited the amount of funding directed through the WSF: (1) leaner years, during which the General Fund education appropriation (from which WSF funding is derived) has been smaller due to fiscal crisis, and (2) the important policy decision that determines what share of the General Fund education appropriation should be allocated by the WSF. Clearly, the first factor is less in the control of state policymakers and rather is the result of cyclical fluctuations in the economy as a whole. In contrast, the second factor is under the direct control of policymakers and requires thoughtful deliberation over what types of services should be provided by the central office rather than being pushed out to school discretion (see Consideration 3, below). The results of this deliberation will greatly inform the level of funding that needs to be allocated via the WSF.

Challenge 2 – Ensuring WSF Weighting Factors Accurately Reflect Differential Costs

The weighting factors that make up the WSF should accurately account for the differential costs of providing an equal opportunity for all students to achieve, regardless of their individual needs or circumstances (such as geographic location). One theme that emerged from the principal survey and stakeholder interview analysis was that small schools and those in geographically remote locations were especially lacking sufficient funding to cover much more than a minimally operating program. This is a situation in which the inclusion and value of potential weighting factors that account for the additional costs associated with small-scale operations and/or remote geographic settings must be considered. However, identifying the specific factors that account for the differential costs of providing educational services to students with various needs and circumstances is a more general key policy consideration that will have to be addressed on a recurring basis (see Consideration 1, below).

Challenge 3 – Determining an Appropriate Central/School Split of Program Discretion

An inherent challenge in the design of any WSF is determining how discretion over specific educational services should be divided between the central office and school sites. A main tenet of WSF systems is that *more* funding should be directed to the discretion of local school sites on the basis of the assumption that the leadership of each school is in the best position to develop the programs that will most effectively address the unique needs of their students. However, this in no way suggests that *all* funding should be driven out to school discretion. Indeed, there are some services that simply make more sense to be distributed and managed centrally and others that might be better placed under the discretion of school sites with a system in place that provides effective monitoring, capacity support where necessary, and accountability for results. These decisions represent a key policy consideration (see Consideration 3, below) and should take into account both the efficiency and practicality with which the central office (as opposed to school sites) can deliver the services under scrutiny. It is important to recognize that addressing the appropriate split of program discretion is in no way a clear-cut exercise. It is not always obvious which services should be placed under the discretion of the central office as opposed to school sites. These policy decisions must be made with thoughtful deliberation on the part of the central office administration and should take into account input from school sites.

Challenge 4 – Having Enough Discretion Over Staffing and Other Programmatic Decisions

Another potential challenge that emerged was the level of discretion over certain resource allocation decisions. Specifically, while principals appreciate the increased level of discretion over dollars the WSF affords them, some stakeholders reported that the effectiveness of this discretion may be limited by the fact that they can change only the *quantities* of the staff at their school as opposed to modifying the composition of their staff with respect to qualifications through hiring and dismissal. Although not suggested by the analysis results, an additional potential limitation concerns the ability to provide alternative payments that are large enough to attract and retain qualified staff at struggling schools or those in remote geographic locations. While there does exist a bonus for teaching at schools that are deemed hard to staff, the current study has not investigated how widely these are used and whether they are large enough to level the playing field in terms of providing equal access to quality teachers.

Key Considerations Moving Forward

On the basis of our previous research, we have identified a number of key considerations that policymakers generally need to address as they implement a WSF policy. As outlined in Exhibit 7.1, the first three relate specifically to funding, while the remaining two concern nonfunding issues around planning and implementation. Within the discussion of each consideration, we outline the general questions the state of Hawaii may wish to address as it reviews and modifies implementation of its own WSF.

Exhibit 7.1 – Key Policy Considerations in Designing and Implementing a WSF

Funding Considerations	1 – Calculating School Allocations
	2 – Calculating School-Level Salaries and Benefits
	3 – Degree of School-Level Discretion
Nonfunding Considerations	4 – Level of School Site Capacity
	5 – Interaction With Other Policies

Consideration 1 – Calculating School Allocations

Given that a WSF policy fundamentally changes how schools receive funding by basing allocations on a predetermined set of student needs and school characteristics thought to influence the cost of providing educational services, it is imperative that the formula design accurately reflects these cost factors, as well as offering a sufficient base per-pupil level of funding.

First, because a WSF allocates funds to schools using a foundation per-pupil amount, it is necessary to define which measure will be used for the count of students being served. States and districts use different metrics for counting students for making funding allocations. Some use total school enrollment, while others use the school's average daily attendance (ADA). The use of ADA creates an incentive for increasing attendance rates and therefore may be preferable, although more burdensome to track, if improving attendance is a goal.

Next, districts must decide how to calculate the specific allocations for each school. As detailed in Chapter 2, Hawaii currently weights funding allocations on the basis of individual student need factors such as grade range, student poverty, English language learner (ELL) status, transiency, and gifted and talented status, and students attending schools on Oahu's Neighbor Islands. In addition, the state uses nonweighted funding allocation adjustments for different school types defined by grade level and whether a school is on a multitrack year.

Ideally, these formula weighting factors and nonweighted adjustments should reflect the best estimate of the differential cost of offering students an equal opportunity to achieve at a given level, regardless of their needs or circumstances. In setting some of the Hawaii WSF weighting factors, such as economically disadvantaged, the support offered by federal programs (e.g., Title I) was taken into account so as to achieve an overall equity with respect to economic disadvantage that recognizes resources allocated both within and outside of the WSF. In other cases, it is unclear whether the weighting factors take into account the additional categorical funds received from federal dollars (e.g., in the case of ELL weighting factors and Federal Title III funding). In any case, the most appropriate way to develop funding adjustments (formula weights) that account for student needs as well as other cost factors is to employ a costing-out approach such as those mentioned earlier in Chapter 3 and detailed in Chambers and Levin (2009).[58] In turn, the state may want to consider engaging in a costing-out study designed to understand the differential costs of serving students with varying needs and circumstances.

[58] The four traditional costing-out approaches include Cost Functions, Professional Judgment, Successful Schools/Districts and the Evidence-Based Approach. Chambers and Levin (2009) also describe a "hybrid" approach that uses elements of the latter three, which they used to determine the cost of an adequate education and develop a corresponding funding formula for New Mexico.

In addition to accounting for student needs, it should be determined whether there are other factors that have cost implications for operating schools. For example, should the state provide additional funding for "necessarily small" schools that cannot take advantage of the economies of scale associated with operating larger schools? Also, should the state take into account geographic differences in resource prices, especially with respect to staff, in order to ensure schools are operating on a level playing field in terms of their ability to attract and retain qualified staff? Schools in geographically isolated areas or are otherwise difficult to staff, for example, may have problems attracting qualified teachers. While there is currently a bonus for teaching at hard-to-staff schools, it is unclear as to whether it is large enough to fully adjust for this cost factor.

Adjustments for compensation differentials might also be based on factors other than geographic isolation, such as challenging student populations, which may require alternative compensation to attract qualified teachers. As was shown in Chapter 2, the state's WSF has, over the years, included adjustments related to scale of operations and geographic isolation. However, we again stress that adjustments for all cost factors—whether they are student needs, scale of operations, or geographic differences in resource (staffing) prices—should be set to reflect the differential cost of providing an equal opportunity for students to achieve at a given level, regardless of their needs or circumstances. This is best done through a formal costing-out study that can use several methodologies to calculate the differential cost of providing educational services across a population with varying needs and circumstances.[59]

Finally, policymakers need to determine whether the funding their schools receive under the WSF policy is at least sufficient to support basic operations. Establishing this basic level of funding support ensures that every school has sufficient funds to operate a basic program of services. Note that what constitutes enough funding to support basic operations may very well differ from school to school, depending on the various cost factors they face. Again, a formal costing-out study using methods similar to those outlined in Chambers and Levin (2009) is also ideal for understanding what the cost is to support basic operations across different schools. In addition to determining what level of funding is necessary to support basic operations (in line with Challenge 1, above), a key policy consideration is how much revenue needs to be driven through the formula in order to provide enough resources to allow school leadership to make use of the additional flexibility and discretion afforded by the WSF.

Consideration 2 – Calculating School-Level Salaries and Benefits

In implementing a WSF policy, policymakers must determine how to charge the costs of school personnel against each school's budget. When a district uses average salaries, the salary amount charged against the school budget for each teacher reflects the average teacher salary for the district and therefore is identical for each school. When a district uses actual salaries, this amount is the actual salary for each teacher, which is usually determined by educational preparation and experience (i.e., the step-salary schedule). Because less experienced (and therefore lower salaried) teachers are more typically found in higher disadvantage schools, the use of average salaries tends to charge these schools an amount that is higher than their teachers' earnings,

[59] For an overview of the four main costing-out methodologies (cost functions, evidence-based models, and the professional judgment panel and successful schools approaches), see Chambers and Levin (2009).

while lower disadvantage schools (with a higher incidence of more experienced, higher salaried teachers) will be charged an amount that is lower than that paid out by the district to its teachers. In other words, under the average salary system, schools that employ a greater number of higher salaried teachers are subsidized by schools that employ a greater number of lower salaried teachers. Because the higher salaried teachers tend to gravitate to schools serving fewer disadvantaged students, while newer and lower salaried teachers are more often found in schools serving relatively more disadvantaged students, an inherent funding inequity associated with the use of average rather than actual salaries may ensue that can undermine the very intent of a WSF.[60]

In contrast, moving to actual salaries ensures that charges against school budgets reflect exactly what is paid out to their staff, which offers schools the opportunity to respond to this inequity in the distribution of qualified staff. Use of actual salaries means that schools with less experienced teachers have lower teacher-related costs, which allows remaining funds to be redirected toward resources such as professional development to improve teacher capacity, or toward providing additional supports that would support and help retain or attract a qualified pool of teachers.

However, it must be noted that the use of actual salaries can also introduce political tensions into a district. Use of actual salaries is often avoided because of the potential political tensions that may arise with the teachers' union, administrative and privacy challenges, and a concern that principals might discriminate against more "expensive" veteran teachers.

Consideration 3 – Degree of School-Level Discretion

One of the main goals of a WSF policy is an increased level of school-level discretion. As mentioned above under Challenge 3, one of the major challenges (and key policy considerations moving forward) is determining the appropriate split between central office and site-level discretion, which will have a direct impact on the level of funding directed through the WSF. Following up on this discussion, it is also important to distinguish between the discretion over the types and quantities of services used by schools and who is responsible for providing these services. Increasing school discretion does not mean that sites necessarily have to provide the services themselves and that central office departments administering specific programs will be dismantled. Rather, it is often the case that these services can be provided much more efficiently and in a more organized manner through the central office. As pointed out in Chapter 3 (under the section *Establishing the Central Office Service Economy)*, increasing discretion for school sites can also include the option for school leadership to purchase required services (e.g., professional development or maintenance services) from the central office or to permit school leaders to contract for services from external vendors. Central office staff would have to be more competitive and market oriented in their services, but this could improve their efficiency and help create a culture among central office staff that is more responsive to their clients (i.e., schools sites).

Related to discretion over staffing decisions, our experience in this arena is that school leaders often feel that true discretion requires control over not only the general quantities of various staff but also which staff to hire or dismiss. While there was generally substantial agreement among

[60] For example, see Roza (2009).

principals that they had the autonomy to implement the instructional programs required to meet their students' needs (as reported above under Challenge 4; see Exhibit 4.3), some stakeholders suggested that there were limits to real autonomy because of principals' inability to hire and dismiss teachers (see Chapter 5, on the *Autonomy of School Leaders*). To this end, additional consideration might be given to whether school leadership should be provided additional discretion over hiring and dismissal. It must be noted that providing this type of discretion would involve extensive discussion between multiple stakeholder groups including educational administration and union leadership in order to modify collective bargaining agreements. Moreover, these deliberations need to take into account how policy governing discretion over hiring and dismissal practices might interact with other policies (see Consideration 5, below).

Consideration 4 – Capacity of School Sites

Given that a WSF policy requires a school to assume a larger role in determining its academic plans and to develop a corresponding budget, policymakers need to ensure that schools have adequate information and the technical capacity to make effective decisions about resource allocation. As mentioned above, results from interviews with stakeholders suggest that state and complex area staff have the necessary capacity to implement the WSF but that school staff do not necessarily have this capacity. Therefore, a key policy consideration to take into account concerns the support and additional training that will be provided to schools that lack a sufficient amount of capacity necessary to implement the WSF.

Consideration 5 – Interaction with Other Policies

Finally, it is important to consider how other policies affect the implementation of the WSF. No policy exists in a vacuum. Policies and processes—including those related to the treatment of small schools, open enrollment, and collective bargaining agreements, as well as the number of state and federal categorical programs, the budgeting cycle, and the level of funding in the state—all impact the way the WSF has been implemented in Hawaii. It is critical for the state to see its implementation of the WSF within this larger context and to think about how these various policies impact school operations and, ultimately, student learning.

Concluding Statement

The findings of this evaluation have shown that implementation of Hawaii's WSF appears to have gained widespread acceptance among school leaders and some key stakeholders within the state. It has generated an increased awareness among these constituencies of how funding is distributed to Hawaii's public schools and has generally increased the equity with which funds are allocated among schools serving the diverse populations of students across the state.

The investigation findings also suggest that WSF has also resulted in expanded autonomy for school leadership that allows greater flexibility to implement instructional programs that best suit the needs of their unique student populations. In addition, Hawaii's WSF policy has provided the opportunity for local communities to participate in local decision making surrounding their schools and to function in a partnership with the state in an attempt to improve the effectiveness with which children are served. It is important that both school leadership and the community have a key role in deciding how to serve the students because this combination of stakeholders is most likely to know and understand their students' needs and be able to recognize more easily what is and is not working.

The evaluation also showed there to be some outstanding challenges that the state still faces. First, one of the main findings suggest that there is a perception among principals and stakeholders that the amount of funding in the education system as a whole may not be sufficient to allow them to both make use of the additional flexibility the WSF has afforded them and consequently inhibits their ability to achieve their goals. Second, there is some question as to whether the existing formula accurately reflects the differential costs of serving the diversity of students attending schools that vary in size and degree of geographic isolation. A related question is what the cost for providing a basic level of services is and how this might vary across schools (especially with respect to size and degree of geographic isolation).

Additional challenges cited involve determining: (1) the optimal split of program discretion between the central office and school sites, (2) whether there is enough site-level discretion with respect to hiring and dismissal, and (3) if the salary structure for teachers is too rigid to allow for meaningful forms of alternative compensation that provide all schools a similar opportunity to attract and retain qualified instructors.

Going forward, the state might choose to engage in future work that investigates the remaining challenges. In addition, because the WSF has been implemented for several years, the state now has an excellent opportunity to undertake a longitudinal analysis that investigates the extent to which the implementation of WSF has had a positive impact on student learning and to assess the factors underlying any observed changes that may have occurred. It is only through a more comprehensive program evaluation analysis of the policy's impact on student learning that the state can explore ways to further improve how resources are distributed and used by schools under WSF. In sum, the suggested next steps are for the state to engage in investigations that will assess the sufficiency of available funding and whether the distribution of resources accurately reflect student needs, and to inform various policies that further support the autonomy, efficiency and innovation in order to promote a positive impact on student outcomes in the future.

References

Chapter 1 References

Baker, B. D., & Thomas, S. L. (2006). *Review of Hawai'i's Weighted Student Formula 2006–2007*. Honolulu, HI: Hawaii State Board of Education.

Education Resource Strategies. (2010). *Fair Student Funding Summit: Conference proceedings and recommendations for action*. Watertown, MA: Education Resource Strategies.

Snell, L. (2009). *Weighted student formula yearbook.* Los Angeles, CA: Reason Foundation. Retrieved from http://reason.org/files/wsf/yearbook.pdf

Thomas B. Fordham Institute. (2006). *Fund the child: Tackling inequity and antiquity in school finance.* Washington, DC: Thomas B. Fordham Institute. Retrieved from http://www.schoolfunding.info/resource_center/media/Fordham_FundtheChild.pdf

Chapter 2 References

Auditor, State of Hawaii. (1998). *Audit of the Decentralization Efforts of the Department of Education.* Honolulu, HI: State of Hawaii.

Baker, B. D., & Thomas, S. L. (2006). *Review of Hawai'i's Weighted Student Formula 2006–2007*. Honolulu, HI: Hawaii State Board of Education.

Duncombe, W., & Yinger, J. (2008). Measurement of cost differentials. In E. Fiske & H. Ladd (Eds.), *Handbook of research in education finance and policy* (pp. 239–256). New York: Routledge.

Hamamoto, P. (2007). Memo: Discussion/recommendation for Board action on the 2007 Committee on Weights' recommendations on the weighted student funding. Honolulu, HI: Office of the Superintendent.

Hawaii Department of Education. (2012). *Supporting school and Complex Area improvement: Academic and financial plan drafting guidance.* Honolulu, HI: Hawaii Department of Education.

Hawaii Department of Education. (2005). *SY 2006–07 weighted student formula/school financial plan implementation manual.* Honolulu, HI: Hawaii Department of Education.

Hawaii Department of Education. (2003). *Weighted student formula feasibility study.* Honolulu, HI: State of Hawaii, Board of Education, Department of Education.

Hawai'i Educational Policy Center. (2003). *Adoption of a student weighted formula for funding Hawai's's public schools: Policy issues.* Honolulu, HI: Hawai'i Education Policy Center.

Izu, J., Aronson, J., De Long, B., Cuevas, J., & Braham, N. (1996). *Voice, collaboration and school culture: Creating a community for school improvement. Evaluation of the pioneer SCBM schools, Hawaii's school/community-based management initiative. Executive summary.* San Francisco, CA: Far West Laboratory for Educational Research and Development.

Office of Curriculum, Instruction and Student Support. (2008). *School community council handbook II.* Honolulu, HI: Hawaii Department of Education.

Chapter 3 References

Baker, B. D., & Corcoran, S. P. (2012). *The stealth inequities of school funding: How state and local school finance systems perpetuate inequitable student spending.* Washington, DC: Center for American Progress.

Baker, B. D., & Thomas, S. L. (2006). *Review of Hawai'i's Weighted Student Formula 2006–2007.* Honolulu, HI: Hawaii State Board of Education.

Chambers, J. G. (1981). Cost and price level adjustments to state aid for education: A theoretical and empirical review. In K. F. Jordan (Ed.), *Perspectives in state school support programs: Second annual year book of the American Educational Finance Association*. Cambridge, MA: Ballinger.

Chambers, J., & Levin, J. (2009). *Determining the cost of providing an adequate education for all students.* Washington, DC: National Education Association.

Chambers, J., Levin, J., Wang, A., Verstegen, D., Jordan, T., & Baker, B. (2012). *Study of a new method of funding for public schools in Nevada.* San Mateo, CA: American Institutes for Research.

Chambers, J., Shambaugh, L., Levin, J., Poland, L., & Muraki, M. (2008). *A tale of two districts—A comparative study of student-based funding and school-based decision making in San Francisco and Oakland unified school districts.* Palo Alto, CA: American Institutes for Research.

Duncombe, W., & Yinger, J. (2008). Measurement of cost differentials. In E. Fiske & H. Ladd (Eds.), *Handbook of research in education finance and policy* (pp. 239–256). New York: Routledge.

Education Resource Strategies. (2010). *Fair Student Funding Summit: Conference proceedings and recommendations for action.* Watertown, MA: Education Resource Strategies.

Engdahl, T. (2013, May 1). School finance bills cross finish line. *EdNews Colorado*. Retrieved from http://www.ednewscolorado.org/news/capitol-news/school-funding-bills-cross-finish-line

Haxton, C., Brodziak de los Reyes, I., Chambers, J., Levin, J., & Cruz, L. (2012). *A case study of Title I comparability in three California school districts.* Washington, DC: American Institutes for Research.

Miles, K. H., & Roza, M. (2006). Understanding student-weighted allocation as a means to greater school resource equity. *Peabody Journal of Education*, *81*(3), 39–62.

The mal-distribution of teachers across schools and courses hurts poor and minority students. Prepared testimony for hearing on teacher equity, U.S. House Committee on Education and Labor, (2009) (testimony of Marguerite Roza). Retrieved from http://archives.republicans.edlabor.house.gov/Media/file/111th/hearings/fc/093009/roza.pdf

Snell, L. (2009). *Weighted student formula yearbook.* Los Angeles, CA: Reason Foundation. Retrieved from http://reason.org/files/wsf/yearbook.pdf

Taylor, L. L. (2006). Comparable wage approach to geographic cost adjustment research and development report. Washington, DC: U.S. Department of Education Institute of Education Sciences National Center for Education Statistics (NCES 2006-321).

Ujifusa, A. (2013, May 15). Jerry Brown prepares to do battle for his California education budget. *Education Week*. Retrieved from http://blogs.edweek.org/edweek/state_edwatch/2013/05/for_some_time_californias_budget.html

United States Department of Education. (2010). *A blueprint for reform: The reauthorization of the Elementary and Secondary Education Act.* Alexandria, VA: U.S. Department of Education.

Verstegen, D. A. (2011). A 50-state survey of school finance policies. Retrieved from www.schoolfinances.info

Chapter 7 References

Chambers, J., & Levin, J. (2009). *Determining the cost of providing an adequate education for all students.* Washington, DC: National Education Association.

The mal-distribution of teachers across schools and courses hurts poor and minority students. Prepared testimony for hearing on teacher equity, U.S. House Committee on Education and Labor, (2009) (testimony of Marguerite Roza). Retrieved from http://archives.republicans.edlabor.house.gov/Media/file/111th/hearings/fc/093009/roza.pdf

Appendix A – Key Elements of Act 51: Reinventing Education Act of 2004

The following paragraph and numbered items are taken verbatim from the *Reinventing Education Act of 2004*:

> Description: Establishes a weighted student formula; provides additional information technology; empowers principals through a Hawaii principals' academy and other means; strengthens community involvement through school community councils and parent-community networking centers; provides more mathematics textbooks; lowers class size in kindergarten, grade one, and grade two; provides full-time, year-round student activity coordinators; provides support for students who need additional help to succeed in school; establishes a national board certification incentive program for teachers; enhances teacher education; reduces the bureaucracy that hampers the effectiveness of the department of education; improves the educational accountability system; requires the board of education members to hold community meetings in their districts.

(1) Establishing a weighted student formula
(2) Providing additional information technology
(3) Empowering principals through a Hawaii principals academy and other means
(4) Strengthening community involvement through school community councils and parent-community networking centers
(5) Providing more mathematics textbooks
(6) Lowering class size in kindergarten, grade one, and grade two
(7) Providing full-time, year-round, high school student activity coordinators
(8) Providing support for students who need additional help to succeed in school
(9) Establishing a national board certification incentive program for teachers
(10) Enhancing teacher education
(11) Reducing the bureaucracy that hampers the effectiveness of the department of education
(12) Improving the educational accountability system
(13) Requiring board of education members to hold community meetings in their districts

Appendix B – Principal Survey of Attitudes and Perspectives About the Hawaii WSF

Hawaii's Weighted Student Formula: Principal Survey

Purpose. This evaluation for the Hawaii Department of Education is being carried out by the independent, non-profit research organization the American Institutes for Research (AIR). The purpose of the evaluation is to gain a better understanding of the implementation and effectiveness of Hawaii's Weighted Student Formula (WSF). We are asking all principals in the state to participate in an online survey, intended to gather information on the implementation of the WSF.

Procedures. The survey should take approximately 20-25 minutes. We recommend completing the survey in a single session, though the survey may be completed in multiple sessions. You must use the unique link to the survey that was e-mailed to you.

Benefits and Risks. Your completion of this survey gives you the opportunity to share your opinions on issues that may be important to you and will contribute to an understanding of how to improve the state's implementation of the WSF. There are no anticipated risks to participating in this study.

Confidentiality. The surveys are intended to provide information about participants' experiences and not to evaluate individuals' capabilities or performance. We will treat the information you supply in a confidential manner. Your email address will be replaced with an anonymous identification number to protect your confidentiality. Only the AIR research team will have access to the survey responses. Individual responses will not be provided to other school staff, your complex area, or any other party outside of the AIR research team.
Voluntary Participation. Your participation in this survey is entirely voluntary.

More Information. For more information about this evaluation you can contact the study's director, Jesse Levin, at the American Institutes for Research at (650) 843-8270 or jlevin@air.org. If you have concerns or questions about your rights as a participant, contact AIR's Institutional Review Board (which is responsible for the protection of project participants) at IRB@air.org, toll free at 1-800-634-0797, or c/o IRB, 1000 Thomas Jefferson Street, NW, Washington, DC 20007.

If you have any technical issues when completing this survey, please email Kevin Lane at klane@air.org

Please answer each question below.

Prior to this school year, how many years did you serve as principal of this or any other school in Hawaii?

- [Enter number of years]

1. **Prior to this school year, how many years did you serve as principal of this school?**
   - [Enter number of years]

2. Please indicate how much you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Agree	Strongly Agree
I understand how Hawaii's Weighted Student Formula (WSF) is applied to determine the allocation of funds to schools.	☐	☐	☐	☐
I can explain to my School Community Council (SCC) how WSF funds were calculated for my school this year.	☐	☐	☐	☐
I know where to independently obtain details about how WSF allocations were calculated for my school this year.	☐	☐	☐	☐
I know who I can ask for information about how my WSF allocations were calculated for my school this year.	☐	☐	☐	☐
I have discretion over how the dollars in my school budget are spent.	☐	☐	☐	☐
Schools in Hawaii that serve greater percentages of students with additional needs receive more resources.	☐	☐	☐	☐
The categories of the existing WSF weighting factors (economically disadvantaged, English learners, gifted and talented, transient, grade level) appropriately account for the broad range of student needs that require additional funding.	☐	☐	☐	☐
The values of the WSF weighting factors used to determine the levels of funding schools receive accurately reflect the differential cost associated with providing an equitable educational opportunity to all students.	☐	☐	☐	☐
I have sufficient autonomy to implement an instructional program that meets the needs of the students in my school.	☐	☐	☐	☐

2. **Please indicate how much you agree or disagree with the following statements. (continued)**

I believe WSF funds are equitably allocated to schools in Hawaii.	☐	☐	☐	☐
The WSF allocation for this school year (2012-13) is appropriate to meet the needs of students at my school.	☐	☐	☐	☐
The projected WSF allocation for next school year (2013-14) is appropriate to meet the needs of students at my school.	☐	☐	☐	☐
The amount of funds my school receives through the WSF and other sources is sufficient for students at my school to meet the Hawaii Content and Performance Standards III.	☐	☐	☐	☐
The amount of funds my school receives through the WSF and other sources will be sufficient for students at my school to meet the Common Core State Standards in future years.	☐	☐	☐	☐
The amount of funds my school receives through the WSF and other sources is sufficient for school operations.	☐	☐	☐	☐
The WSF funds allocated to my school provide me with sufficient flexibility to try new instructional programming.	☐	☐	☐	☐
The WSF funds allocated to my school provide me with sufficient flexibility to implement innovative approaches at my school.	☐	☐	☐	☐
The WSF funds allocated to my school provide me with sufficient flexibility to operate my school efficiently.	☐	☐	☐	☐
Recent changes in the timeline for developing my Academic and Financial Plan have improved my ability to plan my school's budget for next school year.	☐	☐	☐	☐

3. How much control do you feel you have over how resources are allocated to the following areas in your school this year?

	No control	Minor control	Moderate control	A great deal of control
Types and numbers of classroom teachers	☐	☐	☐	☐
Types and numbers of support staff (learning coaches, paraprofessionals, vice principals, etc.)	☐	☐	☐	☐
Professional development	☐	☐	☐	☐
Curriculum and course offerings	☐	☐	☐	☐
Selection of instructional materials, strategies, and approaches	☐	☐	☐	☐
Parent involvement	☐	☐	☐	☐
Partnerships with community stakeholders	☐	☐	☐	☐
Supports for students with additional needs	☐	☐	☐	☐
Classroom technology	☐	☐	☐	☐
Use of data by administrators and teachers to inform instruction	☐	☐	☐	☐
Student assessment activities	☐	☐	☐	☐
Extending the school day or year	☐	☐	☐	☐
Extracurricular or after-school programming	☐	☐	☐	☐
Other (please specify)	[Open ended response box]			

4. **Please indicate how much you agree or disagree with the following statements.**

	Strongly Disagree	Disagree	Agree	Strongly Agree
I am held accountable for student performance by my SCC.	☐	☐	☐	☐
I am held accountable for student performance by my Complex Area Superintendent.	☐	☐	☐	☐
I am held accountable for student performance by the Superintendent.	☐	☐	☐	☐
I am held accountable for student performance by the state Board of Education.	☐	☐	☐	☐
Teachers in our school are held accountable for student performance.	☐	☐	☐	☐
The SCC in our school is held accountable for student performance.	☐	☐	☐	☐
The complex area superintendent is held accountable for student performance.	☐	☐	☐	☐

5. **How many SCC meetings do you hold in a typical year? [Fill in number]**

6. **How many SCC meetings do you hold in a typical year specifically to develop and review your annual Academic and Financial Plan? [Fill in number]**

7. **How many days prior to SCC meetings is public notice of SCC meetings posted in the school office and on the school website? [Response options: 1-2 days; 3-4 days; 5-6 days; more than 6 days]**

8. **Which of the following best describes the level of engagement between you and the School Community Council (SCC)?** *(Please select one.)*

   - ☐ I make key resource allocation decisions and inform the SCC.
   - ☐ I consult with the SCC about key resource allocation decisions; I make the final decisions.
   - ☐ The SCC and I are involved in two-way communication about key resource allocation decisions; I make the final decisions.
   - ☐ The SCC and I are involved in two-way communication about key resource allocation decisions; we make final decisions together.

9. Which of the following best describes the level of engagement between you and the faculty? *(Please select one.)*

- ☐ I make key resource allocation decisions and inform the faculty.
- ☐ I consult with the faculty about key resource allocation decisions; I make the final decisions.
- ☐ The faculty and I are involved in two-way communication about key resource allocation decisions; I make the final decisions.
- ☐ The faculty and I are involved in two-way communication about key resource allocation decisions; we make final decisions together.

10. [Open ended]: Has the WSF program permitted you to design and/or implement an innovative program in your school? (Yes/No). If no, please explain why not. If yes, can you briefly describe one example of a program you have developed that would have been difficult to implement without WSF? Also, please tell us, how you have used the flexibility you have with WSF funds to implement the program

11. [Open ended] Do you have any suggestions for how the WSF formula could be improved (e.g. additional categories or different weights)?

12. [Open ended] Do you have any suggestions for how the implementation of WSF could be improved?

Thank you!

Appendix C – Differences in Characteristics Between Schools With and Without Principal Survey Responses

Exhibit C.1 - Tabulation of Neighbor Island and Geographically Isolated Status Schools, by Response Category

Respondent/ Nonrepsondent		Neighbor Island	Oahu
Respondent	Count	70	139
	Proportion (Row)	33.49%	66.51%
Nonrespondent	Count	16	26
	Proportion (Row)	38.10%	61.90%
Respondent/ Nonrepsondent		**Not Geographically Isolated**	**Geographically Isolated**
Respondent	Count	202	7
	Proportion (Row)	96.25%	3.35%
Nonrespondent	Count	42	0
	Proportion (Row)	100%	0%

Exhibit C.2 - Tabulation of Schools, by Demographic Tertile and Response Category

Group	Group Type		0%–33%	33%–66%	66%–100%
Percentage of English Language Learners (ELLs)	Respondent	Count	70	71	68
		Proportion (Row)	33.49%	33.97%	32.54%
	Nonrespondent	Count	14	13	15
		Proportion (Row)	33.33%	30.95%	35.71%
Percentage of Students Eligible for Free or Reduced-Price Lunch (FRPL)	Respondent	Count	67	68	74
		Proportion (Row)	32.06%	32.54%	35.41%
	Nonrespondent	Count	17	16	9
		Proportion (Row)	40.48%	38.10%	21.43%
Student Enrollment in Elementary Schools	Respondent	Count	45	47	48
		Proportion (Row)	32.14%	33.57%	34.29%
	Nonrespondent	Count	11	8	7
		Proportion (Row)	42.31%	30.77%	26.92%
Student Enrollment in Middle Schools	Respondent	Count	11	11	11
		Proportion (Row)	33.33%	33.33%	33.33%
	Nonrespondent	Count	2	2	1
		Proportion (Row)	40%	40%	20%
Student Enrollment in High Schools	Respondent	Count	10	6	8
		Proportion (Row)	41.67%	25%	33.33%
	Nonrespondent	Count	1	5	3
		Proportion (Row)	11.11%	55.56%	33.33%
Student Enrollment in CEM, CMH, or K–12 Schools	Respondent	Count	4	4	4
		Proportion (Row)	33.33%	33.33%	33.33%
	Nonrespondent	Count	1	1	0
		Proportion (Row)	50%	50%	0%

Exhibit C.3 - Tertile Threshold Cutoffs, by School Characteristics

Group	Cutoff 1	Cutoff 2
Percentage of English Language Learners (ELLs)	5%	10%
Percentage of Students Eligible for Free or Reduced-Price Lunch (FRPL)	45%	64%
Student Enrollment in Elementary Schools	421	611
Student Enrollment in Middle Schools	647	863
Student Enrollment in High Schools	1,116	1,612
Student Enrollment in CEM, CMH, or K–12 Schools	387	660

Exhibit C.4 - Tabulation of Schools, by Schooling Level and Response Category

Group Type		Elementary	Middle	High	CEM, CMH, or K–12
Respondent	Counts	140	24	33	12
	Proportion (Row)	66.99%	11.48%	15.79%	5.74%
Nonrespondent	Counts	26	9	5	2
	Proportion (Row)	61.90%	21.43%	11.90%	4.76%

Exhibit C.5 - Tabulation of Schools, by NCES Locale Type and Response Category

Group Type		City	Suburb	Town	Rural
Respondent	Counts	48	79	56	26
	Proportion (Row)	22.97%	37.80%	26.79%	12.44%
Nonrespondent	Counts	6	18	13	5
	Proportion (Row)	14.29%	42.86%	30.95%	11.90%

Appendix D – Stakeholder Interview Protocol

Informed Consent – HI WSF Interviews

Thanks again for taking the time to speak with me today. Before we start, I'd like to provide a little background on why I'm here and answer any questions you might have for me.

The Hawaii Department of Education (DOE) has a great interest in ensuring that the Weighted Student Formula used to fund its public schooling is best serving its students, staff, and communities. To this end, HIDOE has commissioned an independent evaluation to better understand the implementation and effectiveness of Hawaii's Weighted Student Formula (WSF). They have contacted with the American Institutes for Research (AIR), an independent not-for-profit research organization, to conduct this evaluation.

This interview will allow you to share your experiences, perceptions, and feedback about WSF policies and implementation. Information gained during the interviews will provide the state with meaningful information that will help inform future WSF implementation decision making.

All of the information you provide will be completely confidential, meaning that we will not associate your name with what you said when we present findings. This interview is voluntary, and you may withdraw from the interview without penalty or decline to answer any question at any time.

If you don't mind, I would like to record this interview simply for note-taking purposes. No one will hear the tape, outside of our research team; it will just be for my own reference. If you would like me to turn off the recorder at any point, just let me know. Will that be ok?

If you have any questions about your rights as a participant you may contact the AIR IRB chair at IRB@air.org or 1-800-634-0797.

Do you have any questions before we begin?

Do you agree to participate in this interview?

HI WSF Interview Protocol

Background and goals

1. What is your current role?
    a. How long have you been in this role?
    b. What were you doing before?

2. What has been your role in developing and implementing Hawaii's Weighted Student Formula?

3. What are the state's goals for the WSF policy?
    Probe: What do you see as the primary goals for funding allocation decisions?
    - *Flexibility/autonomy of funds; per-pupil funding, need-based funding; actual teacher salaries; Transparency; Innovation*

    Probe: What do you see as primary goals for the planning and budgeting process?
    - *Budget timeline; goals-based budgeting; alignment between program plans, budgets, and resource allocation; transparency; innovation; staff and community engagement*

4. To what extent have these goals changed since the WSF's inception?

Development of the WSF

5. What key decisions were made in the creation of the WSF?
    a. How did the idea first get onto the state's education agenda?
    b. Who were the early champions of the policy?
    c. What challenges emerged as the policy was being developed?

6. What kinds of data and analyses were used to determine the pupil weights? (*Probe on both categories and relative weights for each category*)
    a. What role does the Committee on Weights play? (*Probe if a contractor was involved, if committee had analytic staff to do the work, etc.)*

7. Approximately what percentage of a school's resources come from WSF funds?

8. To what extent do you perceive that the WSF provides sufficient funding to achieve desired student outcomes?
    a. If yes, why is it sufficient?
    b. If no, why is it not sufficient?
    Probes: In what ways do you assess the sufficiency of funds? What does insufficiency mean to you? Is it sufficient for some students and not others?

Implementation

9. Can you describe how implementation of the WSF has proceeded over the years since inception?

10. What progress has been made in the last few years on goals related to funding allocation decisions? What key milestones have been reached?

11. How have funding allocation decisions changed over the past five years?
    a. To what would you attribute those changes or lack of changes?

12. How has the planning and budgeting process changed over the past five years?
    a. To what would you attribute those changes or lack of changes?
    b. Has the process or tools for supporting planning and budgeting changed over time?

13. What progress has been made this school year (2012-13) on other WSF goals? What key milestones have been reached?

14. To what extent do you feel that schools' Academic and Financial plans are aligned with resource allocation?
    a. How well are the AcFin plans aligned with state and complex area goals?

15. To what extent do school leaders have the necessary autonomy to make a difference in student learning, to be innovative and creative about programs, and to ensure access to quality teaching? (*Probe on barriers to autonomy and flexibility at the school level)*

Capacity

16. Do you feel that state and complex area staff have adequate preparation and the technical capacity to successfully implement the WSF?
    a. If yes, what evidence do you have of this?
    b. If no, what kinds of capacity building activities do you think are important?

17. Do you feel that principals, teachers, and school community council (SCC) members have adequate preparation and the technical capacity to make effective decisions about program planning, budgeting, and resource allocation?
    a. If yes, what evidence do you have of this?
    b. If no, what kinds of capacity building activities do you think are important?

18. Who would you say are key contributors to WSF implementation in the state office? In the complex area offices? In the schools?
    a. About how much time do they spend related to WSF?
    b. Why are they key?

Professional development training and support

19. How would you describe the role of the state Department of Education in supporting the alignment of schools' Academic and Financial plans with resource allocation decisions?

    Probe: What has the state office done this year (2012-13) to provide PD training to school sites around program planning, budgeting, and/or resource allocation?

20. How would you describe the role of the Complex Area Superintendent and his/her office in supporting the alignment of schools' Academic and Financial plans with resource allocation decisions?
    Probe: What has the complex area offices done this year to provide PD?

21. What other resources or supports do principals, school community councils (SCC), and teachers have for program planning, budgeting, and resource allocation—besides from the state office?
    Probe: What resources or supports do you think they need? Are there any plans to provide these?

<u>Communication</u>

22. What has the state done this year (2012-13) with regard to communicating about the WSF? *(Probe: website announcements, newsletters, emails, etc.)*

23. Do you feel that state-level staff – both in the Department of Education and in the State Legislature - have a clear understanding of the WSF?
    a. <u>If no,</u> what do they know? What don't they know?
    b. What perceptions or misperceptions do they have?

24. Do you feel that complex area superintendents have a clear understanding of the WSF?
    a. <u>If no,</u> what do they know? What don't they know?
    b. What perceptions or misperceptions do they have?

25. Do you feel that principals, teachers, school site council members, parents, and community members have a clear understanding of the WSF?
    a. <u>If no,</u> what do they know? What don't they know?
    b. What perceptions or misperceptions do they have?

<u>Transparency and involvement</u>

26. To what degree do you believe the current WSF calculations and implementation process is transparent?
    a. What has been done to increase transparency?
    b. What remains to be done to increase transparency?
    c. What successes or failures have you encountered in attempting to increase transparency?

27. How would you describe the role and involvement of the school community (teachers, other faculty, parents, students, other community members) in the budgeting and program planning process at the school level? What evidence do you have to support your answer?

General reflection on WSF

28. What do you most like about the WSF?

29. What do you most dislike about the WSF?

30. What kinds of accountability mechanisms are in place for implementing the WSF?
    a. If applicable - Why were they not implemented?

31. Do you feel that the WSF has created more of a culture of innovation and efficiency in the way resources are being allocated in the state or in the schools?
    a. If so, what changes have you observed that provide evidence of innovation or improved efficiency?
    b. If not, why do you think this is so?

32. Do you feel there are any federal or state policies that create barriers to WSF implementation and achieving WSF goals?
    a. <u>If yes</u>, which policies? What is the implication of these policies for the WSF? What would you like to see changed about this policy? Do you have any strategies for changing the policy?

33. What have been the biggest challenges or barriers to implementing the WSF and achieving its goals? *Probe on: funding and resource allocation; planning and budgeting process; capacity of school leaders; professional development; communication; transparency; community involvement*
    - *How were these addressed?*
    - *Were there any issues you faced that you hadn't predicted? If yes, how did you address this?*
    - *Were there any major mistakes that were made? If yes, how did you address this? What might you do to avoid a similar mistake in the future, or to prevent it if you could go back?*
    - *What most concerns or disappoints you about the WSF? What "keeps you up at night"?*

34. What have been the biggest successes related to the WSF?

35. What do you see as critical next steps moving forward? What do you see as major challenges?

36. Do you have any suggestions for improving the WSF or its implementation?

37. Is there anything else you would like to add that we haven't already covered?

Appendix E – Description of Position and Transactional Allocation Files

Position Allocation File

The position allocation files received from HIDOE contained information about the number and type of FTE staff positions allocated to schools from each funding source. These files were comprised of the following elements:

- ***Year:*** A four-digit code identifying year. HIDOE provided files for the 2000-01 through 2012-13 school years.
- ***Organization ID:*** A unique six-digit code assigned to each school. The file also included allocations for complex area offices and the state central office, which also are assigned distinct organization IDs.
- ***Program ID:*** A five-digit code that identifies the source and purpose of funds. This code was used to identify fiscal resources that were distributed through the Weighted Student Formula (WSF). See Exhibit 6.A.2 below for a list of Program IDs that identify WSF dollars.
- ***Object Code:*** A four-digit code describing the position associated with a specific allocation. For example, an elementary teacher position has a code of "2510." A principal position has a code of "2607."
- ***Total FTEs:*** The number of FTEs associated with a specific allocation.
- ***Average Salary:*** The statewide average salary associated with a specific position. In years prior to the implementation of the WSF, a school's monetary allocation for staff positions were based on average salaries. Those staff funded by programs not associated with the WSF continue to be allocated to school sites using this method.
- ***Total Allocation*****:** The product of the Total Number of FTEs times Average Salary.

Transactional Allocation File

The transactional allocation files received from HIDOE included allocation amounts by school from the WSF, dollar amounts from all funding sources for non-staff allocations, and subsequent adjustments to each school's allocation amounts. These files were comprised of the following elements:

Year: A four-digit code identifying year. HIDOE provided files for the 2000-01 through 2012-13 school years.

Organization ID: A unique six-digit code assigned to each school. The file also included allocations for complex area offices and the state central office, which also are assigned distinct organization IDs.[61]

[61] The last three digits of the code identify funding centers within a site; therefore, sites are uniquely identified by the first three digits.

Program ID: A five-digit code that identifies the source and specific purpose of funds. This code was used to identify fiscal resources that were distributed through the WSF. See Exhibit 6.A.2 below for a list of Program IDs that identify WSF dollars.

Fund Code: The fund code indicates the source of funds. In the files there were four types of funds:

- General Funds – Revenues from state income and excise taxes indicated with a code of "G".
- Federal Funds – Federal grants and reimbursements (e.g., Title I, Individuals with Disabilities Education Act (IDEA)) indicated with a code of "F".
- Special Funds – Revenues collected from user fees and indicated with a code of "S".
- Trust Funds – Revenues collected from donors and foundations and indicated with a code of "T".

Each program is associated with a specific fund code. For the purposes of the analysis, any program, regardless of the fund with which it was associated, was counted in a school's total allocation. Resources distributed through the WSF are entirely comprised of revenues from the General Fund.

Character Code: The character code is a broad aggregation of the types of resources on which allocations can be spent. Exhibit 6.A.1 lists the resource categories associated with each code.

Exhibit E.1 – Description of Character Code

Code	Description
A	Salaried Payrolls
A1	Casual/hourly Payrolls
B	Supplies, other current expenses
C	Equipment
M	Motor Vehicles
BC	Allocations for new facilities, is a combination of resource categories associated with B and C
T	A combination of the resource categories A, A1, B, C, and M used to indicate federal funds
F	A combination of the resource categories A1, B, C, and M used to indicate WSF, other resources from programs with a "General fund code" or carryover from programs with a "General" fund code.

***Allocation*:** Amount of allocation (in dollar values).

Transaction Type: This data element indicates whether an allocation amount is an initial allocation, carryover from a federal funding source allocated in a previous fiscal year, or a transaction that took place during the fiscal year. Allocations can be adjusted during the fiscal year; additionally, schools can transfer allocations between specific programs, and buy and or sell staff positions. These allocations were added to a school's initial allocation to generate a total allocation that reflected a more accurate measure of the total amount of resources available to a school during the school year. A more detailed description of how WSF funds are allocated to schools and subsequently adjusted can be found below in Appendix F.

Combining the Position and Transactional Allocation Data to Calculate School-Level Allocations

For each fiscal year, the position and transactional allocation files were combined to calculate the total amount of money allocated to each school in a given fiscal year, net of all adjustments. In years prior to the introduction of the WSF, all payroll-related allocations were included in the position file. Allocation amounts from the *position* file were calculated by multiplying the number of staff FTEs times the statewide average salary for a particular position.

Because the information that was reported in both the position and transactional allocation files by schools changed after the introduction of WSF, the calculation method differed slightly over time. Following the implementation of WSF, the transactional file included each school's *entire* initial WSF allocation at the start of the school year and any subsequent adjustments to that allocation, which included resources that were used to fund the payroll of many staff positions. Note that these WSF dollar allocations that were based on the formula described in detail in Chapter 2 took the place of the previous ones based on staff FTEs that were costed out at statewide average salaries. However, allocations for positions that were funded by fiscal resources that were *not* distributed through the WSF continued to be calculated by using statewide average salaries. Therefore, for years prior to WSF, a school's total allocation was generated by simply adding all allocation amounts from both the position and transactional file. For years in which funds were distributed through the WSF, however, only the allocation amounts from fiscal resources not associated with WSF were used from the position allocation file.[62]

[62] Specifically, these amounts were added to the transactional allocation file amounts after filtering out "Fin Plan A Load" transactions, which cancel out non-negative WSF allocations that schools put towards staff payroll.

Exhibit E.2 – List of Current Program IDs Identifying Dollar Distributed by WSF

Program ID	Program Description
42100	WEIGHTED STUDENT FORMULA
42101	WSF-INSTRUCTION
42102	WSF-ELL
42103	WSF-INSTRUCTIONAL SUPPORT
42104	WSF-STUDENT SERVICES
42105	WSF-STUDENT BODY ACTIVITIES
42106	WSF-ENABLING ACTIVITIES I
42107	WSF-ENABLING ACTIVITIES II
42108	WSF-ENABLING ACTIVITIES III
42109	WSF-ENABLING ACTIVITIES IV
42110	WSF-ENABLING ACTIVITIES V
42111	WSF-ENABLING ACTIVITIES VI
42112	WSF-SCHOOL ADMINISTRATION
42113	WSF-SCHOOL FACILITY SERVICES
42114	WSF-PROTOCOL FUND
42115	WSF-CTE
42121	WSF BUY BACK DECA
42122	WSF BUY BACK SKILLS USA
42123	WSF BUY BACK FFA
42124	WSF BUY BACK FCCLA
42125	WSF BUY BACK HOSA
42127	CAREER & TECHNICAL STUDENT ORGS
42150	WSF-SCHOOL HEALTH AIDES

Exhibit E.3 – List of Retired Program IDs Distributed Through Hawaii WSF and Indicator of "Pure" WSF Status

Program ID	Program Description	Year First Distributed Through WSF	"Pure" WSF
12641	PREGNANT/PARENTING PROGRAM	2009-10	No
12652	SCIENCE EDUCATION	2006-07	Yes
15103	CLASS SIZE REDUCTION	2006-07	Yes
15110	BASIC NEEDS	2006-07	Yes
15123	GRADE SCHOOL PRIORITY FUND	2006-07	Yes
15186	FRP 12-SCHOOL BASED SERVICES	2006-07	Yes
15630	HIGH RISK COUNSELORS	2006-07	Yes
15636	YOUTH LEADERSHIP PROJECT	2009-10	No
15637	INSTRUCTIONAL MATERIALS FOR REGULAR ED	2006-07	Yes
15638	SCHOOL-BASED SERVICES EA	2006-07	Yes
15672	STUDENT SERVICES COORDINATORS-FELIX	2006-07	Yes
15674	PRIMARY PREVENTION/INTERVENTION-FELIX	2006-07	Yes
15684	FRP-EXTENDED SCHOOL YEAR	2006-07	Yes
15816	SCIENCE EQUIPMENT	2006-07	Yes
15852	MUSIC EQUIPMENT	2006-07	Yes
15878	FOUNDATION PROGRAM / STANDARDS SUPPORT	2006-07	Yes
15954	LSB / WSF ADJUSTMENT	2006-07	Yes
16111	SCHOOL PRIORITY FUND-CASH	2006-07	Yes
16202	PREGNANT/PARENTING PROGRAM	2009-10	No
16290	INSTRUCTIONAL RES AUGMENTATION	2006-07	Yes
16734	SKILLS-USA	2006-07	Yes
16735	JUNIOR SKILLS-USA	2006-07	Yes
16744	HEALTH CAREER ACADEMY	2009-10	No
16771	CORE LEARNING	2006-07	Yes
16816	PINS-STUDENT ACTIVITY COORDINATOR	2006-07	Yes
16817	PINS-BASIC SKILLS	2006-07	Yes
16819	PINS-INSTRUCTION & SUPPORT SERVICES-VPS	2006-07	Yes
16830	WORLD LANGUAGES-SECONDARY	2006-07	Yes
16833	WORLD LANGUAGES-ELEMENTARY	2006-07	Yes
16871	GIFTED & TALENTED	2006-07	Yes
16887	ESLL	2006-07	Yes
16901	PROTOCOL FUND	2006-07	Yes

Exhibit E.3 – List of Retired Program IDs Distributed Through Hawaii WSF and Indicator of "Pure" WSF Status (continued)

Program ID	Program Description	Year First Distributed Through WSF	"Pure" WSF
16902	ENVIRONMENTAL EDUCATION	2006-07	Yes
16936	PINS-INSTRUCTION & SUPPORT SERVICES	2006-07	Yes
17131	SPECIAL EDUCATION IN REGULAR SCHOOLS	2006-07	Yes
17711	TRANSITION SERVICES	2006-07	Yes
17724	OCCUPATIONAL SKILLS LEARNING CENTER	2006-07	Yes
18291	COMPREHENSIVE SCHOOL ALIENATION PRGM	2006-07	Yes
18727	IN-SCHOOL SUSPENSION	2009-10	No
23105	SCHOOL ADMINISTRATION	2006-07	Yes
23106	SAFETY MANAGERS	2006-07	Yes
24317	SCHOOL LIBRARIES	2006-07	Yes
26120	COUNSELING	2006-07	Yes
27032	DECA	2006-07	Yes
27358	ATHLETIC DIRECTORS	2009-10	No
27362	INTRAMURALS	2006-07	Yes
27535	SCIENCE AND ENGINEERING FAIR	2006-07	Yes
27713	TRANSPORTATION FOR BAND	2006-07	Yes
27856	STUDENT ACTIVITIES COORDINATION SERVICES	2006-07	Yes
27857	TECHNOLOGY EDUCATION FAIR	2006-07	Yes
27867	MOLOKAI/LANAI STUDENT ACTIVITIES	2006-07	Yes
27868	ART EXHIBIT	2006-07	Yes
27875	MAUI INTER SCHOOL LEADERSHIP COUNCIL	2006-07	Yes
27876	FAMILY CAREER COMM LEADERS OF AMERICA	2006-07	Yes
27889	FUTURE FARMERS OF AMERICA	2006-07	Yes
28715	PREGNANT TEEN CENTER-MAUI	2009-10	No
36168	LUNCH AND BREAKFAST SUPERVISORS	2006-07	Yes
36172	CAMPUS SUPERVISION AND PATROL	2006-07	Yes
37297	SCHOOL CUSTODIAL SERVICES	2006-07	Yes
37305	CLASSROOM CLEANERS	2006-07	Yes
37325	TELEPHONE (CENTRALIZED SERVICES)	2006-07	Yes
37662	REPAIRS AND MAINTENANCE OF SCHOOLS	2006-07	Yes
46793	PCNC COORDINATORS	2006-07	Yes

Exhibit E.4 – Total and Relative WSF Dollar Allocations Associated With Retired Program IDs

Program ID	Program Description	Total Allocation	Percent of Overall 2005-06 Allocation from Program IDs Distributed by WSF in 2006-07 or Later	Year First Distributed Through WSF
15110	BASIC NEEDS	$320,193,434	51.7%	2006-07
23105	SCHOOL ADMINISTRATION	$81,697,352	13.2%	2006-07
37297	SCHOOL CUSTODIAL SERVICES	$31,446,325	5.1%	2006-07
16290	INSTRUCTIONAL RES AUGMENTATION	$24,620,689	4.0%	2006-07
26120	COUNSELING	$23,555,042	3.8%	2006-07
15672	STUDENT SERVICES COORDINATORS-FELIX	$17,137,835	2.8%	2006-07
24317	SCHOOL LIBRARIES	$15,436,951	2.5%	2006-07
16771	CORE LEARNING	$13,281,508	2.1%	2006-07
16887	ESLL	$10,135,808	1.6%	2006-07
18291	COMPREHENSIVE SCHOOL ALIENATION PRGM	$8,542,173	1.4%	2006-07
15674	PRIMARY PREVENTION/INTERVENTION-FELIX	$7,427,369	1.2%	2006-07
15630	HIGH RISK COUNSELORS	$6,825,240	1.1%	2006-07
16111	SCHOOL PRIORITY FUND-CASH	$6,354,325	1.0%	2006-07
15638	SCHOOL-BASED SERVICES EA	$5,823,858	0.9%	2006-07
16871	GIFTED & TALENTED	$4,951,704	0.8%	2006-07
36172	CAMPUS SUPERVISION AND PATROL	$4,693,145	0.8%	2006-07
16817	PINS-BASIC SKILLS	$3,786,909	0.6%	2006-07
46793	PCNC COORDINATORS	$3,537,118	0.6%	2006-07
47282	ACT 51-CLASS SIZE REDUCTION K,1,2	$3,408,048	0.6%	2006-07
27358	ATHLETIC DIRECTORS	$2,737,098	0.4%	2009-10
27856	STUDENT ACTIVITIES COORDINATION SERVICES	$2,726,421	0.4%	2006-07
15954	LSB / WSF ADJUSTMENT	$2,685,829	0.4%	2006-07
16936	PINS-INSTRUCTION & SUPPORT SERVICES	$2,609,780	0.4%	2006-07

Source: Historical fiscal data obtained from the HIDOE Budget Execution Section.

Exhibit E.4 – Total and Relative WSF Dollar Allocations Associated With Retired Program IDs (continued)

Program ID	Program Description	Total Allocation	Percent of Overall 2005-06 Allocation from Program IDs Distributed by WSF in 2006-07 or Later	Year First Distributed Through WSF
15878	FOUNDATION PROGRAM / STANDARDS SUPPORT	$2,173,248	0.4%	2006-07
17711	TRANSITION SERVICES	$1,875,806	0.3%	2006-07
37662	REPAIRS AND MAINTENANCE OF SCHOOLS	$1,816,475	0.3%	2006-07
15123	GRADE SCHOOL PRIORITY FUND	$1,759,227	0.3%	2006-07
15637	INSTRUCTIONAL MATERIALS FOR REGULAR ED	$1,294,228	0.2%	2006-07
16202	PREGNANT/PARENTING PROGRAM	$1,237,115	0.2%	2009-10
17131	SPECIAL EDUCATION IN REGULAR SCHOOLS	$883,757	0.1%	2006-07
37325	TELEPHONE (CENTRALIZED SERVICES)	$749,404	0.1%	2006-07
16816	PINS-STUDENT ACTIVITY COORDINATOR	$716,184	0.1%	2006-07
16744	HEALTH CAREER ACADEMY	$567,035	0.1%	2009-10
15816	SCIENCE EQUIPMENT	$557,031	0.1%	2006-07
15852	MUSIC EQUIPMENT	$498,139	0.1%	2006-07
16833	WORLD LANGUAGES-ELEMENTARY	$372,240	0.1%	2006-07
18727	IN-SCHOOL SUSPENSION	$355,885	0.1%	2009-10
16830	WORLD LANGUAGES-SECONDARY	$235,604	0.0%	2006-07
12652	SCIENCE EDUCATION	$233,359	0.0%	2006-07
16902	ENVIRONMENTAL EDUCATION	$200,583	0.0%	2006-07
28715	PREGNANT TEEN CENTER-MAUI	$184,449	0.0%	2009-10
27362	INTRAMURALS	$57,704	0.0%	2006-07
17724	OCCUPATIONAL SKILLS LEARNING CENTER	$49,392	0.0%	2006-07

Source: Historical fiscal data obtained from the HIDOE Budget Execution Section.

Exhibit E.4 – Total and Relative WSF Dollar Allocations Associated With Retired Program IDs (continued)

Program ID	Program Description	Total Allocation	Percent of Overall 2005-06 Allocation from Program IDs Distributed by WSF in 2006-07 or Later	Year First Distributed Through WSF
27713	TRANSPORTATION FOR BAND	$45,706	0.0%	2006-07
15636	YOUTH LEADERSHIP PROJECT	$43,524	0.0%	2009-10
27867	MOLOKAI/LANAI STUDENT ACTIVITIES	$20,000	0.0%	2006-07
16735	JUNIOR SKILLS-USA	$17,351	0.0%	2006-07
27032	DECA	$15,387	0.0%	2006-07
16901	PROTOCOL FUND	$10,640	0.0%	2006-07
27875	MAUI INTER SCHOOL LEADERSHIP COUNCIL	$10,383	0.0%	2006-07
16734	SKILLS-USA	$10,240	0.0%	2006-07
27876	FAMILY CAREER COMM LEADERS OF AMERICA	$10,007	0.0%	2006-07
27889	FUTURE FARMERS OF AMERICA	$6,800	0.0%	2006-07
12641	PREGNANT/PARENTING PROGRAM	$0	0.0%	2009-10

Source: Historical fiscal data obtained from the HIDOE Budget Execution Section.

Exhibit E.5 – Total Dollars Associated With Programs Allocated by WSF (2006-07 to 2012-13)

Program ID	Program Description	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
42100	WEIGHTED STUDENT FORMULA	$689,835	$1,043,114	$1,542,214	$1,105,336	$2,367,184	$2,281,901	$9,269,004
42101	WSF-INSTRUCTION	$400,556,693	$445,721,231	$441,022,161	$463,455,005	$463,913,451	$462,002,938	$465,599,824
42102	WSF-ELL	$10,131,979	$11,514,134	$11,909,674	$12,377,306	$13,858,327	$13,708,124	$14,258,223
42103	WSF-INSTRUCTIONAL SUPPORT	$22,133,930	$24,472,849	$23,760,992	$23,808,571	$26,105,682	$23,478,088	$22,576,155
42104	WSF-STUDENT SERVICES	$57,477,743	$65,889,325	$65,050,226	$69,621,964	$70,101,633	$69,551,222	$68,378,506
42105	WSF-STUDENT BODY ACTIVITIES	$2,883,886	$3,186,970	$3,254,928	$4,732,528	$4,503,366	$4,395,639	$4,350,606
42106	WSF-ENABLING ACTIVITY I	$731,960	$1,943,924	$1,867,470	$2,095,909	$2,904,045	$2,900,345	$3,383,040
42107	WSF-ENABLING ACTIVITY II	$370,377	$559,588	$917,888	$867,366	$665,198	$658,126	$611,015
42108	WSF-ENABLING ACTIVITY III	$478,538	$772,963	$553,484	$523,037	$699,525	$632,012	$714,532
42109	WSF-ENABLING ACTIVITY IV	$74,759	$36,406	$141,138	$130,271	$60,869	$119,013	$136,013
42110	WSF-ENABLING ACTIVITY V	$133,471	$47,136	$105,522	$86,933	$57,949	$124,960	$28,946
42111	WSF-ENABLING ACTIVITY VI	$33,528	$99,934	$13,147	$61,346	$142,592	$58,447	$72,472
42112	WSF-SCHOOL ADMINISTRATION	$88,022,107	$99,426,713	$100,128,160	$106,305,126	$113,662,502	$110,081,671	$118,027,615
42113	WSF-SCHOOL FACILITY SERVICES	$42,863,965	$48,070,844	$48,346,927	$50,038,411	$51,803,593	$51,794,297	$51,773,711
42114	WSF-PROTOCOL FUND	$105,395	$129,617	$74,300	$48,072	$181,997	$59,507	$69,218
42115	WSF-CTE	$0	$0	$0	$0	$0	$1,522,732	$1,335,299
42121	WSF BUY BACK DECA	$0	$0	$0	$0	$0	$0	$0
42122	WSF BUY BACK SKILLS USA	$0	$3,040	$569	$1,360	$150	$0	$0
42123	WSF BUY BACK FFA	$0	$0	$293	$0	$155	$0	$750
42124	WSF BUY BACK FCCLA	$0	$0	$1,356	$1,176	$0	$0	$0
42125	WSF BUY BACK HOSA	$718	$0	$759	$0	$0	$0	$0

Source: Historical fiscal data obtained from the HIDOE Budget Execution Section.

Appendix F – Description of How Schools Receive WSF Allocations and Necessary Adjustments to Allocations Data

How Schools Receive WSF Allocations

In the fall prior to the upcoming fiscal year (e.g., Fall 2010 for the 2011-12 school year), schools are forwarded their projected WSF allocations, which are used by principals and school site councils to develop their Academic and Financial Plans. The following summer, schools receive their initial WSF allocation, which is based on this projected figure. This allocation is subsequently adjusted in August, when official enrollment counts for the school year are taken. At this point, schools can either gain or lose money due to actual enrollment being lower or higher than projected enrollment.

In September, schools that experience enrollment growth after the official enrollment count is taken receive an additional per-pupil allocation that is pro-rated at 75 percent for the number of additional students that have enrolled in the school since August. Schools also receive a similar adjustment for enrollment growth in December, except that the per-pupil allocation is pro-rated at 50 percent. Note that schools do not lose funding for enrollment declines experienced between the official August counts and either the September or December updates.

During the fiscal year, allocations may also change because schools have the option to transfer fiscal resources between locations (i.e. to other school sites or to Complex Area or State Offices to consolidate resources for projects or initiatives).[63] Finally, schools also have the option to carry over a portion of their WSF allocations from the prior fiscal year. For these reasons, school-level WSF allocations calculated from the transactional allocation file may not reflect their actual WSF allocation in a given fiscal year.

Necessary Adjustments to Allocations Data

In a handful of cases noted in the crosswalk, dollars in the retired programs were split between WSF and non-WSF program IDs in the post-WSF years. For these programs, allocation amounts for the pre-WSF years WSF were pro-rated into a WSF share and non-WSF share for all schools. The percentages used to pro-rate the allocations were based on the dollars distributed through the WSF and outside of the WSF in 2006-07 divided by the total allocation associated with the Program ID in the 2005-06 school year. Below we list the handful of cases and the corresponding percentages used to pro-rate program allocations in the years before WSF was introduced (see Exhibit 6.B.1).

Between the 2006-07 and 2009-10 school year, WSF allocations included fringe benefits for all staff supported by WSF programs. Beginning in the 2010-11 school year, this money, and the responsibility of administering fringe benefits was transferred to the Hawaii Department of Budget and Finance. In order to ensure that WSF allocation levels reflected the same amount of

[63] Schools can also elect to spend more or less of their allocation on payroll. That is, schools have the option to buy or sell additional FTEs with their staff allocation. However, this does not affect their total WSF allocation, only the balance between allocations used to cover payroll and non-payroll expenses.

resources across years, WSF allocations in these years were pro-rated to remove the share of allocation that comprised fringe benefits. The amount by which these allocations were pro-rated in post-WSF years are contained in Exhibit 6.B.2.

Exhibit: F.1 – Programs Pro-Rated Between WSF and Non-WSF Allocations

Program ID	Program Description	Pro-Rated into WSF	Pro-Rated into Non-WSF
15110	BASIC NEEDS	99.8%	0.2%
15630	HIGH RISK COUNSELORS	99.6%	0.4%
15638	SCHOOL-BASED SERVICES EA	99.6%	0.4%
15672	STUDENT SERVICES COORDINATORS-FELIX	99.7%	0.3%
17131	SPECIAL EDUCATION IN REGULAR SCHOOLS	0.7%	99.3%
17711	TRANSITION SERVICES	96.4%	3.6%
23105	SCHOOL ADMINISTRATION	98.9%	1.1%
37297	SCHOOL CUSTODIAL SERVICES	94.0%	6.0%
37325	TELEPHONE (CENTRALIZED SERVICES)	93.0%	7.0%
37662	REPAIRS AND MAINTENANCE OF SCHOOLS	99.7%	0.3%
46793	PCNC COORDINATORS	92.3%	7.7%

Exhibit F.2 – Rates Used to Eliminate Fringe Benefits from WSF Allocations in Analysis Data (2006-07 to 2009-10)

Year	Adjustment for Fringe Benefits
2006-07	71.8%
2007-08	76.0%
2008-09	75.9%
2009-10	73.5%

Appendix G – Generation of English Language Learner (ELL) Percentages for Study Years 2000-01 through 2002-03

To generate school-level ELL rates for the 2000-01, 2001-02, and 2002-03 school years, the research team used data housed in the National Longitudinal School-Level State Assessment Score Database (NLSLSASD). This database contains test score information for approximately 90,000 public schools in the U.S. until the 2004-2005 school year, and contains information available about the number of tested students by different demographic groups.

Data for Hawaii schools were available in the 2000-01, 2002-03, 2003-04, and 2004-05 school years. These files contained school-level Stanford Achievement Test, Ninth Edition (SAT 9) scores in grades 3, 5, 8, 10, and also included the total number of tested students as well as the number tested identified as Limited English Proficient or non-Limited English Proficient. These counts were used to generate school-level ELL percentages for the 2000-01 and 2002-03 school years by dividing them through by the total numbers of students tested.

Unfortunately, the NLSLSASD did not contain data for Hawaii schools in the 2001-02 school year. ELL rates for this year were therefore imputed for each school by taking the average of the calculated 2000-01 and 2002-03 ELL rates.[64]

To investigate the possibility that the ELL rates generated from the NLSLSASD data were not representative of a school's actual ELL rate, the research team compared school-level ELL rates from the HIDOE data and that generated using the NLSLSASD for the two years in which both files were available (2003-04 and 2004-05). The average pupil-weighted difference between the two files by schooling level was computed for each of these two years. The results showed, as one might expect, that the NLSLSASD rates were systematically lower by an average of 3.0 percentage points for elementary schools, 2.0 percentages points for middle schools, and 0.4 percentage points for high schools.[65] To account for this likely undercounting, ELL rates in 2000-01, 2001-02, and 2002-03 were adjusted upward by these averages.

[64] A handful of schools did not have an ELL percentage available for the 2000-01 school year. For these schools, the more recent 2002-03 percentage was imputed for 2001-02.

[65] One might expect this finding if the number of ELL students tested represent a selective sample of all ELL students enrolled at a school and this group has a lower incidence of test-taking. If this is the case, then dividing this smaller number of tested ELLs by the overall number tested will provide a proxy for ELL percentage that is downwardly biased.

Appendix H – Study Sample of Schools

Exhibit H.1 –List of Schools Excluded from Analysis

Org ID	School Name	Reason for Exclusion
144	JEFFERSON ORTHOPEDIC SCHOOL	School serves a special population
149	WAIALAE ELEM PCS	Charter school, does not receive WSF allocation
320	LANIKAI ELEM PCS	Charter school, does not receive WSF allocation
394	WAIMEA MIDDLE PCS	Excluded beginning in 2003-04 school year due to conversion to charter school
396	CONNECTIONS PCS	Charter school, does not receive WSF allocation
397	KANU O KA'AINA PCS	Charter school, does not receive WSF allocation
398	WATERS OF LIFE PCS	Charter school, does not receive WSF allocation
399	WEST HAWAII EXPLORATIONS ACADEMY PCS	Charter school, does not receive WSF allocation
408	KEANAE ELEM	School serves a special population
461	NIIHAU SCHOOL	School serves a special population
466	KULA AUPUNI NIIHAU A KAHELELANI ALOHA PCS	Charter school, does not receive WSF allocation
470	HAWAII SCHOOL FOR THE DEAF & THE BLIND	School serves a special population
472	HALE O' OLOMANA	School serves a special population
475	OLOMANA SCHOOL	School serves a special population
495	POHUKAINA SCHOOL	School serves a special population, and closed before introduction of WSF
496	LAHAINALUNA BOARDING	School serves a special population

Exhibit H.2 – Average FRPL, ELL, SWD, and Enrollment by FRPL Deciles for Elementary Schools, 2005-06, 2011-12, 2012-13

Year	FRPL Decile	Average Percent FRPL	Average Percent ELL	Average SWD	Average Enrollment
2005-06	10	83.9%	18.4%	9.6%	488
	9	72.3%	13.1%	10.4%	392
	8	63.1%	12.5%	10.3%	410
	7	54.4%	11.3%	9.2%	473
	6	49.7%	10.9%	7.4%	614
	5	45.1%	7.9%	9.4%	549
	4	38.1%	8.1%	8.4%	604
	3	30.9%	5.6%	7.7%	580
	2	22.0%	6.0%	8.4%	591
	1	10.4%	4.8%	5.1%	507
2011-12	10	90.7%	23.6%	11.8%	465
	9	81.5%	14.6%	13.7%	406
	8	72.0%	17.9%	10.0%	519
	7	65.5%	14.6%	10.4%	461
	6	59.9%	8.5%	9.2%	571
	5	55.1%	11.5%	9.7%	597
	4	47.4%	8.4%	9.5%	600
	3	39.1%	6.9%	10.1%	578
	2	30.3%	4.6%	8.5%	618
	1	14.5%	5.4%	6.7%	547
2012-13	10	91.8%	28.7%	10.5%	528
	9	83.9%	21.0%	12.0%	337
	8	74.5%	22.0%	10.7%	596
	7	67.7%	15.0%	9.6%	526
	6	61.6%	13.5%	9.3%	530
	5	56.4%	17.4%	9.1%	628
	4	49.3%	10.8%	9.7%	577
	3	41.6%	9.8%	9.4%	616
	2	32.3%	7.0%	9.0%	645
	1	16.3%	9.6%	6.5%	539

Exhibit H.3 – Average FRPL, ELL, SWD, and Enrollment by FRPL Deciles for Middle Schools, 2005-06, 2011-12, 2012-13

Year	FRPL Decile	Average Percent FRPL	Average Percent ELL	Average SWD	Average Enrollment
2005-06	10	72.6%	11.2%	16.1%	609
	9	62.3%	17.6%	11.2%	853
	8	50.9%	8.2%	12.2%	887
	7	48.1%	7.2%	14.3%	457
	6	45.4%	5.8%	10.2%	805
	5	41.4%	5.4%	13.7%	896
	4	38.4%	4.8%	12.1%	853
	3	32.6%	5.9%	11.1%	723
	2	27.1%	3.5%	12.3%	1,066
	1	15.0%	3.3%	10.4%	977
2011-12	10	79.7%	21.5%	13.0%	655
	9	72.2%	18.5%	13.0%	493
	8	62.6%	9.8%	14.6%	570
	7	59.1%	20.1%	8.8%	986
	6	54.4%	14.3%	8.6%	797
	5	53.4%	11.4%	14.0%	705
	4	50.3%	5.9%	14.0%	630
	3	46.4%	7.6%	10.3%	820
	2	36.1%	4.8%	12.8%	943
	1	22.4%	4.4%	9.9%	1,110
2012-13	10	82.4%	29.4%	12.8%	675
	9	73.3%	24.5%	14.3%	502
	8	66.5%	17.6%	12.5%	668
	7	63.2%	22.7%	13.0%	796
	6	60.1%	16.9%	10.2%	785
	5	55.4%	17.8%	10.2%	682
	4	53.1%	9.7%	14.6%	694
	3	49.2%	11.9%	11.3%	782
	2	39.2%	7.1%	13.0%	983
	1	24.1%	7.5%	9.6%	1,100

Exhibit H.4 – Average FRPL, ELL, SWD, and Enrollment by FRPL Deciles for High Schools, 2005-06, 2011-12, 2012-13

Year	FRPL Decile	Average Percent FRPL	Average Percent ELL	Average SWD	Average Enrollment
2005-06	10	61.6%	11.8%	18.1%	1,475
	9	54.9%	7.6%	17.9%	1,131
	8	46.3%	12.4%	14.8%	1,599
	7	41.0%	5.5%	16.5%	1,334
	6	36.9%	4.2%	17.0%	764
	5	33.9%	6.3%	15.3%	1,650
	4	29.1%	4.5%	14.7%	1,575
	3	22.0%	4.9%	11.7%	1,660
	2	19.8%	3.7%	14.2%	1,412
	1	10.7%	4.1%	11.0%	1,656
2011-12	10	79.1%	10.6%	19.8%	787
	9	66.2%	9.8%	15.1%	1,191
	8	59.6%	16.2%	14.5%	1,019
	7	53.8%	8.7%	13.2%	1,477
	6	47.9%	6.5%	11.3%	1,066
	5	44.2%	5.3%	12.4%	1,931
	4	41.7%	7.8%	11.3%	1,213
	3	36.6%	9.9%	9.4%	1,320
	2	27.3%	4.2%	10.2%	1,483
	1	18.3%	3.5%	10.0%	1,695
2012-13	10	83.4%	14.8%	19.9%	757
	9	69.7%	15.7%	12.7%	1,282
	8	63.3%	18.7%	15.9%	883
	7	56.0%	12.5%	13.4%	1,474
	6	51.4%	10.3%	13.0%	1,227
	5	47.3%	8.7%	11.0%	914
	4	45.1%	11.7%	11.4%	1,758
	3	39.4%	14.1%	9.6%	1,310
	2	29.1%	5.8%	10.5%	1,459
	1	20.7%	6.2%	10.4%	1,727

Exhibit H.5 – Correlation Between FRPL and ELL, 2005-06 and 2012-13

Schooling Level	Year	Correlation Between Percent FRPL and Percent ELL
Elementary	2005-06	0.47
	2012-13	0.40
Middle	2005-06	0.59
	2012-13	0.55
High	2005-06	0.41
	2012-13	0.41

Appendix I – Technical Description of Regression Model

Simple regression analysis was used to identify if there were any systematic patterns in school-level per-pupil allocations that could be explained by cost factors related to student need (pupil socioeconomic disadvantage proxied by percent eligible for free or reduced-price lunch) and scale of operations (enrollment and enrollment squared), and whether the relationships between dollar allocations and these cost factors changed over time (and specifically since the implementation of the WSF. The regressions estimated year-specific implicit weights for student need and scale, which represented how school-level per-pupil allocations varied on average with respect to levels of socioeconomic disadvantage and total school enrollment. The analysis was run separately by grade level (elementary, middle and high) with regressions being run separately using Overall per-pupil dollar allocations, as well as those allocations defined as WSF and non-WSF (i.e., dollars that were and were not allocated using the WSF). The formal regression specification used was as follows.

$$\begin{aligned}\ln(Per\ Pupil\ Allocation)_{s,t} &= \alpha + \beta_1 \ln\left(1 + FRL_{s,t}\right) + \beta_2 \ln(ENR_{s,t}) + \beta_3 \ln(ENR_{s,t})^2 \\ &+ \sum_{t=1}^{T} \delta_t YEAR_t + \sum_{t=1}^{T} \phi_t \ln\left(1 + FRL_{s,t}\right) YEAR_t + \sum_{t=1}^{T} \eta_t \ln(ENR_{s,t}) YEAR_t \\ &+ \sum_{t=1}^{T} \psi_t \ln(ENR_{s,t})^2 YEAR_t + \varepsilon_{s,t}\end{aligned}$$

where,

- s = index of school-specific observations
- t = index of year-specific observations
- FRL = School-Level Percent of Pupils Eligible or Receiving Free or Reduced-Price Lunch
- ENR = Total School Enrollment
- $YEAR$ = Year-Specific Dummy Indicator Equal to 1 for year t and 0, otherwise.
- α = The average per-pupil allocation in 2005-06 (reference year).
- β_1 = Estimated implicit socioeconomic disadvantage weight for reference year.
- β_2, β_3 = Estimated implicit enrollment weights (linear and quadratic) for specified pre-implementation reference year.
- δ_t = Marginal impact of year t relative to specified pre-implementation reference year.
- ϕ_t = Marginal impact of poverty in year t relative to estimated implicit poverty weight for reference year.
- η_t, ψ_t = Marginal impacts of (linear and quadratic) enrollment in year t relative to estimated implicit enrollment weight for reference year.
- $\varepsilon_{s,t}$ = School-level random error term.[66]

[66] The error terms are assumed to be independent across schools, but not within schools across years. To this end, robust standard errors are calculated for all of the regressions that take into account this form of group-clustered heteroskedasticity, where the group is an individual school. Standard errors that do not adjust for clustered error terms tend to overstate the precision with which parameters are estimated.

ABOUT AMERICAN INSTITUTES FOR RESEARCH

Established in 1946, with headquarters in Washington, D.C., American Institutes for Research (AIR) is an independent, nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance both domestically and internationally. As one of the largest behavioral and social science research organizations in the world, AIR is committed to empowering communities and institutions with innovative solutions to the most critical challenges in education, health, workforce, and international development.

LOCATIONS

Domestic

Washington, D.C.

Atlanta, GA

Baltimore, MD

Chapel Hill, NC

Chicago, IL

Columbus, OH

Frederick, MD

Honolulu, HI

Indianapolis, IN

Naperville, IL

New York, NY

Portland, OR

Sacramento, CA

San Mateo, CA

Silver Spring, MD

Waltham, MA

International

Egypt

Honduras

Ivory Coast

Kenya

Liberia

Malawi

Pakistan

South Africa

Zambia

AMERICAN INSTITUTES FOR RESEARCH®
2800 Campus Drive, Suite 200
San Mateo, CA 94403
650.843.8100 | TTY 877.334.3499
www.air.org

Making Research Relevant

14

Districts' Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings From a National Study

Volume 1 — Final Report

Districts' Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings From a National Study

Volume 1 — Final Report

Prepared for:

Policy and Program Studies Service
Office of Planning, Evaluation and Policy Development
U.S. Department of Education

Prepared by:

Jesse Levin
Karen Manship
Steve Hurlburt
Drew Atchison
American Institutes for Research

Ryoko Yamaguchi
Adam Hall
Plus Alpha Research & Consulting, LLC

Stephanie Stullich
U.S. Department of Education

2019

This report was produced under U.S. Department of Education Contract No. GS-00F-347CA: ED-PEP-16-A-0004 with American Institutes for Research. Joanne Bogart served as the contracting officer's representative. The views expressed herein do not necessarily represent the positions or policies of the U.S. Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service, or enterprise mentioned in this publication is intended or should be inferred. For the reader's convenience, this publication contains information about and from outside organizations, including hyperlinks and URLs. Inclusion of such information does not constitute an endorsement by the Department.

U.S. Department of Education
Betsy DeVos
Secretary

Office of Planning, Evaluation and Policy Development
James Blew
Assistant Secretary

Policy and Program Studies Service
Greg Fortelny
Director

October 2019

This report is available on the Department's website at:
https://www2.ed.gov/about/offices/list/opepd/ppss/reports.html.

Availability of Alternate Formats
Requests for documents in alternate formats such as Braille or large print should be submitted to the Alternate Format Center by calling 202-260-0852 or by contacting the 504 coordinator via email at om_eeos@ed.gov.

Notice to Limited English Proficient Persons
If you have difficulty understanding English, you may request language assistance services for Department information that is available to the public. These language assistance services are available free of charge. If you need more information about interpretation or translation services, please call 1-800-USA-LEARN (1-800-872-5327) (TTY: 1-800-437-0833), or email us at: Ed.Language.Assistance@ed.gov. Or write to: U.S. Department of Education, Information Resource Center, LBJ Education Building, 400 Maryland Avenue SW, Washington, D.C. 20202.

Content Contact:
Stephanie Stullich
Phone: 202-401-2342
Email: Stephanie.Stullich@ed.gov

Contents

Exhibits

Acknowledgments

We wish to thank all of those who contributed to the successful completion of this study. In particular, we are grateful for the considerable time and effort provided by staff in the nine case study districts who participated in interviews and provided documents and data for our analyses, as well as the hundreds of principals and district administrators who responded to the surveys.

We also thank members of the study's Technical Working Group — Mark Ferrandino, Matt Hill, Betty Malen, Amy Ellen Schwartz, and Jason Willis — who provided thoughtful feedback throughout the study. We also extend our gratitude to the AIR staff who contributed to this report in various capacities, including Jay Chambers, Alexa Cinque, Megan Eccleston, Sandy Eyster, Lynn Hu, Vaibhav Jain, Korantema Kaleem, Caitlin Kearns, Kerstin Le Floch, Kathy Sonnenfeld, and Cong Ye.

Finally, we appreciate the guidance and support of staff in the U.S. Department of Education, especially Joanne Bogart, Leticia Braga, and Oliver Schak of the Policy and Program Studies Service.

Although we greatly appreciate the assistance and support of these individuals, any errors are the responsibility of the authors.

Executive Summary

Over the past 25 years, a small but growing number of school districts have implemented weighted student funding (WSF), a type of school-based budgeting system, as a way to increase school-level autonomy and flexibility and more equitably distribute funding among schools. In these districts, education leaders have implemented policies that allocate dollars to schools rather than staffing positions, using weights to provide higher levels of funding for certain types of students who need additional support, such as students from low-income households, English learners (ELs), and students with disabilities (SWDs). In addition, these systems are intended to provide more autonomy at the school level, shifting more of the decision-making responsibility over resource allocation and school programming to principals and other school stakeholders (such as teachers, parents, and other community members).

This study identified 27 school districts that were implementing WSF systems as of the 2018–19 school year; these systems vary considerably in their longevity and in the specific features of their allocation formulas. This report examines how WSF districts have implemented these systems, the types of weights and other adjustments that they used, how they compare with districts that use more traditional resource allocation practices, and funding equity outcomes. The report is based on surveys of district administrators and principals in a nationally representative sample of WSF and non-WSF districts as well as in-depth case studies of nine WSF districts.

Highlights from this study include the following:

- WSF districts were more likely than non-WSF districts to classify principal autonomy and transparency as high-priority goals for their system of allocating resources to schools.
- The most common student subgroup weighted in WSF formulas were students from low-income families, English learners, and students with disabilities.
- Although all WSF case study districts reported that their schools use average rather than actual teacher salaries in developing their budgets, three districts also used actual salaries, either for some of their schools or by incorporating them into their weighting scheme.
- On average, WSF district administrators reported that over half (53 percent) of their total operational spending was under school discretion, compared with 8 percent in non-WSF districts.
- Despite the flexibility to make decisions about resources, principals in all nine WSF case study sites reported that their effective autonomy was constrained by district requirements to fill certain "non-negotiable" staff positions, collective bargaining agreements, and resource limitations.
- In six of the nine WSF case study districts, higher-poverty schools had higher per-pupil spending levels than lower-poverty schools, but after controlling for other school characteristics, only two had a positive relationship between poverty and spending, while three had a negative relationship.
- Among the five WSF case study districts with sufficient trend data, three showed increases in relative funding levels for high-poverty schools after WSF implementation.

Study Purpose

Few studies to date have investigated how WSF systems operate and their outcomes related to resource allocation. This nationwide study is intended to help fill this gap based on surveys of both WSF and non-WSF districts, site visits and interviews in nine WSF case study districts, and analysis of school-level expenditure data. The study examines three main study questions:

1. How are resources allocated to schools in districts with WSF systems, and how do they compare with districts with more traditional resource allocation practices?
2. In what ways do schools have autonomy and control over resource allocation decisions, and how does this vary between WSF and non-WSF districts?
3. Do WSF districts have higher levels of per-pupil spending in their higher-need schools, and has funding equity increased since the adoption of the WSF system?

This study is intended to provide both practitioners and policymakers with detailed information about the design, implementation, and outcomes of WSF systems in the United States. Readers should note that study results are descriptive and the design of the study does not support causal inferences about the effects of WSF. However, the findings may enable districts who are implementing WSF — or considering whether to adopt a WSF system — to learn from the examples and experiences of other districts who have pursued this approach to improving equity and governance in education.

Methodology and Study Limitations

To address the above study questions, the study team administered surveys to district administrators and principals in a nationally representative sample of 400 districts and 679 schools between December 2017 and June 2018, including all 26 districts identified as implementing WSF at the time of sample selection. Survey responses were received from 253 district administrators (including 13 of the 26 WSF districts) and 318 principals. The surveys included questions about the resource allocation system and perceptions of equity, autonomy, accountability, stakeholder engagement, and transparency.

In addition to the surveys, site visits were conducted to collect more detailed information from a subset of nine WSF districts: Baltimore City, Boston, Cleveland, Nashville, Denver, Indianapolis, Milwaukee, Prince George's County, and San Francisco. In these districts, site interviews were conducted with a district finance administrator, a district academic administrator, three school principals, and two respondents most knowledgeable about the WSF system from the following groups: union representatives, school board members, or other district administrators. The interview data were analyzed to better identify themes surrounding the motivation behind developing a WSF system and challenges implementing such a system, as well as the perceived changes in school-level control over resources and equity across schools.

The case studies also included collection of documents describing the allocation of funding to schools, documents describing the school-level budgeting process or other district budgeting guidelines, and data on school-level expenditures. This information was used to provide descriptions of how the WSF mechanisms distributed funding to schools and to perform an empirical analysis of resource equity across schools. Eight of the nine case study districts also responded to the district survey.

One limitation of the study is the relatively low response rates achieved on the district administrator and principal surveys (63 percent and 47 percent, respectively). In particular, the 13 WSF districts responding to the survey tended to be less urban and to have lower percentages of children in poverty and ELs than the full set of 27 WSF districts. In addition, the nine districts that served as case studies are not nationally representative, and those findings cannot be generalized to all WSF districts in the nation. Finally, although all of the case study districts were asked to provide expenditure data for five years prior to WSF implementation and all years since WSF implementation, some districts' data systems were limited in their ability to provide this information, especially if the WSF system was adopted more than 10 years ago.

Because the study findings are based on a non-random sample of case study sites and on surveys with relatively low response rates, they do not necessarily generalize to the nation as a whole. Additionally, in the analyses of survey results, reported differences between WSF and non-WSF district and schools are intended to be descriptive, not causal, and do not necessarily mean that these differences were caused by the use of WSF.

Summary of Findings

Goals and Structure of WSF Systems

WSF districts were more likely than non-WSF districts to classify principal autonomy and transparency as high-priority goals for their system of allocating resources to schools.

Nearly all district survey respondents in WSF district reported that allowing principal control over budgeting decisions at their schools was a high priority (95 percent, compared with 49 percent in non-WSF districts). Similarly, nearly all WSF districts reported that transparency in how resources are allocated to schools was a high priority (95 percent vs. 64 percent). In case study interviews, district leaders in seven of the nine WSF case study districts indicated that improving equity of resource distribution was a driving motivation behind moving to a WSF system.

The most common student subgroups weighted in WSF formulas were students from low-income families, English learners, and students with disabilities.

District documentation of the WSF systems for 14 districts (including the nine case study districts and an additional five districts that provide links to such documentation via the district survey) revealed that 10 the 14 used weights for students from low-income families, nine used weights for ELs, and seven used weights for SWDs. Six of the districts used weights for low-performing students, while three used weights for gifted and talented students. Two districts used weights for students who are homeless.

The size and structure of the weights to address student needs varied considerably among the nine case study districts.

For example, weights for individual students from low-income families ranged from 0.05 to 0.15, and three of the districts provided additional funding for schools with high concentrations of these pupils (Baltimore, Boston, and Denver), bringing the combined weights for low-income students up to a high of 0.275 in Denver. For EL students, some districts varied the weights by English proficiency level while others used a single weight for all ELs. Similarly, weights for students with disabilities often varied by type and severity of disability. Weights for ELs and SWDs were often larger than those for low-income students; EL weights ranged as high as 0.94, and SWD weights were over 1.0 in three districts, with a high of 7.25 in one district.

Among the nine case study districts, seven provided larger per-pupil amounts for lower grade levels, but they differed in the specific grades that were favored. Six case study districts supplemented their WSF allocations with additional allocations for specialized programming such as specialty schools and vocational programs.

All WSF case study districts made at least one change to their weighting schemes in recent years.

Among the nine WSF case study districts, two-thirds reported reviewing their weighting schemes on an annual or otherwise regular basis. The most common change, reported by five WSF case study districts, was to add a weight for one or more new student need categories, including students from low-income families (Baltimore, Denver, and Nashville), homeless students (Boston and San Francisco), gifted students (Baltimore), and SWDs (Denver).

Although all nine WSF case study districts reported that their schools use average teacher salaries in developing their budgets, three of the districts also used actual salaries, either for some of their schools or by incorporating them into their weighting scheme.

Boston, Denver, and Prince George's have adopted methods to introduce actual salaries into their WSF schemes to address resource inequities resulting from the distribution of teachers with respect to experience and educational attainment. In both Boston and Denver, about one-third of the schools had opted to use actual salaries for budgeting purposes. Because the schools that choose this option generally have below-average salaries, using actual salaries for budgeting means the schools' budgeted salaries are less than they would be if using district average salaries, which effectively provides the schools with additional funds that can be used to expand or improve other services and resources.

Prince George's took a different approach: instead of addressing teacher salary differences across schools by using actual salaries for budgeting, it incorporated a measure of schools' differences between actual and average salaries into its weighting scheme. Specifically, Prince George's tailored the base allocation for each school by applying a weight to account for differences in teacher salary levels across schools, as well the resources that some schools (particularly specialty programs) receive in addition to their WSF dollars.

School Autonomy

On average, WSF district administrators reported that over half (53 percent) of their total operational spending was under school discretion, compared with 8 percent in non-WSF districts.

District operational funds include both unrestricted funds and restricted funds. Most district funds flow through the "general fund," which provides unrestricted funding for a wide range of school and district functions. In addition, districts have restricted funds that must be used for particular students and/or purposes, including categorical programs such as Title I of the *Elementary and Secondary Education Act of*

1965 (ESEA), the *Individuals with Disabilities Education Act*, and state compensatory education programs. WSF districts, on average, reported providing somewhat higher shares of their unrestricted funds for schools to use at their discretion (59 percent) than they did for restricted funds (48 percent). The share of funds reported as under school discretion varied across WSF districts; among the case study districts, the percentage of unrestricted funds over which principals had discretion ranged from 27 percent to 54 percent.

Principals in WSF districts often reported that decisions about hiring staff, selecting instructional materials, and instructional programming were mostly made at the school level.

For example, 85 percent of principals in WSF districts reported that decisions about hiring regular classroom teachers were mostly made by school staff and stakeholders, compared with 56 percent of principals in non-WSF districts. Responses of district administrators showed similar patterns.

Principals in WSF districts were more likely than their counterparts in non-WSF districts to indicate that decisions about hiring school-level staff were mostly made by school staff and stakeholders. However, most of these differences were not statistically significant in conditional analyses that controlled for certain differences between WSF and non-WSF districts (such as enrollment size), with the exception of instructional coaches.

WSF principals were more likely than their non-WSF counterparts to report that decisions about selecting instructional materials were mostly made by school staff and stakeholders, although this was less common than for decisions about selecting staff. For example, 48 percent of WSF principals reported that school staff and stakeholders made most decisions about selection of instructional software, compared with 10 percent of non-WSF principals.

WSF principals were also more likely than those in non-WSF districts to report that school staff and stakeholders made most decisions about before- and after-school programming (59 percent vs. 30 percent), elective and non-core classes (56 percent vs. 26 percent), and summer programming (33 percent vs. 9 percent). WSF principals were also more likely to report such autonomy for professional development (30 percent vs. 9 percent).

Despite the flexibility to make decisions about resources, principals in all nine WSF case study districts reported that their effective autonomy was constrained by district requirements and other factors.

In the case study interviews, principals in WSF districts reported that district policies required them to fill certain “non-negotiable” staff positions, which limited the amount of funds in the school’s annual budget that they could actually control. School staff in case study districts also reported constraints related to collective bargaining agreements and resource limitations.

Principals in WSF districts reported that the most significant challenge to budgeting is difficulty in predicting school resources from year to year.

Just over half (56 percent) of WSF principals reported that predicting school resources from year to year is a major or moderate challenge for them, compared with 35 percent of non-WSF principals.

In six of the nine WSF case study districts, district administrators reported challenges related to building and sustaining principal capacity around the planning and budgeting process, citing concerns specifically about principals' understanding of the financial aspects of making resource allocation decisions.

Interviewees often noted that managing the business aspects of running a school is not part of a principal's traditional skill set. Several district respondents spoke about the unevenness in principals' knowledge of budgeting and skill in making effective spending decisions, particularly among novice principals and districts experiencing high principal turnover.

Principals in WSF districts reported having access to a variety of district supports for budget development and management, including having a specific district staff person assigned to their school to assist with budget development and management (75 percent); availability of district staff to provide technical assistance as needed, either by phone (73 percent) or in-person (62 percent); and online resources such as documents, videos, and/or training modules (66 percent).

Stakeholder Inclusion in the Budgeting and Planning Process

Principals in WSF districts often reported that teachers and other school stakeholders had moderate or significant influence over school budget decisions.

Not surprisingly, principals most often reported themselves as having moderate or significant influence over school budget decisions (96 percent). In addition, 81 percent reported that teachers had moderate or significant influence, followed by other school administrative staff (79 percent), district staff (77 percent), school support staff (59 percent), and parents (47 percent).

All of the WSF case study districts had policies requiring principals to engage school stakeholders during the budgeting process, and principals and district administrators often emphasized the value of seeking their input. For example, one administrator described how this process can build community support for the school, saying "you have to go in with some ideas as a recommendation; then you come out with what the feeling of the school community is."

Accountability

Principals in WSF districts reported that the most likely consequence of a school spending more than its allotted amount was that the amount overspent could be deducted from the school's budget the following year.

Fifty-seven percent of principals and 60 percent of district administrators in WSF districts reported that if a school's spending exceeded its budget, the overage could be deducted from the school's budget the following year. In the case study interviews, district administrators described providing supports to principals to help them meet budgetary requirements, and principals said it is rare for a school to overspend, given the frequent district oversight and guidance.

More than half of principals and district administrators in WSF districts indicated that not meeting performance targets could result in closer district monitoring of a school's budget.

For example, 74 percent of principals reported that a school not meeting performance targets could result in the district more closely *evaluating the school's proposed budget* for the next year, and 52 percent said the district could more closely *monitor implementation of the school's budget*. However, the case study data suggest that accountability systems for school performance may not be directly connected to WSF financial systems; interviewees were unable to point to any specific mechanisms or procedures that apply budgetary consequences for poor academic performance.

Funding Equity

To examine this issue, we used school-level expenditure data provided by the nine WSF case study districts to examine equity patterns within each district using two approaches. First, we compared average per-pupil spending in higher-need versus lower-need schools in terms of poverty rates and percentages of ELs and SWDs. Second, we used regression analysis to estimate implicit weights that measure the extent to which schools with higher levels of student needs tend to have higher per-pupil spending after controlling for other school characteristics.

Examining equity trends in WSF districts is challenging due to the difficulty in obtaining detailed school-level expenditure data both before and after the implementation of WSF. Because of the limited amount of pre- and post-WSF implementation data, the trend analyses in this report are presented as descriptive, not causal, analyses, and should be interpreted with caution.

In six of the nine WSF case study districts, higher-poverty schools had higher per-pupil spending levels than lower-poverty schools, but after controlling for other school characteristics, only two had a positive relationship between poverty and spending, while three had a negative relationship.

Although high-poverty schools had higher funding levels than low-poverty schools in six of the districts, they also typically had higher needs in terms of special education and ELs. Although this analysis is based on unrestricted funds, and did not include categorical funds that are restricted to serving SWDs and ELs, it is possible that the higher spending in high-poverty schools could in part reflect other funds provided to help meet the needs of those students. The implicit weight approach, which uses regression analysis to control for other student needs (EL and SWD), school size, and grade level, indicated that in three of the case study districts, high-poverty schools spent less per student than otherwise similar schools with low poverty rates.

It may seem surprising that not all WSF districts have higher per-pupil spending in their high-poverty schools, given that WSF formulas allocate funds to schools at least in part based on indicators of student needs. However, equity outcomes may be influenced by a variety of factors, such as whether the WSF formula contains weights for students from low-income families and the relative size of those weights. A second factor that could reduce equity results is if funds outside the WSF formula are provided to support programs serving more advantaged students.

In addition, the use of average salaries for budgeting the funds that are allocated through the WSF formula, rather than the amounts actually paid to those teachers, could result in schools with lower-paid teachers having lower actual per-pupil expenditures than they appear to have "on paper." Because higher-poverty schools often have teachers with less experience and lower salaries, these schools may then have lower per-pupil expenditures than lower-poverty schools, even if the WSF formula uses weights to provide them with larger allocations.

Looking at total school-level expenditures, rather than just spending from unrestricted funds, provides a more positive view of school spending patterns in relation to poverty.

Restricted funds are those that are targeted to specific student groups or programs, such as the federal Title I program, state compensatory education programs, and programs serving English learners and students with disabilities. Typically these restricted funds are not allocated to schools through WSF formulas, which is why this report focus on unrestricted funding. However, because these funds are part of the total resources that are available in schools, we also examined equity patterns for these funds, in the eight case study districts that provided data on restricted funds.

Across the eight districts, the number of districts in which high-poverty schools received more than low-poverty schools rose from five districts (for unrestricted funds) to seven districts (for both unrestricted and restricted funds). After controlling for other factors, one district showed a positive relationship[1] between poverty and total spending and the other seven districts showed no significant differences.

Among the five WSF case study districts with sufficient data to examine trends before and after WSF implementation, three showed a more positive relationship between spending and poverty after the adoption of WSF, after controlling for other variables.

High-poverty schools experienced gains in per-pupil spending from unrestricted funds, relative to low-poverty schools, in four of the five districts. After controlling for other school characteristics, three of these districts showed increases in their implicit weights for students from low-income families.

In four of the nine WSF case study districts, schools with higher concentrations of English learners had higher per-pupil spending, on average, than low-EL schools, but only two districts had a positive relationship between percentage of EL students and spending levels, after controlling for other variables.

The other seven districts showed no relationship between EL concentration and per-pupil spending.

Among the five districts with sufficient data to examine trends, two showed relative average gains for high-EL schools after WSF implementation, compared with low-EL schools. After controlling for other school characteristics, three districts showed increases in their implicit weights for EL students.

Most of the WSF case study districts showed substantially higher spending levels in schools with higher proportions of students with disabilities, both before and after WSF implementation.

In eight of the nine case study districts, schools with higher concentrations of students with disabilities had higher spending levels than other schools, and this relationship was statistically significant after

[1] One of the two districts that showed a significant positive relationship between poverty and spending from unrestricted funds was not included in the analysis of total spending.

controlling for other school characteristics. This is not surprising given that children eligible under IDEA are entitled to a free appropriate public education.

Four of the five case study districts with sufficient trend data largely maintained their distribution of per-pupil spending resources with respect to students with disabilities in the post-WSF time period.

Conclusions

WSF is a policy that aims to increase school-level autonomy and funding equity. The survey results from this study indicate that WSF districts allocate over half of their total operational spending to schools to be used under principals' discretion — more than six times the amount reported by non-WSF districts. In addition, principals in WSF districts reported a higher degree of school autonomy in a number of areas than did their counterparts in non-WSF districts, including hiring instructional coaches, selecting curricular materials and instructional software, and making decisions about extended time programs and professional development. However, in the case study interviews, WSF principals often reported that their autonomy was constrained to some degree by requirements to fill non-negotiable staff positions and other factors.

In terms of equity, the findings from this study are mixed. Although districts often targeted similar student need categories in their WSF systems — in particular, students from low-income families, English learners, and students with disabilities — they varied considerably in the magnitudes of the weights they used, as well as in other formula details. Analyses of expenditure data in the nine WSF case study districts found that while some WSF districts had progressive equity outcomes and appeared to make equity gains after WSF implementation, others did not. Although WSF is a tool that may be used to direct higher levels of funding to schools with greater needs, its effectiveness in improving the equitable distribution of funds will be affected by the types and sizes of weights used, the share of total funding distributed through the formula, and whether schools use actual or average salaries for budgeting the funds that are allocated to them.

In short, the WSF districts in this study have grappled with a variety of challenges in their efforts to use this approach to increase equity and school autonomy. Some districts have just begun to implement their WSF approach or are in the process of deciding whether to embark on this path, while others have seen their systems evolve over many years and changes in leadership — yet all may benefit from learning from the examples and experiences of other districts who have pursued this approach to improving equity and governance in education.

1. Introduction

Over the past 25 years, a small but growing number of school districts have experimented with the use of weighted student funding (WSF), a type of school-based budgeting system, as a way to increase school-level autonomy and flexibility and more equitably distribute funding among schools. While school districts in the United States typically distribute most school-level resources in the form of staff, instructional materials, and other tangible resources to schools, districts with WSF systems allocate dollars to each school and assign the schools greater responsibility and control over how those funds are spent. Under WSF systems, individual school allocations are based on a formula that includes weights for certain types of students, such as students from low-income families,[2] English learners (ELs), and students with disabilities (SWDs),[3] in order to provide additional resources to meet the needs of those students.

This study identified 27 school districts that were implementing WSF systems as of the 2018–19 school year; these systems vary considerably in their longevity as well as the specific features of their allocation formulas. This report examines how WSF districts have implemented these systems, the types of weights and other adjustments that they used, how they compare with districts with more traditional resource allocation practices, and funding equity outcomes. The report is based on surveys of district administrators and principals in a nationally representative sample of WSF and non-WSF districts as well as in-depth case studies of nine WSF districts.

Policy Context

Most school districts in the United States distribute school-level resources in the form of staff, instructional materials, and other tangible resources, rather than allocating specific dollar amounts to individual schools. These traditional resource allocation systems typically determine the number of teachers, school administrators, and other types of staff for each school based on its total student enrollment; supplemental support for particular groups of students (e.g., students from low-income families, ELs, and SWDs) is provided through federal- and state-funded categorical funding programs. In addition, decisions about the allocation and use of those categorical funds often may be made at the district level.

Under these systems, school leaders and other stakeholders such as teachers and other school staff, parents, and community members may have little discretion or influence over how dollars are spent at their schools, or even understand how much money is being spent on their school. In addition, a large

[2] This report frequently refers to "students from low-income families," who are defined as those who are eligible for free and reduced-price lunch (FRPL) under the National School Lunch Program. FRPL eligibility is determined based on documentation obtained from a student's parents or other household members, or through direct certification based upon administrative records (e.g., records from the Temporary Assistance for Needy Families program or Supplemental Nutrition Assistance Program). These students are also sometimes referred to as "economically disadvantaged" students.

[3] In this report, the term "students with disabilities" is not specifically limited to students who have Individualized Education Programs (IEPs) and who receive special education services under the *Individuals with Disabilities Education Act (IDEA)*. The documentation provided by WSF districts most often referred to "students with disabilities" and not students with IEPs, and it is possible that some WSF systems may consider the term to include a broader category of students, such as those covered under Section 504 of the *Rehabilitation Act*, as well as students with IEPs served under the *IDEA*.

percentage of those resources may be fixed because of staffing decisions made at the district level, as well as staffing obligations required by district policies and/or collective bargaining agreements.

In addition, some researchers and advocates have raised concerns that traditional resource allocation systems can result in inequities in the distribution of resources. One concern is that schools with higher concentrations of at-risk students may not receive sufficient additional resources to meet the complex needs of those students (Rubenstein, Schwartz, and Stiefel 2006). Another concern is that teacher assignment practices and patterns can result in higher-poverty schools having lower per-pupil expenditures compared with other schools in the district, because higher-poverty schools often have teachers with less experience and lower salaries and districts typically allocate staff to specific schools without regard to their actual salaries (Roza and Hill 2004).

In contrast, districts with WSF systems have implemented policies that allocate dollars to schools rather than staffing positions, using weights or other funding adjustments to provide higher levels of funding for certain types of students who need additional support,[4] while also shifting more of the decision-making responsibility over resource allocation and school programming to principals and school stakeholders.

Under the WSF approach, providing schools with more autonomy may enable school leaders to use resources more effectively to meet the specific needs of their school's students. Some prior research suggests that increased principal autonomy may be associated with improved school quality and student outcomes (Mizrav 2014; Steinberg 2014). By devolving more control over programming and resource decisions to schools and providing more transparency about the level and types of resources in each school, WSF systems may also increase the level of accountability placed on school leadership and staff to deliver results and encourage greater stakeholder involvement in decision-making. Finally, using weights to allocate higher per-pupil amounts to schools with higher concentrations of students from low-income families, ELs, SWDs, and other kinds of at-risk students may provide the additional resources those schools need to help those students attain better educational outcomes.[5]

Federal Student-Centered Funding Pilot Program

A new federal pilot program to encourage the adoption of WSF systems was included in the *Every Student Succeeds Act of 2015* (*ESSA*), the most recent reauthorization of the *Elementary and Secondary Education Act of 1965* (*ESEA*). Under this law, the Department of Education is authorized to enter into local flexibility demonstration agreements with school districts that allow a district to consolidate certain federal education funds with its state and local funds and to allocate these funds to schools through a weighted student formula.[6] Initial applications for the Student-Centered Funding (SCF) pilot

---

[4] The literature on education finance widely recognizes that additional costs are associated with achieving similar outcomes for students with specific needs and circumstances such as students from low-income families, ELs, and SWDs (Duncombe and Yinger 2008).

[5] Baker (2016) provides an overview of the case that additional spending on students with specific needs can effectively improve outcomes.

[6] *ESEA* programs for which funds could be consolidated under the pilot are: Title I, Part A; Title I, Part C; Title I, Part D; Title II; Title III; Title IV, Part A; and Title V, Part B. Participating districts must still meet the purposes of the federal programs but would not have to provide a separate accounting for the funds.

were due in March 2018, and six districts have submitted applications; none are currently approved to participate in the pilot (as of September 2019).[7]

Under the SCF pilot, participating districts must follow a number of statutory requirements, including:

1. **Provide "substantial" weights for students from low-income families and for English learners.** The formula must allocate substantially more funding for these students than for other students. A district may also choose to apply weights for other student characteristics associated with educational disadvantage; if it does so, then the formula must also allocate substantially more funding for those students than for other students.
2. **Allocate a "significant percentage" of the district's funds through the formula.** The share of state, local, and federal funds allocated through the student-centered funding system must be a significant percentage[8] that is sufficient to carry out the purposes of the demonstration agreement and meet the requirements of *ESEA* section 1501(d).
3. **Use actual expenditures, not districtwide averages or other proxies.** When charging schools' expenditures against the funding allocated to each school, the district must use actual expenditures, "including staff salary differentials for years of employment." Similarly, districts must also use actual expenditures for non-personnel resources.
4. **Report annual data on funding equity outcomes.** Participating districts are required to publicly report school-by-school data on per-pupil expenditures and ensure funding gains for high-poverty schools. More specifically, a participating district must ensure that each high-poverty school receives more per-pupil funding for students from low-income families, and at least as much per-pupil funding for ELs, in the first year of the demonstration agreement as it received in the previous year.[9]

Although this study is not directly examining the SCF pilot program, its findings may help illuminate some of the issues and decisions facing districts and policymakers as they consider how to implement the program. The law does not define the terms "substantial" or "significant percentage"; this study may help practitioners and policymakers think about appropriate levels and expectations by providing information on the types and sizes of weights used by other districts that have implemented weighted student funding formulas. With regards to the use of actual expenditures, a Frequently Asked Questions (FAQs) document issued by the Department in February 2018 acknowledged that "this is not currently a common practice [and] many LEAs currently charge an average salary for each position after allocating funding to schools" (U.S. Department of Education 2018, p. 15).[10] This study examines the extent to which, and how, the case study districts used actual versus average personnel expenditures in their WSF systems — which may help prospective pilot applicants consider ways that they might propose to meet

[7] Several applicants were seeking flexibility that was already available to them under federal law. One district was initially approved but that approval was later withdrawn because the district did not meet statutory requirements.

[8] When calculating the significant portion of funds to be allocated to the school level, a district must also include all school-level actual expenditures for instructional staff and non-personnel resources.

[9] This report makes use of data on various measures of incidence of students from low-income families, including children with approved applications for free and reduced price lunch, those who are *directly certified* for free lunch through verified enrollment in programs such as Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families or Medicaid, or child poverty measures developed by the U.S. Census such as the Small Area Income Population Estimates. Note that Census poverty data are available for school districts but not at the school level. In this report we use the terms low income and poverty interchangeably.

[10] The FAQs for the Student-Centered Funding pilot are available at https://www2.ed.gov/policy/elsec/leg/essa/scfp/faqs.pdf.

this requirement. The study's analyses of longitudinal fiscal data for the case study districts provide examples of outcomes that have been achieved by some WSF districts and demonstrate methods that can be used to examine equity outcomes and how they change after WSF implementation. Finally, study information on the challenges experienced by WSF districts and schools — and the strategies they used to address those challenges — may be useful to both practitioners and policymakers considering ways to improve the implementation and efficacy of WSF systems.

Study Purpose

Few studies to date have investigated how WSF systems operate and their outcomes related to resource allocation, such as whether school leaders and stakeholders have experienced greater autonomy and how they use that autonomy, whether there have been increases in the equity with which resources are distributed among schools, and how resource allocation and use differ between WSF and non-WSF districts.

To help fill this gap, this study examined resource allocation practices in both WSF and non-WSF districts to explore these issues, as well as examining changes in the distribution of funding across schools after the implementation of a WSF system. The study focused on three main study questions:

1. How are resources allocated to schools in districts with WSF systems, and how do they compare with districts with more traditional resource allocation practices?
2. In what ways do schools have autonomy and control over resource allocation decisions, and how does this vary between WSF and non-WSF districts?
3. Do WSF districts have higher levels of per-pupil spending in their higher-need schools, and has funding equity increased since the adoption of the WSF system?

This study is intended to provide both practitioners and policymakers with detailed information about the design, implementation, and outcomes of WSF systems in the United States.[11] Readers should note that study results are descriptive and the design of the study does not support causal inferences about the effects of WSF. However, the findings may enable districts who are implementing WSF — or considering whether to adopt a WSF system — to learn from the examples and experiences of other districts who have pursued this approach to improving equity and governance in education.

Study Design

To address the above study questions, the study conducted surveys of district administrators and principals in both WSF and non-WSF districts, as well as conducting case studies to obtain more in-depth data in nine WSF districts, including interviews, document reviews, and analysis of school-level

[11] In addition to the study results presented in this volume (Volume 1), a set of technical appendices is provided in Volume 2 containing supplemental information for the interested reader. Appendix A provides short profiles of the WSF systems used in each case study district. Appendix B provides the statutory authorizing language for the Student-Centered Funding pilot. Appendix C provides a more detailed description of the study methodology, including sample selection and data collection and analysis methods for the surveys, interviews, extant documentation, and fiscal data. Appendix D provides supplemental data tables and charts. Appendix E provides the data collection instruments.

expenditure data. This section describes these data sources, selection of the study samples, procedures for data collection and analysis, and study limitations.

Data Sources

To address the above study questions, the study used three primary data sources:

1. **District and principal surveys** were administered to a nationally representative sample of 400 district administrators and 675 school principals in both WSF and non-WSF districts. The surveys were completed by 253 district administrators and 318 principals from this sample, for response rates of 63 percent and 47 percent, respectively. The goal of the surveys was to better understand the experiences and perceptions of practitioners in WSF and other districts across the country regarding resource allocation practices. Specifically, the surveys included questions about the resource allocation system and perceptions regarding equity, autonomy, accountability, stakeholder engagement, and transparency.
2. **Interviews and document reviews** were conducted in a purposive sample of nine case study districts that were implementing WSF systems in 2017–18. The case studies included in-person interviews with district and school staff, including district program officers, chief financial officers, school principals, union representatives, and school board members, as well as examination of district documents describing their WSF weights and other formula features.
3. **School-level expenditure data** were collected from the nine case study districts to examine patterns in the distribution of school-level resources before and after the implementation of WSF. Districts were asked to provide these data for five years prior to WSF implementation and all years since WSF implementation, if possible. The longitudinal expenditure data were used to examine the relationship between school-level per-pupil spending and various indicators of student need and whether this relationship changed after WSF implementation.

Sample Selection

For the nationally representative surveys, 400 districts were randomly selected from public school districts in the United States that have at least six schools (3,389 districts); this threshold was selected because the smallest district identified as implementing WSF at the time of sample selection had six schools.[12] The sample was designed to include 26 districts identified as implementing a WSF system during the 2017–18 school year, as well as five districts identified as having previously implemented WSF. This list of 31 current or previous WSF districts was developed by consulting with school finance experts, drawing on reports such as the *Reason Foundation Weighted Student Formula Yearbook* (Snell and Furtick 2013) and a presentation by Koteskey and Snell at the Future of Education Finance Summit (Koteskey and Snell 2016), and examining district websites; these districts were selected with certainty to guarantee their inclusion in the study sample.[13]

[12] The smallest district that we identified as a WSF district at the time of sample selection was later determined to be not in fact implementing WSF; the smallest WSF district in our final set of known WSF districts had 22 schools in 2018–19 (see Exhibit 2).

[13] Among the 26 districts identified as WSF implementers at the time of sample selection, the study team later learned (during the data collection phase of the study) that two were not in fact implementing WSF systems.

For the principal survey, 675 schools were randomly selected from the sample districts. In each of the 31 WSF districts, up to 10 schools were selected, for a total of 306 schools in WSF districts. In the remaining 369 districts, one school per district was selected, for a total of 369 schools in non-WSF districts.

For the case study component, we selected a purposive sample of nine districts identified as currently implementing a WSF system. The specific sites were selected to yield a diverse set of districts with respect to geographic location, age of WSF system, and formula design (Exhibit 1).

Exhibit 1. Characteristics of the nine WSF case study districts

District name	State	Year established	Enrollment	Number of schools	Urbanicity
Milwaukee Public Schools	WI	2000–01	77,316	167	City
San Francisco Unified	CA	2002–03	58,414	127	City
Denver School District	CO	2007–08	88,839	191	City
Baltimore City Public Schools	MD	2008–09	84,976	189	City
Boston Public Schools	MA	2011–12	54,312	120	City
Prince George's County Public Schools	MD	2012–13	127,576	211	Suburb
Cleveland Municipal School District	OH	2013–14	39,365	102	City
Metro Nashville Public Schools	TN	2015–16	84,069	164	City
Indianapolis Public Schools	IN	2016–17	31,794	67	City

Exhibit reads: One of the nine case study districts was Milwaukee Public Schools, which established its WSF system in the 2000–01 school year. The district had 77,316 students and 167 schools in the 2015–16 school year and was located in a city.

Sources: Information on the year the WSF system was established is based on review of school district documents and websites and personal communication with district administrators. Other data are from National Center for Education Statistics, Common Core of Data Local Education Agency (School District) Universe Survey Data (2015–16).

Data Collection and Analysis

The nationally representative surveys were administered electronically between December 2017 and June 2018. In each of the case study districts, the study team conducted interviews with a district program officer, a district finance officer, three school principals,[14] and two respondents from the following three groups — a union representative, a school board member, or an additional district administrator. The two individuals selected depended on such factors as the existence of a union in the district and which respondents were most knowledgeable about the WSF system. Case study site visits were conducted in spring and summer of 2018, including interviews and collection of extant documents; follow-up phone calls were also conducted during the 2018-19 school year to collect additional information where needed. WSF system characteristics are based on information for 2018–19. Eight of the nine case study districts also responded to the district survey.

In addition, the study team collected a variety of documents and data from the case study districts, including documents describing how funding and other (personnel and non-personnel) resources were allocated to schools; documents describing the school-level budgeting process or other district budgeting guidelines; and audited end-of-year, school-level fiscal files. We asked the districts to provide

[14] For each case study district, the three principal interviewees were purposively selected from the 10 randomly selected schools included in the survey sample, with the aim of including variation in school grade levels.

expenditures for at least five years prior to WSF implementation and at least five years after implementation (but ideally for all post-WSF years), as possible.

Data from surveys were weighted to produce national estimates of the frequency of practices and attitudes collected through the survey items. Fiscal data were analyzed to examine trends in pre- and post-WSF relationships between spending and student need for each case study district. Interview and document data were organized and analyzed using the tagging function in Microsoft OneNote. At least two respondents in a given case study district must have mentioned a fact or concern for it to have been included as a theme for that district.

Study Limitations

The study surveys collected information from district administrator and principal respondents in both WSF and non-WSF districts and schools in an effort to compare responses on many items that asked for individuals' perceptions about the resource allocation system being used, which by definition could be subjective. In addition, the survey response rates for the district survey (63 percent) and principal survey (47 percent) were lower than the Office of Management and Budget target for federal program evaluations (85 percent).[15] Consequently, the survey results are not necessarily generalizable to the populations of WSF and non-WSF districts and schools across the country. While the survey weights account for nonresponse bias based upon the sample site characteristics, a comparison of the WSF districts that responded to our survey shows some differences from the population of known WSF districts. Specifically, the 13 WSF districts responding to our survey tended to be less urban and have lower levels of both poverty and ELs than the full set of 27 known implementers.[16]

In addition, WSF and non-WSF districts differ along several dimensions other than their decision to implement a WSF system. Specifically, WSF districts tend to be larger and more urban and to have higher poverty rates and other need indicators. In our comparative analyses of WSF and non-WSF survey responses we have attempted to control for these types of differences through statistical conditional analysis. However, these adjustments cannot control for unobserved differences in the characteristics of the two groups. Consequently, the comparisons between WSF and non-WSF survey responses are presented as descriptive analyses and do not necessarily mean that these differences were caused by the use of WSF.

There are also some limitations to the interpretation and generalizability of the study findings stemming from the case study districts. Although the nine case study sites represent a relatively large proportion of the 27 districts identified as implementing WSF, they are not nationally representative, so the case studies findings cannot be generalized to the nation as a whole. It also should be noted that although the district-level interviews included a variety of officials, the school-level interviews were limited to principals, whose views about the involvement of teachers and other school stakeholders may not match the perceptions of those groups. Finally, although all of the case study districts were asked to provide expenditure data for years prior to WSF implementation, sometimes the data systems were limited in their ability to provide this information, especially if the data systems and/or WSF systems were old.

[15] This study is not evaluating a federal program, so selected districts and principals were not required to participate in the surveys. In addition, some survey items asked for factual budgetary and fiscal information, which may have discouraged some respondents from continuing because these items are more challenging than simple opinion or perception questions.

[16] A comparison of the characteristics between the WSF survey respondent districts and the group of districts representing our best approximation of the population of WSF implementers is included in Exhibit C-5 in Appendix C.

Prevalence of WSF Systems

The study identified 27 school districts that were implementing WSF systems as of the 2018–19 school year; these districts enrolled 9 percent of the nation's students.

Minneapolis Public Schools was the first district in the country to implement a WSF system, starting in the 1993–94 school year. Seven of these districts adopted their WSF system 15 or more years ago, while 16 adopted WSF in the past 10 years. The most recent adopters were Indianapolis, Atlanta, and Shelby County, with full WSF implementation taking place in 2016–17 in Indianapolis and in 2018–19 in Atlanta and Shelby County (Exhibit 2).

Exhibit 2. Districts identified as implementing a WSF system in 2018–19, by year of adoption

District name	State	Year adopted	Enrollment	Number of schools	Poverty rate	Urbanicity
Minneapolis Public Schools	MN	1993–94	36,793	86	24%	City
Prince William County Public Schools	VA	1994–95	87,793	92	9%	Suburb
Cincinnati Public Schools	OH	1999–2000	34,227	54	33%	City
Houston Independent School District	TX	2000–01	215,627	283	31%	City
Milwaukee School District*	WI	2000–01	75,749	158	34%	City
San Francisco Unified School District*	CA	2002–03	58,865	116	12%	City
St. Paul Public School District	MN	2002–03	37,698	103	27%	City
Hawaii Department of Education	HI	2006–07	181,995	289	10%	Suburb
Denver Public Schools*	CO	2007–08	90,235	189	20%	City
New York City Public Schools	NY	2007–08	981,667	1,579	26%	City
Poudre School District	CO	2007–08	29,527	53	9%	City
Baltimore City Public Schools*	MD	2008–09	83,666	182	31%	City
Douglas County School District	CO	2008–09	66,896	89	2%	Suburb
Falcon School District 49	CO	2010–11	20,561	22	8%	City
Boston Public Schools*	MA	2011–12	53,885	120	28%	City
Charlotte-Mecklenburg Schools	NC	2011–12	146,211	164	17%	City
Newark Public School District	NJ	2011–12	40,889	65	33%	City
Prince George's County Public Schools*	MD	2012–13	128,936	207	12%	Suburb
Adams 12 Five Star Schools	CO	2013–14	39,287	53	10%	Suburb
City of Chicago School District 299	IL	2013–14	387,311	591	27%	City
Cleveland Municipal School District*	OH	2013–14	39,410	101	43%	City
Metro Nashville Public Schools*	TN	2015–16	85,598	154	23%	City
Jeffco Public Schools	CO	2015–16	86,731	165	7%	Suburb
Santa Fe Public Schools	NM	2015–16	13,265	33	20%	City
Indianapolis Public Schools*	IN	2016–17	31,371	67	41%	City
Atlanta Public Schools	GA	2018–19	51,500	89	33%	City
Shelby County Schools	TN	2018–19	114,487	208	34%	City

Exhibit reads: Minneapolis Public Schools adopted a WSF system in the 1993–94 school year, enrolls 36,793 students, has 86 schools, a poverty rate of 24 percent, and is located in a city.

Note: Data on enrollment and number of schools are for the 2015–16 school year. School districts included in the case study sample are indicated with an asterisk (*) and boldface text.

Sources: Information on the year the WSF system was established is based on review of school district documents and websites and personal communication with district administrators. Enrollment, number of schools, and urbanicity are based on data provided from the National Center for Education Statistics, Common Core of Data Local Education Agency (School District) Universe Survey Data (2015–16). Poverty rates are based on the 2016 Census Small Area Income Poverty Estimate (SAIPE) data for school districts.

As can be seen from Exhibit 2, school districts that have implemented WSF systems are predominantly large, urban districts. Although the 27 known WSF districts comprised less than 1 percent of all school districts in the United States, they accounted for 11 of the 40 largest districts (28 percent) and nine of the 20 largest urban districts (45 percent). Collectively they enrolled 3.2 million students in the 2015–16 school year, or 9 percent of the nation's students in public elementary and secondary schools.

Nearly a quarter (23 percent) of the districts identified as implementing a WSF system were in Colorado. Collectively, the six WSF districts in Colorado represented 30 percent of public schools and 37 percent of students in the state.

There may well be additional WSF districts that we were not able to identify through review of prior research, consultation with school finance experts, and the study's district survey.[17] Based on the district survey results, we estimate that approximately 33 districts nationwide are using a WSF system.

The study team also identified five districts that previously had implemented WSF but discontinued those systems prior to 2018–19 (Exhibit 3). Seattle, for instance, eliminated WSF in 2008–09 over concerns from multiple stakeholders — including principals, community members, the district's budget advisory team, and other district staff — around the perceived complexity and inefficiencies of the approach. In its place, Seattle adopted a Weighted Staffing Standards system, which the district said "retains the principle of funding a school according to the needs of its student population, but . . . is much simpler to use" (Seattle Public Schools 2008). Under Seattle's revised approach, all schools receive funding for instructional staff (e.g., teachers, librarians, instructional support) and for non-instructional staff (e.g., administrators, office staff, counselors, and nurses). In addition, all schools receive discretionary funding based on total student enrollment, the number of students eligible for free and reduced-price lunch, and the presence of specific special needs programs (Seattle Public Schools 2019). In at least four of the five districts, the decision to end WSF followed a change in district leadership.

Exhibit 3. Districts identified as having adopted and discontinued a WSF system prior to 2018–19

District name	State	Year adopted	Last year implemented	Enrollment	Number of schools	Poverty rate	Urbanicity
Seattle Public Schools	WA	1996–97	2007–08	53,317	105	10%	City
Oakland Unified School District	CA	2004–05	2013–14	49,098	121	22%	City
Hartford Public Schools	CT	2008–09	2014–15	20,874	66	35%	City
Twin Rivers Unified School District	CA	2010–11	2012–13	31,137	54	33%	Suburb
Rochester City School District	NY	2010–11	2011–12	28,886	54	42%	City

Exhibit reads: Seattle adopted a WSF system in the 1996–97 school year and discontinued it in 2007–08.

Note: Data on enrollment and number of schools are for 2015–16.

Sources: Review of school district documents and website for districts that various experts initially identified as previously implementing a weighted student funding system. National Center for Education Statistics, Common Core of Data Local Education Agency Universe Survey Data (2015–16). Poverty is based on the 2016 Census Small Area Income Poverty Estimate (SAIPE) data for school districts.

[17] Indeed, one of the 27 WSF districts listed in Exhibit 2 was part of the random sample of "non-WSF" districts selected for the surveys. This district provided survey responses suggesting that it was implementing WSF, and the study team followed up with phone calls, as well as reviewing district documentation available online, to confirm that the district did indeed have a WSF system. Four other survey districts also provided survey responses suggesting that they were implementing WSF, but the study team determined, based on follow-up communications with the districts and reviews of district documentation, that they were not in fact using WSF formulas to allocate funds to schools.

The total number of districts identified as implementing WSF systems, though small, has grown steadily over the past 25 years, from one district in 1993–94 to six districts by 2001–02, 15 by 2009–10, and 27 as of 2018–19 (Exhibit 4).

Exhibit 4. Growth in number of WSF districts, 1993–94 through 2018–19

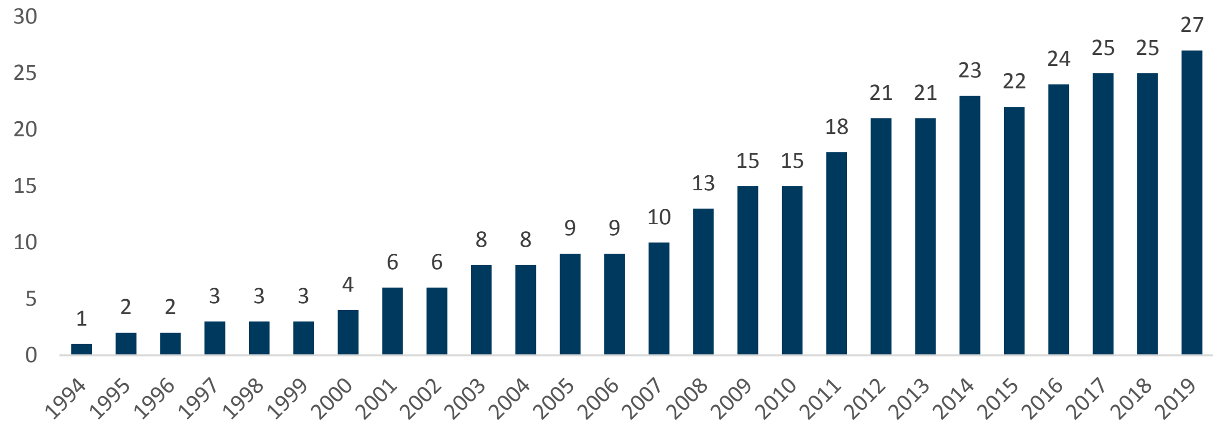


Exhibit reads: The number of school districts implementing WSF grew from one in 1993–94 to 27 in 2018–19.

Sources: Review of school district documents and websites for districts identified in prior research and by various experts as previously implementing a weighted student funding system.

WSF districts were more likely to be large, urban districts than non-WSF districts and to enroll a greater percentage of students from low-income families than non-WSF districts.

Over three-quarters (78 percent) of WSF districts were located in urban areas, compared with 6 percent of all non-WSF districts and 17 percent of non-WSF districts with more than six schools.[18] In contrast, none of the identified WSF districts were located in town or rural areas. Nearly two-thirds (63 percent) of WSF districts had student enrollments of at least 50,000 students, compared with 1 percent of non-WSF districts. Almost half (48 percent) of WSF districts had a student poverty rate greater than 25 percent, compared with 21 percent of non-WSF districts. Districts with 20 percent or more of their students identified as ELs accounted for 26 percent of WSF districts, compared with 6 percent of all non-WSF districts and 11 percent of non-WSF districts with more than six schools (Exhibit 5).

[18] To provide a more comparable set of non-WSF districts, the survey sample of non-WSF districts was drawn from districts that had six or more schools, which represented the smallest number of schools in a district that we had identified as implementing WSF at the time of sample selection. Exhibit 5 compares the population characteristics of the 27 known WSF districts to that of all non-WSF districts and of non-WSF districts with six or more schools.

Exhibit 5. Distribution of WSF and non-WSF districts, by various demographic characteristics, 2015–16

Characteristic	WSF districts (*n* = 27)	Non-WSF districts with six or more schools (*n* = 3,389)	All non-WSF districts (*n* = 16,388)
By urbanicity			
City	78%	17%	6%
Suburb	22%	42%	23%
Town	0%	22%	18%
Rural	0%	19%	53%
By district enrollment size			
Very large (50,000 or more students)	63%	2%	1%
Large (25,000–49,999)	30%	5%	1%
Medium (10,000–24,999)	7%	16%	5%
Small (less than 10,000)	0%	76%	93%
By poverty rate			
Highest poverty quartile (25% or more)	48%	22%	21%
Second highest poverty quartile (17–24%)	15%	25%	24%
Second lowest poverty quartile (10–16%)	11%	25%	29%
Lowest poverty quartile (less than 10%)	26%	28%	26%
By percentage of English learners (ELs)			
High-EL (20% or more)	26%	11%	6%
Medium-EL (5–19%)	59%	30%	18%
Low-EL (less than 5%)	15%	59%	76%

Exhibit reads: School districts located in cities accounted for 78 percent of WSF districts, 17 percent of non-WSF districts with six or more schools, and 6 percent of all non-WSF districts.

Note: The 27 districts classified as WSF are listed in Exhibit 3. It is possible that the comparison group of "non-WSF" districts may include some additional WSF districts that we were not able to identify as such; however, these are likely to be few in number and to have a negligible impact on the demographic statistics presented for non-WSF districts. The reported percentages defining poverty quartiles are rounded approximations of the actual cutoffs between quartiles.

Sources: Urbanicity, enrollment, percentage of ELs, and number of schools are based on data provided from the National Center for Education Statistics, Common Core of Data Local Education Agency (School District) Universe Survey Data (2015–16). Poverty is based on the 2016 Census Small Area Income Poverty Estimate (SAIPE) data for school districts.

Chapter Summary

The WSF approach to combining formula-based resource allocations to schools with increased school-level autonomy is used in only a small set of predominantly large, urban districts. Even so, WSF has spread markedly in recent years — nearly two-thirds of current WSF districts adopted their WSF systems in the past decade, and over one-third did so within the past five years.

This report provides a broad examination of the WSF landscape across school districts in the United States, with the aim of understanding how WSF is being implemented, including the types of weights and other adjustments that are used, how WSF districts compare with districts that use more traditional resource allocation practices, and funding equity outcomes. The next chapter describes the goals and structure of WSF systems, as well as stakeholder perceptions regarding the transparency and stability of these systems. Chapter 3 looks at school autonomy and stakeholder engagement in decision-making about resource allocation, and Chapter 4 explores funding equity in the nine WSF case study districts.

2. Goals and Structure of WSF Systems

Districts that choose to adopt WSF may have a variety of goals for these systems, such as a desire to increase school autonomy and flexibility, funding equity, stakeholder engagement in decision-making, and budget transparency. In addition, WSF districts vary in the types of students that are weighted, the magnitude of these adjustments, and other features of these systems. This chapter examines districts' goals for their WSF systems, the types of student weights used and other WSF policy decisions, and stakeholder perceptions regarding the efficacy, transparency, and stability of WSF systems.

District Goals for School Funding Systems

WSF districts were more likely than non-WSF districts to classify principal autonomy and transparency as high-priority goals for their system of allocating resources to schools.

The largest difference between WSF and non-WSF districts was for the goal of allowing principal control over budgeting decisions at their schools (95 percent vs. 49 percent) (Exhibit 6). Similarly, nearly all WSF districts (95 percent) reported that transparency in how resources are allocated to schools was a high priority for the district's resource allocation system, compared with 64 percent of respondents in non-WSF districts. For three other potential goals — equitable resource allocation, stakeholder participation in school decision-making, and principal accountability — there was no significant difference between WSF and non-WSF districts. However, in case study interviews, district leaders in seven of the nine districts cited improving equity in resource allocation as a driving motivation behind their WSF systems.

Exhibit 6. Percentage of district administrators reporting that various goals are a high priority for their district's system of allocating resources to schools, in WSF and non-WSF districts

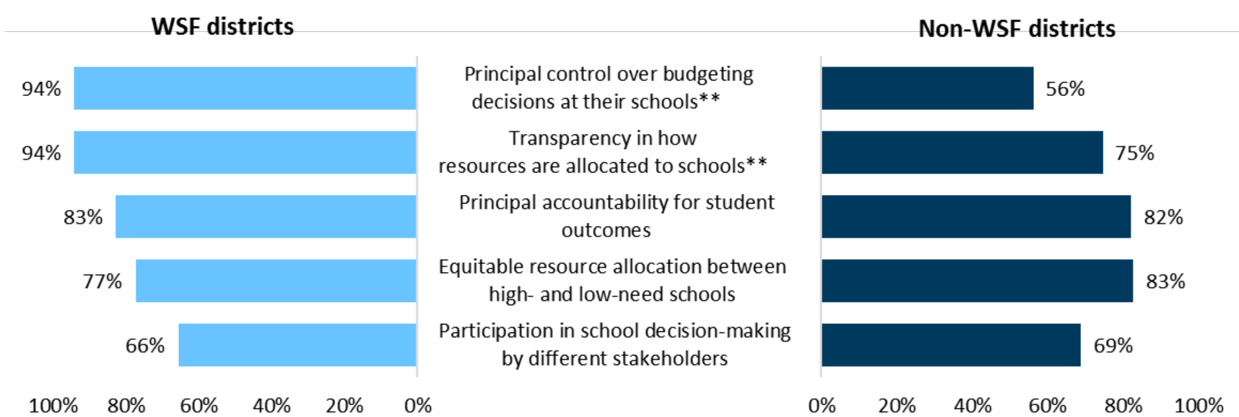


Exhibit reads: Principal control over budgeting decisions was reported to be a high priority for the district's resource allocation system by 95 percent of WSF districts and 49 percent of non-WSF districts.

Note: Asterisks denote a statistically significant difference between WSF and non-WSF districts (**$p < .05$). In addition to the simple frequency data presented here, regression analyses were run to control for differences in certain district characteristics between WSF and non-WSF districts; the two significant differences in this chart persisted after controlling for district size, urbanicity, and percentage of FRPL students (see Exhibit D-1 in Appendix D).
Source: District survey, Q20 (n = 13 WSF, 237 non-WSF).

Autonomy

While increased principal autonomy in decision-making was mentioned as a priority for WSF across all case study districts, respondents in three case study districts specifically highlighted autonomy as a key reason for adopting a WSF system. These districts, however, differed in their rationale for increasing principal autonomy. In one district, for instance, district administrators strengthened principal decision-making authority to address principal concerns with the district's top-down approach to budgetary policies and decision-making. A district program officer explained the frustration that principals felt before the shift to the WSF system:

> *If you are a principal trying to make changes and [are] told this is the process and it's a one-size-fits-all for everybody, this was frustrating for a lot of our principals who expressed, "I know best how to educate our students, and you need to allow me to do this."*

In another district, the initial decision to decentralize decision-making authority was based on the superintendent's belief that school principals were better equipped to make funding decisions because their close contact with students gave them a better understanding of their students' needs. In later years, however, this district began to reduce the amount of school-level autonomy, following a change in superintendents to one who saw a need for greater centralization to ensure additional basic services to all schools. As a district administrator explained, "There are some things that . . . just really, truly just need to be centralized and just automatic, [such as] art, music, physical education . . . in elementary school."

Some respondents stated that increased principal autonomy may improve efficiency in budgetary decision-making. For example, one district adopted WSF because of budgetary constraints at the district level and a view that affording principals with greater budgetary autonomy under WSF — thereby delegating decision-making responsibility to those more attuned to students' needs — would result in improved student outcomes per dollar spent.

Transparency

The case study data suggest several connected motivations for prioritizing transparency as a goal of the WSF system. First, districts may seek to improve financial transparency so that external stakeholders such as families and community members may better understand how education dollars are distributed. Increasing transparency may also be done to reinforce other goals of the WSF system — most notably, equity, accountability, and autonomy. In two districts, for instance, district respondents reported on the need for transparency to assess how equitably the system allocates resources. As one school board member stated,

> *. . . there had been a number of concerns around how dollars are being used, where they were going, and why they were going where they were. . . . People wanted to know where the money was going and if it was being distributed in an equitable way. In order to know that, you had to be able to see [school-level allocations].*

In another district, administrators viewed transparency as a means to facilitate principal autonomy. According to the district financial officer, the district sees more transparent information as a means to developing a school-level culture of decision-making "that takes into account resource efficiency and effectiveness."

Accountability

Case study respondents in three districts explicitly reported that promoting accountability among school leadership for budget decisions and student outcomes is a major priority of the WSF system. Respondents in each of these three districts stressed the importance of pairing principal autonomy with principal accountability. As one district administrator explained,

> *Handing over control to the principals in how they dictate their dollars meant they did get that autonomy they needed, but it also held them accountable . . . we need[ed] to stop blaming [the] Central Office and put power in the hands of the principals who are there and then support them to be able to make the best decisions as possible.*

A principal in another district described how the WSF system helped ensure that "we're accountable for the spending" and that "students are getting equitable services."

Equity

Among the nine case study districts, respondents in seven districts cited improving equity in resource allocation as the issue driving their respective WSF systems. By using student weights and other factors to determine school funding allocations, these districts sought to provide more resources for high-need schools and underserved student populations. One district administrator expressed the idea simply: WSF helps ensure that "monies follow the needs of students." One school board member, for instance, described the reactions of stakeholders when they learned how much money each school was receiving under the previous resource allocation model:

> *. . . the [school board] and the public were shocked at the inequities in the previous [staffing] formula. . . . Plain and simple, we saw schools that had received favoritism over the years. Not usually from a malicious viewpoint, but it had just built up over time. . . . Once it became clear to us, we had to support a weighted student funding formula because that was what we perceived as the most equitable way to distribute funds.*

Key Features of WSF Formulas Used to Allocate Funds to Schools

Under WSF systems, schools receive a base allocation for each student served, along with a series of funding adjustments based on student characteristics and other factors the district believes affect the cost of providing educational services.[19] In general, the formula factors used in WSF systems can be divided into five categories:

[19] Note that WSF formulas do not include all of a district's or school's total funding. Typically they exclude funding for capital expenditures and debt service, federal and state funding for categorical programs, and funds for districtwide programs and services (e.g., central office staff). The study did not collect data on WSF allocations to individual schools and we do not have information on the share of funding allocated through the WSF formula for the case study districts. However, Chapter 3 provides estimates of the share of funding distributed to schools to use at their discretion, as reported on the district survey, which can be thought of as a proxy for the share of funding that flows through the WSF formula (see Exhibit 16).

1. **Base allocation.** Amount that a school receives for each pupil served, regardless of any specific needs the pupil may have.
2. **Grade-level adjustments.** These adjustments provide differential amounts for students in elementary, middle, or high school or in specific grades (e.g., kindergarten).
3. **Student need adjustments.** These adjustments provide additional funding based on student need characteristics (e.g., socioeconomic status, EL status, special education status).
4. **Performance adjustments.** These adjustments provide additional funding based on student academic or behavioral outcomes (sometimes as rewards for positive outcomes, sometimes using negative outcomes as indicators of need).
5. **Allocations for specialized programming.** Additional funding provided to specific academic programs or schools that are considered to be more resource-intensive (e.g., vocational programs; programs with a particular theme, such as science, technology, engineering, and mathematics [STEM]; arts programs).

Under WSF systems, schools receive a base allocation for each student served, along with a series of funding adjustments, which can be defined in either of two ways: as weights relative to the base allocation or as additional per-pupil dollar amounts (Education Resource Strategies 2018). As an example of how weights are used to calculate funding adjustments, consider a weight of 0.20 for students from low-income families. This would provide schools with an additional 20 percent of the base allocation for each student served from a low-income family. Alternatively, the funding adjustment may be defined in absolute terms — for instance, each school would receive an additional $1,000 per low-income student. For comparability purposes, the study team mathematically converted absolute weights used by case study districts to equivalent relative weights and vice versa. Exhibit 7 summarizes the different types of funding adjustments used by the case study districts. For full descriptions of the WSF systems used in each case study district, see the case study profiles in Appendix A; in addition, Exhibit D-2 in Appendix D provides a detailed comparison of WSF features across the nine sites.

Exhibit 7. Types of funding adjustments used in WSF allocation formulas, by case study district

	Grade level	Students from low-income families	English learners	Students with disabilities	Homeless students	Other needs group	School/ student performance	Specialized programming
Baltimore	●	●		●			●	
Boston	●	●	●	●	●	●	●	●
Cleveland	●		●	●		●	●	●
Denver		●	●	●			●	●
Indianapolis	●	●		●				
Milwaukee	●		●					●
Nashville	●	●	●	●				
Prince George's	●		●				●	
San Francisco	●	●	●	●	●			
Total	**8**	**6**	**7**	**7**	**2**	**2**	**5**	**4**

Exhibit reads: Baltimore's school funding formula included adjustments for grade level, students from low-income families, students with disabilities, and gifted and talented students.

Note: WSF system features are based on information for 2018–19.
Source: Extant documentation from case study districts.

How Districts Developed Their Specific Formula Adjustments

District staff who were interviewed in the case study districts often described a considerable investment of time and effort in developing specific funding adjustments used in their formulas, including both the types of student and school characteristics considered and the specific weights or per-pupil amounts for each. Many of these districts sought outside assistance with developing their WSF formulas.[20] In addition, respondents in several districts described appointing a design team consisting of various district- and school-level stakeholders to provide input on key design decisions, such as determining which student characteristics to include in the system. One district administrator summarized the early-stage design process:

> *The work that went into it involved the design team, school-based leaders, and central office leaders. Initially you take inventory of all the resources that they have in schools. Everything from security officers, football coaches to teachers to secretaries to books and curricular materials . . . In determining the weights, the first calculation is of implicit weighting. What are we spending now in these different areas? And then calculate implicitly the amount [that] the base is for a standard kid, for special education, gifted and talented, English language learners, struggling students, etc. Engaging people in the question — how many more dollars do English language learner students need than a general education student? . . . How much more time and resources do they need?*

The ways in which base per-pupil amounts, funding adjustment sizes, and other WSF policy factors may affect each other make it difficult to estimate the *right* size of funding adjustments, particularly at the onset of introducing a WSF system (Education Resource Strategies 2018). Indeed, respondents in several case study districts described a level of ambiguity in initially defining the size of the funding adjustments. As one district administrator explained,

> *There's an art and a science to it. There is no "correct" weight. It's just a combination of past practice, desired practice, and you negotiate the intersection.*

Similarly, in another district, an administrator suggested that, while "there was research to support the idea that there were some categories of students that needed more support," there was little evidence to specify the *precise* value of its funding adjustments. To help refine the model in the early stages, four case study districts reported conducting a one- to two-year pilot with a subset of schools, using this experience to adapt the model prior to full implementation across the district. In addition, all of the case study districts have revised their weighting formulas at least once since developing the initial scheme.

Base Funding

WSF formulas for allocating funds to schools generally provide a base amount of per-pupil funding for all students to support school operations, prior to adding funds for specific kinds of students and programs. In the case study districts, the base allocation per student ranged from $3,060 in Prince George's to $5,521 in Baltimore (Exhibit 8). Between 2016–17 and 2018–19, Cleveland experienced the largest growth in base funding, a 21 percent increase from $4,051 per student to $4,887 per student. In

[20] Seven of the WSF case study districts consulted with Education Resource Strategies (ERS), a non-profit organization, to support initial planning around the funding adjustments. ERS worked with each of these seven districts (Baltimore, Boston, Cleveland, Denver, Indianapolis, Nashville, and Prince George's) to conduct a detailed analysis of its existing resource allocation strategy and student needs to inform the design of the funding system.

contrast, Milwaukee saw a 13 percent decline in base funding, due to a combination of diminishing revenues and recentralizing management of school costs to the district.

Exhibit 8. WSF base allocations per pupil in each case study district, 2016–17 to 2018–19

District	2016–17	2017–18	2018–19	Percentage change
Baltimore	$5,693	$5,416	$5,521	−3%
Boston	$4,100	$4,100	$4,291	5%
Cleveland	$4,051	$4,860	$4,887	21%
Denver	—	$4,051	$4,283	—
Indianapolis	—	$3,758	$4,985	—
Milwaukee	$3,620	$3,329	$3,163	−13%
Nashville	$4,350	$4,425	$4,600	6%
Prince George's	$3,000	$3,300	$3,060	2%
San Francisco	$3,475	$4,529	$3,904	12%

Exhibit reads: In Baltimore, the base per-pupil amount declined from $5,693 in 2016–17 to $5,521 in 2018–19, a decrease of 3 percent over the three-year period.

Notes: Baltimore and Milwaukee provided base allocations that differ by grade level; this exhibit presents the lowest of their grade-level base allocations. A dash indicates data were not available. Denver did not provide data on base allocations for 2016–17. Indianapolis began implementation of its WSF system in 2017–18, so base allocation data did not exist for 2016–17.
Source: Extant documentation from case study districts.

Grade-Level Funding

Seven of the nine WSF case study districts provided larger per-pupil amounts for lower grade levels, but they differed in the specific grades that were favored.[21]

Although Milwaukee and Nashville prioritized all elementary schools, four districts focused just on early grades (prekindergarten in Indianapolis, grades K–1 in Prince George's, and grades K–3 in Cleveland and San Francisco). Boston used a more complex set of six grade-level categories. For most of these districts, the elementary or early-grade supplement was about 10 percent of the base allocation; however, Indianapolis provided a 23 percent supplement for prekindergarten and San Francisco, a 26 percent supplement for grades K–2, while Boston's weights for elementary grade categories ranged from a 30 percent supplement for grades 3–5 to an 80 percent supplement for prekindergarten (Exhibit 9).

In contrast, Denver did not differentiate base funding amounts by grade level, and Baltimore provided a larger per-pupil amount to high schools, amounting to an additional 10 percent over the base allocation. Also, three of the districts that provided larger amounts in the early grades also provided larger amounts to high schools than to middle schools, with this supplement amounting to 1 percent of the base allocation in Cleveland, 4 percent in Milwaukee, and 18 percent in San Francisco. Nashville, however, provided 5 percent more to middle schools than to high schools, and Indianapolis provided supplemental funding for each student in grades 7 and 9 "to ensure students experience success as they enter middle and high school" (Indianapolis Public Schools 2018).

[21] Two districts provided base allocations that differ by grade level (Baltimore and Milwaukee), while six districts provided the same base allocation regardless of grade level but then make grade-level funding adjustments (Boston, Cleveland, Indianapolis, Nashville, Prince George's, and San Francisco).

Exhibit 9. WSF base allocations per pupil after grade-level adjustments, by case study district

District	Grade-level category	Per-pupil allocation	Grade-level weight
Baltimore	Elementary	$5,521	*1.00*
	Middle	$5,521	*1.00*
	High	$6,096	*1.10*
Boston	Prekindergarten	*$7,724*	1.80
	Kindergarten	*$6,866*	1.60
	1–2	*$6,007*	1.40
	3–5	*$5,578*	1.30
	6–8	*$6,007*	1.40
	9–12	*$5,149*	1.20
Cleveland	K–3	$5,349	*1.10*
	4–8	$4,860	*1.00*
	9–12	$4,925	*1.01*
Denver	All grades	$4,283	*1.00*
Indianapolis	Prekindergarten	$4,895	*1.23*
	K–6, 8, 10–12	$3,985	*1.00*
	Grades 7 and 9	$4,385	*1.10*
Milwaukee	Elementary	$3,465	*1.10*
	K–8	$3,469	*1.10*
	Middle	$3,163	*1.00*
	High	$3,294	*1.04*
Nashville	Elementary	*$5,060*	1.10
	Middle	*$4,830*	1.05
	High	*$4,600*	1.00
Prince George's	K–1	*$3,305–$3,397*	1.08–1.11[1]
	2–12	*$3,060*	1.00
San Francisco	K–3	$4,934	1.26
	4–5	$3,904	1.00
	6–8	$4,529	1.16
	9–12	$4,606	1.18

Exhibit reads: In Baltimore, the base per-pupil amount allocated to elementary schools was $5,521.

Notes: For districts that reported funding adjustments as additional per-pupil amounts, we mathematically converted them to equivalent relative weights, and vice versa; calculated figures are presented in italics (San Francisco reported funding adjustments both as additional per-pupil amounts and their equivalent relative weights). Baltimore and Milwaukee provided base allocations that differ by grade level, while Boston, Cleveland, Indianapolis, Nashville, Prince George's, and San Francisco provided the same base allocation regardless of grade level but then made grade-level adjustments. The exhibit presents adjusted base allocations for all districts for comparability purposes only. WSF system characteristics are based on information for 2018–19.

[1] Prince George's WSF formula did not use fixed school-level grade-level base per-pupil allocations; rather, these vary slightly across schools in order to limit funding losses and gains to schools from year to year.

Source: Extant documentation from case study districts.

Student Need Adjustments

The most common student subgroups weighted in WSF formulas were students from low-income families, English learners, and students with disabilities.

District documentation of the WSF systems for 14 districts (including the nine case study districts and an additional five districts that provided links to such documentation in response to the district survey) revealed that 10 of the 14 used weights for students from low-income families, nine used weights for ELs, and seven used weights for SWDs. Six of the 14 districts implemented adjustments for students performing below grade level, while three had weights for gifted and talented or high-performing students. Two districts allocated additional funds through their formula based on numbers of students who are homeless (Exhibit 10). Note that a WSF formula typically applies only to a district's unrestricted funds and does not necessarily represent all funds allocated based on these types of students; schools likely receive additional funds outside of the WSF formula for students who have particular needs requiring additional support, including through federal and state categorical programs, grants, and other restricted funding sources.

Exhibit 10. Number of WSF districts reporting the use formula adjustments to provide additional funding to schools based on various student needs categories

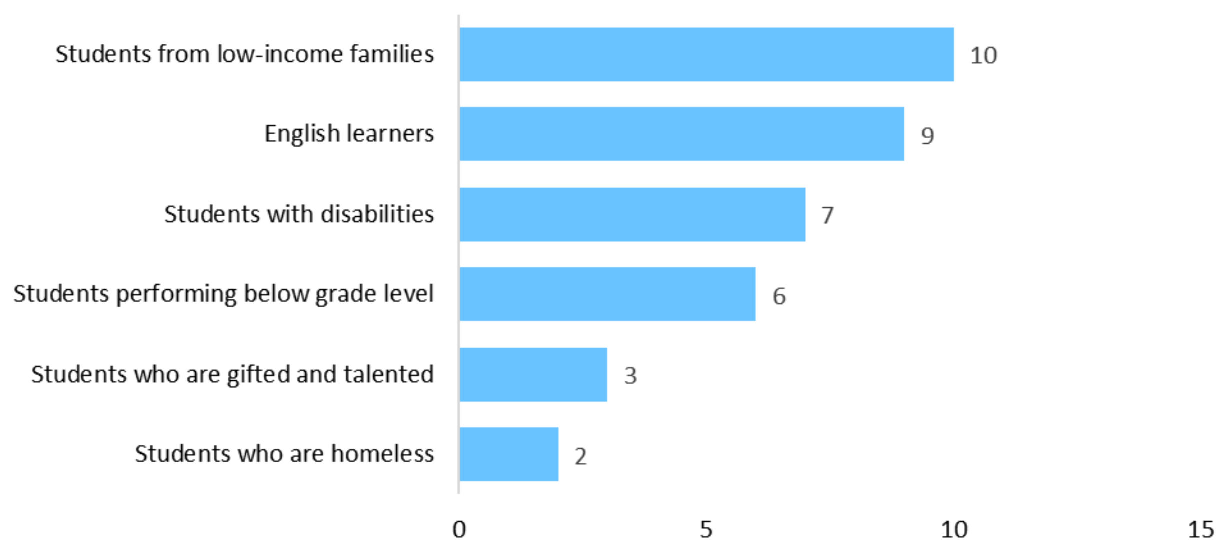


Exhibit reads: Ten out of 14 WSF districts reported using weights or other formula adjustments to provide additional funding to schools based on their numbers of students from low-income families.

Source: Extant documentation from the nine case study districts and from five additional WSF districts that provided links to such documentation in response to the district administrator survey (*n* = 14).

Among the six case study districts providing funding adjustments for students from low-income families, the weights for individual students ranged from 0.05 to 0.15. Three districts — Baltimore, Boston, and Denver — provided additional allocations for schools with high concentrations of these pupils.

Two of the six districts used free and reduced-price lunch (FRPL) eligibility as the basis for this adjustment (Denver and San Francisco), while five districts used direct certification (DC) data, under federal provisions that allow districts to certify students as eligible for free lunch based on shared data on other forms of assistance such as the Supplemental Nutrition Assistance Program[22] (Baltimore, Boston, Denver, Indianapolis, and Nashville). Direct certification data may reflect a lower income ceiling for defining low-income families than the traditional FRPL application process, depending on the specific programs used to determine DC eligibility,[23] and may also provide a more accurate measure of student socioeconomic status by capturing students who are eligible for FRPL but do not apply to receive them (Chingos 2016; Hoffman 2012). In Denver, schools received additional funding from adjustments for both FRPL-eligible students and DC students, with DC students getting the cumulative amount for both adjustment categories (Exhibit 11).

Weights for individual FRPL-eligible students ranged from 0.09 in San Francisco to 0.13 for high school students in Denver. For DC students, Nashville had both the lowest and highest weights for individual DC students (0.05 for middle and high school students and 0.15 for elementary students). Denver had a combined weight of 0.15 for high school students who were both FRPL-eligible and DC.

Among the three districts with additional funding adjustments for high concentrations of students from low-income families, Denver had the largest maximum funding adjustment. Indeed, DC students in Denver schools with a high percentage of such students would have qualified for all four low-income funding adjustments (i.e., FRPL-eligible, DC student, and additional adjustments for high concentrations for FRPL students and for high concentrations of DC students), thus receiving a weight of up to 0.265 in elementary schools and 0.275 in high schools. In Baltimore, the additional allocation for schools with a high concentration of DC students (0.04) applied only to elementary and K–8 schools and increased the weight for those students to equal the basic weight provided to DC students in high schools (0.11). Baltimore and Denver applied the additional funding adjustment to *all* students from low-income families, whereas Boston used the added weight for high concentration only to the number of DC students above the concentration threshold.[24] Baltimore, Boston, and Denver also differed in the thresholds used for these additional allocations, ranging from a 50 percent DC concentration in Boston to an 80 percent DC concentration in Baltimore (Exhibit 11).

---

[22] Since the passage of the *Healthy, Hunger-Free Kids Act of 2010*, the National School Lunch Program (NSLP) has allowed districts to directly certify students as eligible for free meals based on shared data on family eligibility for other forms of assistance such as the Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, and Medicaid, as well as children who are homeless, migrant, or in foster care or Head Start. Under this approach, children who are directly certified to receive free meals at school do not have to submit annual eligibility forms to receive benefits (Food Research and Action Center 2018).

[23] Students are eligible for free lunches if their family's income is no more than 130 percent of the official poverty line and reduced-price lunch eligibility extends up to 185 percent of the poverty line, while eligibility for other programs can have a lower income ceiling and sometimes varies by state.

[24] As an example, consider a high school in Boston with 1,500 students, of which 850 are DC students. The school would only receive the additional high-concentration funding for the 100 students in excess of the 50 percent concentration threshold of 750 students.

In dollar terms, the combined funding adjustments for low-income students ranged from $230 for a middle or high school student in Nashville to a high of $1,132 in Denver for a high school student who is both FRPL-eligible and directly certified and is in a school with a very high concentration of such students.

Exhibit 11. WSF funding adjustments for students from low-income families, by case study district

District	Adjustment category	Per-pupil allocation	Weight
Baltimore	Student who is directly certified (DC) as eligible for free school lunch	E, EM: $400 H: $700	*E, EM: 0.07* *H: 0.11*
	Additional allocation for each DC student in a school with a high concentration of DC students (at least 80%)	E, EM: $200	*E, EM: 0.04*
Boston	DC student	*$429*	0.10
	Additional allocation for each DC student above the 50% DC concentration threshold	*$429*	0.10
Denver	Student eligible for free or reduced-price lunch (FRPL)	E: $498 H: $537	*E: 0.12* *H: 0.13*
	Additional allocation for each FRPL-eligible student in a school with a high concentration of FRPL students (at least 60%)[1]	$183–$415	*0.04–0.10*
	DC student	$80	*0.02*
	Additional allocation for each DC student in a school with a high concentration of DC students (at or above the 50th percentile)[1]	$40–$100	*0.01–0.025*
Indianapolis	DC student	$500	*0.13*
Nashville	DC student[2]	*E: $690* *M, H: $230*	E: 0.15 M, H: 0.05
San Francisco	FRPL-eligible student	*$351*	0.09

Exhibit reads: Baltimore allocated an additional $400 for each student who is directly certified as eligible for free lunch in elementary and elementary/middle schools, which is equivalent to a weight of 0.07 per DC student.

Notes: Cleveland, Milwaukee, and Prince George's are excluded from the table because they did not include adjustments for students from low-income families. For districts that reported funding adjustments as additional per-pupil amounts, we mathematically converted them to equivalent relative weights, and vice versa; calculated figures are presented in italics (San Francisco reported funding adjustments both as additional per-pupil amounts and their equivalent relative weights). WSF system descriptions are based on information for 2018–19.
E = elementary school, M = middle school, EM = elementary/middle school, H = high school.
[1] Denver used a progressive formula to provide additional funds for schools with high concentrations of FRPL students, ranging from $183 per FRPL student in schools with a FRPL rate between 60 to 63.9 percent up to $415 for schools with a FRPL rate of 90 percent or more. For DC students, the additional amount provided for schools with high concentrations of DC students ranged from $40 per DC student up to $100 in schools where the percentage of DC students was at or above the 50th percentile among district schools.
[2] For middle schools and high schools, Nashville applied a weight based on prior academic performance. Because there is no prior performance for incoming students at the elementary level, Nashville applied an extra 0.10 poverty weight to elementary schools as a proxy for prior academic performance, in addition to the 0.05 poverty weight applied to all schools in the district.
Source: Extant documentation from case study districts.

Among the seven case study districts providing funding adjustments for English learners, weights varied considerably, ranging from 0.01 for an elementary bilingual program participant in Milwaukee to 0.94 for a high school student with limited or interrupted formal education in Boston.

Three of the seven districts varied the EL weights by level of English proficiency level (Boston, Cleveland, Prince George's, and San Francisco), while two used a single weight for all ELs (Denver and Nashville) and one varied the weights only by grade level (Milwaukee). In addition, Boston included a weight for students with limited or interrupted formal education (SLIFE) — EL immigrant students whose gaps in formal education left them far behind academically (Exhibit 12).

Exhibit 12. WSF funding adjustments for English learners, by case study district

District	Adjustment category	Per-pupil allocation	Weight
Flat allocation			
Boston	Student with limited or interrupted formal education (SLIFE)	*Grades 4–5: $2,146* *6–8: $3,604* *9–12: $4,034*	4–5: 0.50 6–8: 0.84 9–12: 0.94
Denver	English language learner (ELL) student	$431	*0.10*
Milwaukee	Bilingual program participant	$50	*E, K–8: 0.01* *M, H: 0.02*
Nashville	ELL student	*$1,104*	0.24
Allocation by proficiency level			
Boston	Foundational English learner (EL) student	K–5: *$1,030* 6–8: *$2,188* 9–12: *$2,618*	K–5: 0.24 6–8: 0.51 9–12: 0.61
	Transitional EL student	*$86*	0.02
Cleveland	Prefunctional limited English proficiency (LEP) student	$2,399	*0.49*
	Beginning-level LEP student	K–8: $2,000 H: $2,240	*K–8: 0.41* *H: 0.46*
	Intermediate- or advanced-level LEP student	K–8: $1,600 H: $2,000	*K–8: 0.33* *H: 0.41*
Prince George's	ELL student[1]	*$826–$2,020*	0.27–0.66
San Francisco	Beginner/intermediate EL student	*E: $200* *M: $240* *H: $530*	0.0512 0.0615 0.1358
	Long-term EL student	*$240*	0.0615
	Advanced EL student	*$155*	0.0397

Exhibit reads: Boston allocated an additional $2,146 for each EL student with limited or interrupted formal education (SLIFE), which is equivalent to a weight of 0.50 per student.

Notes: Baltimore and Indianapolis are excluded from the table because they did not include adjustments for EL students. For districts that reported funding adjustments as additional per-pupil amounts, we mathematically converted them to equivalent relative weights, and vice versa; calculated figures are presented in italics (San Francisco reported funding adjustments both as additional per-pupil amounts and their equivalent relative weights). WSF system descriptions are based on information for 2018–19.
E = elementary school, M = middle school, H = high school.
[1] Prince George's WSF model did not use fixed school-level weights, rather weights varied slightly by school to reflect differences across schools in the composition of EL students served with respect to English proficiency (Newcomer, Beginner, Intermediate, and Advanced) and to limit funding losses and gains to schools from year to year.
Source: Extant documentation from case study districts.

Four of the seven districts provided adjustments that amounted to more than $1,000 per student, while the other three provided adjustments of less than $600 per student (Exhibit 12). In Boston, the funding adjustment for SLIFE students amounted to between $2,146 and $4,034, depending on grade level, while the allocation for ELs determined to be at a foundational level (at or below proficiency) was between $1,030 and $2,618. In Cleveland, funding adjustments for ELs ranged from $1,600 to $2,399, depending on proficiency level and grade level. Nashville's adjustment amounted to $1,104 per EL student. Smaller adjustments were provided in Milwaukee, San Francisco, and Denver (Exhibit 12).

Among the seven case study districts providing funding adjustments for students with disabilities, weights often varied by type of disability, ranging from 0.0128 for a student with a low-severity disability in San Francisco to 7.25 for student with a high-severity disability in Nashville.

Two districts' WSF formulas provided a flat supplemental allocation for SWDs taught in a self-contained classroom (Baltimore and Indianapolis) and Denver provided a flat supplemental allocation for each student above the average school caseload of students with mild/moderate disabilities. In contrast, four districts varied the size of the funding adjustment based on disability type (Boston, Cleveland, Nashville, and San Francisco).

As with the EL adjustments, the size of the adjustments for SWDs varied considerably. The three districts providing flat supplemental allocations ranged from $641 to $910 per student. In the four districts with adjustments that varied by disability type, the range in weights was often quite wide ($4,291 to $28,750 in Boston, $729 to $7,918 in Cleveland, and $2,300 to $33,350 in Nashville). At the low end of the spectrum, San Francisco's adjustments were between $50 and $100 (Exhibit 13). It is important to note that the case study districts may differ in the extent to which they provide state and local funding for students with disabilities through or outside of the WSF formula.

Three case study districts used additional categories of student need in determining school allocations.

Cleveland provided a student mobility weight of 0.15 to all K–8 schools for students who moved two or more times in the previous year. In San Francisco, schools with at least 25 homeless students received $4,000 plus $96 for each homeless student. In Boston, homeless students received a 0.10 weight plus a 0.10 weight for the projected number of homeless students above a 5 percent concentration threshold.

Exhibit 13. WSF funding adjustments for students with disabilities, by case study district

District	Adjustment category	Per-pupil allocation	Weight
Flat allocation			
Baltimore	Student with disability (SWD) taught in a self-contained classroom	$641	*E, M: 0.12* *H: 0.11*
Denver	SWD above the average caseload of students with mild/moderate disabilities	$800	*0.19*
Indianapolis	SWD in a self-contained classroom	$910	*0.23*
Allocation by disability type			
Boston	SWD with low-severity disability	*$4,291*	1.0
	SWD with moderate-severity disability	*$6,007*	1.4
	SWD with high-severity disability	*$8,153–$28,750*	1.9–6.7
Cleveland	SWD with emotional disturbances or requiring intensive behavior interventions	$729	*0.15*
	SWD taught in a resource room or inclusion setting	K–8: $7,918 H: $,5938	*K–8: 1.63* *H: 1.22*
	SWD taught in a self-contained classroom	K–8: $4,524 H: $2,545	*K–8: 0.93* *H: 0.52*
Nashville	SWD (varies by disability type)	*$2,300–$33,350*	0.50–7.25
San Francisco	SWD with low-severity disability (in grades K–12)	*$50*	0.0128
	SWD with moderate- or high-severity disability or in prekindergarten	*$100*	0.0256

Exhibit reads: Baltimore allocated an additional $641 for each student with disabilities taught in self-contained classroom, which is equivalent to a weight of 0.12 for elementary and middle schools.

Notes: Milwaukee and Prince George's are excluded from the table because they did not include adjustments for SWDs. For districts that reported funding adjustments as additional per-pupil amounts, we mathematically converted them to equivalent relative weights, and vice versa; calculated figures are presented in italics (San Francisco reported funding adjustments both as additional per-pupil amounts and their equivalent relative weights). WSF system descriptions are based on information for 2018–19.
E = elementary school, M = middle school, H = high school.
Source: Extant documentation from case study districts.

Performance Adjustments

Five of the nine case study districts included performance-based funding adjustments in their WSF systems, sometimes for low-performing students and sometimes for high-performers.

Prince George's had the largest weights in this category, ranging from 0.35 to 0.71; performance weights in the other four districts ranged from 0.02 to 0.30 (Exhibit 14). Prince George's employed a broad set of factors associated with student academic need, including multiple student assessment scores for all grade levels and low-performance risk measures for middle schools and high schools based on student outcomes such as grade point average, attendance, and student assessment scores. Similarly, Boston included additional allocations for high school students at high risk of dropping out based on chronic absenteeism, poor academic performance, and insufficient credit accumulation. In Nashville, middle schools and high schools were provided a weight for students with poor prior academic performance, and in Cleveland, schools received a weight for students below proficient in reading and a weight for high school students with chronic absenteeism.

Three districts included performance adjustments for high-performing students. Cleveland provided a weight for students above proficient in reading, Baltimore employed a weight for students identified as high performing or high potential, and Denver provided a weight for gifted and talented students.

Exhibit 14. WSF funding adjustments for student or school performance, by case study district

District	Adjustment category	Per-pupil allocation	Weight
Baltimore	Student identified as high performing or having high potential	$400	*0.07*
Boston	High-risk student[1]	*$858 (grade 9)* *$215 (grade 10)*	0.20 (grade 9) 0.05 (grade 10)
Cleveland	Chronically absent student (10+ days) in grades 9–12	$750	*0.15*
	Student below proficient in reading (based on proficiency in grades 3 and 8)	$1,500	*0.30*
	Student above proficient in reading (based on proficiency in grades 3 and 8)	$750 $1,500	*0.15 (K–8)* *0.30 (9–12)*
Denver	Gifted and talented student	$130	*0.03*
	School identified as low performing under School Performance Framework (SPF)	3–5 years of phased funding	*N/A*
	Student in school showing schoolwide improvement under SPF	$65–$115	*0.02–0.03*
Nashville	Low-performing student	*$460* *$230*	0.10 (M) 0.05 (H)
Prince George's	Multiple factors including state assessments, at-risk probability ratios, grade point average, attendance, suspension/expulsion requests, and student retention[2]	*$1,071–$2,173*	0.35–0.71

Exhibit reads: Baltimore allocated an additional $400 for each student identified as high performing or having high potential, which is equivalent to a weight of 0.07.

Notes: Indianapolis, Milwaukee, and San Francisco are excluded from the table because they did not include adjustments for student or school performance. For districts that reported funding adjustments as flat per-pupil allocations, we derived the equivalent weights, and vice versa; calculated figures are presented in italics. WSF system descriptions for all districts are based on information for 2018–19.
E = elementary school, M = middle school, H = high school.
[1] Boston defined *high-risk students* as high school students at high risk of dropping out, as evidenced by chronic absenteeism, poor academic performance, and insufficient credit accumulation.
[2] Prince George's WSF model did not use fixed school-level weights; rather, weights varied slightly by school to reflect differences across schools in the composition of students with respect to student performance and to limit funding losses and gains to schools from year to year.
Source: Extant documentation from case study districts.

While performance adjustments were typically applied for *student* performance, Denver's WSF system also focused on *school-level* performance. Under Colorado's district and school accountability system, the School Performance Framework (SPF), schools were evaluated on key performance indicators, including academic achievement, academic growth, and for high schools, postsecondary and workforce readiness. Under the SPF, a school is assigned a rating: blue (distinguished), green (meets expectations), yellow (accredited on watch), orange (accredited on priority watch), and red (accredited on probation). Denver offered additional funding, referred to as *tiered supports*, to low-rated schools (red or orange), as well as extra per-pupil funding (0.02 to 0.03) for schoolwide improvement on the SPF.

Allocations for Specialized Programming

Four of the case study districts supplemented their standard WSF funding adjustments with additional allocations for specialized programming, such as specialty schools and vocational programs.

In general, these additional funds were earmarked for unique academic programs or schools that were deemed to be more resource intensive. Milwaukee, for instance, featured several such allocations, including providing specialty schools (e.g., art schools, International Baccalaureate schools, gifted and talented, career and technical education) with an additional 1.0 FTE teacher and $150 per student; providing Montessori, language immersion, and dual language schools with an additional 2.25 FTE paraprofessionals; and providing schools with culinary arts or Turnaround Arts programs (integrated arts models in high-need schools) with an additional 1.0 FTE teacher (Exhibit 15). In Cleveland, the WSF formula model included extra allocations for specialty schools (e.g., career and technical education, STEM, and performing arts) and new school transition funding typically offered for three to four years to support start-up costs of new schools. Denver offered $7,480 for each Center Program (programs offering individualized support and instruction to students with special needs), and Boston provided a weight of 1.0 ($4,291 per student) for students in vocational programs and a weight of 0.35 ($1,502 per student) for students receiving inclusive supports.

Exhibit 15. Funding adjustments for specialized programming, by case study district

District	Adjustment category	Adjustment
Boston	Vocational program	1.00 ($4,291 per student)
	Student in inclusive setting	0.35 ($1,502 per student)
Cleveland	Specialty schools	Additional funding per school
	Newly created schools	Additional funding (up to 4 years) per school
Denver	Center Program at a school[1]	$7,480 per program
Milwaukee	Specialty schools	1.0 FTE teacher and $150 per student
	Montessori, language immersion, and dual language	2.25 FTE paraprofessionals
	Culinary arts, Turnaround Arts	1.0 FTE teacher

Exhibit reads: Boston provided a weight of 1.0 per student for vocational programs.

Notes: Baltimore, Nashville, Prince George's, and San Francisco are excluded from the table because they did not include adjustments for specialized programming. WSF system descriptions for all districts are based on information for 2018–19.
[1] Denver defines "Center Programs" as programs that provide individualized support and instruction to SWDs.
Source: Extant documentation from case study districts.

Changes to Funding Adjustments Over Time

Seven of the case study districts reported regularly reviewing their weighting schemes, on either an annual basis or some other regular basis. For example, Nashville convened a focus group of principals and district leaders each year to discuss changes to the WSF model. In Cleveland, the district retained the services of an external non-profit organization to regularly provide consultation on remodeling the formula as well as ensuring the weights are appropriate. In contrast, Baltimore reviewed and adjusted its WSF system for the 2018–19 school year, which marked the first time in 10 years that district leaders and stakeholders had revisited the model. As one district administrator explained, "We [as a district] collectively reached a tipping point. . . . Costs have gone up and down, so the weights have had to be adjusted to reflect this. We've identified other factors that affect the ways kids learn, which [needed to be] factored in [to the system]."

All WSF case study districts had made at least one change to their weighting schemes in recent years.

Over the past five years (or since transitioning to WSF in districts that started implementing the system more recently), the most common change, reported by five of the nine case study districts, was to add a funding allocation for one or more new student need categories, including students from low-income families (Baltimore, Denver, and Nashville), homeless students (Boston and San Francisco), gifted students (Baltimore), and SWDs (Denver).

In addition, Boston was experimenting with integrating contextual need factors into its WSF formula. Boston introduced an Opportunity Index for the 2018–19 school year, which "incorporates a range of data representing factors that are outside of the schools' control but are also predictive of students' academic outcomes." These factors consisted of indicators related to students' neighborhoods, including safety, socioeconomic status, educational attainment, and physical environment, as well as factors specific to individual students and their families, such as participation in state-administered programs for low-income populations, student academic achievement, student behavior, and chronic absenteeism. The Opportunity Index was not a part of Boston's WSF system, although "district officials [were] exploring the possibility of incorporating the index into the budget process more deeply in subsequent years" (Boston Public Schools 2018).

Conversely, two districts removed weights from their respective WSF systems. Baltimore eliminated performance weights for students at the basic or advanced level and for high school students at risk of dropping out, while Indianapolis eliminated its base weight for K–2 students.

Case study districts also frequently reported adjusting the size of weights or per-pupil allocations. Boston, in particular, made several changes to weight magnitudes in recent years, including a mix of increases and decreases to the weights for several high-severity disability categories and EL categories, as well as a reduction in the size of its base weight for grades 9–12 (from 1.30 to 1.20). Denver also revised several weights, specifically increasing allocations for FRPL-eligible students, ELs, and gifted and talented students.

Perhaps the most substantial change to a WSF system came from Prince George's, which shifted away from a fixed-weight approach in spring 2017.

> *PGCPS [Prince George's County Public Schools] relies on a formula built from a series of [dynamic] weights. First, PGCPS identifies student characteristics that it believes to affect the cost of providing educational services to different types of students in different contexts (these are weight categories, e.g., performance, or ESOL [English for speakers of other languages]). PGCPS then assigns specific weight values within each category to [each] school based on [its position relative to other schools in the district]. The weight amounts are meant to reflect the relative need students have. These weights are then added together to get a student's (or school's) total funding allocation. (Miller 2018)*

Stakeholder Perceptions on the Efficacy of Funding Adjustments

Case study respondents with positive views about WSF described the funding approach as a valuable instrument for providing resources to schools serving students with the greatest needs and as generally targeting the appropriate student categories.

As a Boston principal summarized, "I think [the WSF system] takes into account a lot of factors . . . the type of students you're getting [and] the type of resources that are going to be needed to have these students educated successfully." Respondents also tended to view the weighting schemes as a work of continual improvement. In Boston, a district administrator described the process as a "constant evolution that WSF needs to go through." In Denver, one district finance officer shared the following observations:

> *I think it's getting there [in terms of meeting the needs of students]. I think it's better than doing it without weights. . . . I think we probably need [to get to] where, for every non-need kid . . . for every one dollar they get, you probably need to be at $1.35 to $1.40, when you start to look at the risk factors. We are probably at $1.20 to $1.30. A couple of years ago, we were probably at $1.05 to $1.20, so we are making progress. I don't think it is where it needs to be, but it is much closer today than it was even a couple of years ago.*

Among case study participants, the most common critiques of WSF weighting schemes were limited capacity to provide significant funding adjustments for all categories of student need and inability to keep pace with evolving student populations.

First, respondents in several case study districts described finite resources as a limiting factor in developing funding adjustments of sufficient magnitude for all student need categories. For example, one district administrator argued that their weighting scheme is unable to capture the needs of some high-need students because their formula was too general and the weights were not suitably nuanced. In another district, a district administrator explained that the core issue is the inability "to grow the pie" because of the state formula, suggesting that "adding a weight in a different place at this point just takes it from someplace else." A district official in a third district voiced a similar concern about their funding system:

> *We do the best we can, but we operate on less than $10,000 per student per year. There is a limited amount of differentiating that we can do within that dollar amount. We would like to add more weights for . . . some of these other subgroups, but with such limited funding, it's tough. . . .*

Similarly, a fourth district chose to limit its number of weighting categories due to resource constraints. As one district administrator explained, the district wanted to ensure that each individual weight carried a sufficient amount of funds, but given the level of state and local funding, they could not adequately support a larger number of weights.

In another district, a principal described the additional amount of funding received through the weights as too little to be meaningful:

> *The crazy thing is all this talk . . . about adjusting weights, holding forums, and getting principal and teacher feedback . . . but really, when the weights are such a small percentage for a poverty school, and literally, you're getting an extra $100 per kid. They*

> *created this big fanfare and [declared] it would totally upset the system, but if you looked at everyone's funding — from what they were getting this year compared to last year — it's fairly neutral. We wasted so much time for massive changes, and what it amounted to is $40,000 to $50,000, which is nothing to sneeze at. But $40,000 to $50,000 on a $3.4 million-dollar budget is like we created fanfare over a rounding error.*

A second theme common across several case study districts was a perception that certain student populations — in particular, immigrant students — were not being adequately counted in WSF formulas. One principal shared the following:

> *My principal friend in [another part of the city] is at a high-poverty school, but his direct certified is low because of a lot of undocumented kids. The undocumented kids are not certified. So, it looks like his free and reduced rate is 40 percent. . . . The district knows this but won't do anything about it. They won't do any adjustments to these schools at all, which they know have high undocumented populations. This school is showing as one of the more affluent schools in the district because they have a ton of kids showing as not certified.*

In another district, which had experienced a growing number of immigrant students and families in recent years, a principal acknowledged that the allocation for ELs was higher than that for non-ELs, but questioned whether the weight assigned to ELs was "a fair amount at this particular point in time" or "high enough based on some of the needs of families."

Other WSF Policy Decisions

In addition to the specific funding adjustments included in a WSF system, there are aspects important to the WSF funding structure, including the use of average versus actual teacher salaries, hold-harmless strategies, and small-school provisions.

Hold-Harmless and Small-School Provisions

Seven WSF case study districts reported having hold-harmless provisions to limit the amount of funding losses that a school could experience from year to year. Eight districts reported having small-school provisions.

Among those districts with hold-harmless provisions, Cleveland, Indianapolis, and Nashville had used these strategies to help ease the transition to WSF, limiting the amount of per-pupil funding that a school could lose compared with the resources they received prior to WSF. To offset these costs and stay within budget, the districts also had to cap the amount of funding that a school could gain. At the time this report was published, Cleveland and Nashville were phasing out these protections, gradually increasing both the gains cap and loss limit each year,[25] while Indianapolis, still in the early phases of WSF implementation, is no longer using a hold-harmless policy for middle and high schools and is planning to eliminate it for elementary schools. As one school board member explained, "At the end of the day, those things will not continue to exist because they perpetuate inequities."

[25] In Nashville, hold-harmless protections will continue for schools designated as Priority Schools.

In Baltimore, the district allocated $5.2 million in additional funding as a temporary measure to hold all schools harmless for the 2018–19 school year after the significant cuts experienced in the prior year. The three other districts — Boston, Prince George's, and San Francisco — adopted ongoing, hold-harmless provisions. For example, San Francisco provided, on average, $60,000 per school annually for schools experiencing budget declines due to actual enrollments in the fall being lower than projected enrollments in the spring. The additional amount often did not cover the full amount caused by enrollment adjustments, but it did, as one district administrator explained, "grant [a] school some latitude in making budget decisions about consolidating staff." As part of its WSF formula, Prince George's capped its schools' per-pupil dollar losses to no more than 1.5 percent, and Boston introduced a series of new supports in 2018–19 for schools with declining enrollments, particularly those that are lower performing.

Eight of the case study districts provided additional funds to very small schools to help cover the basic operational costs of running a school. For example, Nashville provided roughly $16 million in its WSF system to support small schools, mostly in a part of the district that has experienced significant enrollment declines to "[make] sure [they] can afford the non-negotiables, on top of their teaching staff and principal." In San Francisco, the allocation formula included a "floor plan" mechanism, which takes into account minimum staffing ratios to ensure that "base staffing is achieved." Similarly, Baltimore, in cooperation with an external partner, developed a series of algorithms to determine supplemental requirements to support baseline needs.

Use of Actual Versus Average Teacher Salaries

As noted in Chapter 1, one concern about traditional resource allocation systems is that allocating set amounts of staff to each school through staffing formulas can result in an inequitable distribution of resources across schools because higher-poverty schools often have teachers with less experience and lower salaries. As a result, the amount of money spent in high-poverty schools may be less than in lower-poverty schools, all else being equal, thus creating an implicit subsidy from higher-poverty schools to lower-poverty schools (Baker and Thomas 2006; Levin et al. 2013; Malen et al. 2015; Roza and Hill 2004; Shambaugh, Chambers, and DeLancey 2008). WSF systems have the potential to change this dynamic, but only if school budgets are based on the actual salaries of the staff employed in each school. By doing so, a high-poverty school with teachers who are less experienced and lower salaried, on average, would have lower salary expenditures than a school with higher-paid teachers (for the same number of teachers) and could use its "left-over" funds to purchase additional resources such as an instructional coach, professional development for teachers, instructional materials, computers, or lowering class sizes. In this way, WSF could enable districts to compensate for within-district inequities related to such factors as higher teacher attrition in high-poverty schools or a tendency of experienced teachers to choose to teach in more affluent schools. However, if schools are "charged" for each teacher based on a districtwide average salary rate rather than the teacher's actual salary, that potential benefit is lost and schools with lower-paid teachers will appear to have the same level of expenditures as schools with higher-paid teachers.

> **Although all nine WSF case study districts reported that their schools use average teacher salaries in developing their budgets, three of the districts also used actual salaries, either for some of their schools or by incorporating them into their weighting scheme.**

In general, in all of the case study districts, schools used a constant, districtwide average teacher salary when developing their budgets, regardless of the specific pay levels of the teachers in each school. Many district- and school-level respondents perceived this practice as beneficial, stating that use of average salaries simplifies staffing costs, encouraging principals to hire "based on quality [and] not about how much it costs" and to "not penalize [principals] for using veteran staff." One principal shared the following observations:

> *The pluses [are] that if I used the actual salary, I would not have enough monies to pay for the individuals. Here, my staff doesn't leave. They're going to stay. The majority of teachers here have taught 10 [years] or above. So, if you paid them their salary out of my budget, I would not have enough funds for that to happen.*

Three of the case study districts, however, adopted methods to introduce actual salaries into their WSF schemes to address the issue of "implicit subsidies" from higher-poverty schools to lower-poverty schools. In both Boston and Denver, local initiatives and state policy established a set of autonomous schools that have been granted greater control over matters such as staffing, educational programming, calendars and scheduling, and budgeting. Schools with autonomous status were offered the option of choosing to use actual or average salaries for WSF system budgeting — an option that was primarily used by higher-poverty schools with relatively low-salaried teachers.

Roughly one-third of WSF-funded schools in Boston (34 schools) and Denver (65 schools) were autonomous schools in 2018–19, of which most had decided to use actual salaries. Because these schools typically had below-average salaries, the shift to actual salaries increased the effective buying power of their funding allocation, creating, in essence, a sizable windfall for these schools — at least initially — to use as they see fit. Once an autonomous school had chosen to use actual salaries, however, the school could not simply revert to average salaries if that became more beneficial in a subsequent year. In Boston, autonomous schools using actual salaries were permitted to elect to return to using average salaries only after actual school salaries had exceeded the district average for three consecutive years. Similarly, autonomous schools in Denver that opted to use actual salaries were required to continue until, as one school principal explained, "you've reached that threshold where you don't have enough money to fund your staff."

Boston had experienced schools electing to change back to average salaries. In the last three school years, five schools switched back and district administrators expected the number to rise in the coming years. As district administrators explained, schools that are successful in improving the school culture and student performance tend to build a positive reputation, which, in turn, may improve their ability to recruit and retain more experienced (and more expensive) teachers. As a result, the size of the school's "windfall" gradually evaporated. In contrast, Denver officials suggested that they did not view such a situation as likely because the distribution of teacher experience within schools — and, therefore, school-level averages of actual salaries — tended to be more or less constant over time.

Critics of using actual salaries may argue that this approach could encourage principals to hire less qualified (and thereby less expensive) teachers. To help guard against such claims, Denver required a school vote to withdraw from negotiated agreements with the district, such as shifting from average to actual salaries: At least 60 percent of teachers were required to support such measures for a school to make any changes.

The use of actual salaries for lower-salary schools in a district effectively provides those schools with additional funds that they can choose to spend on other things, and those funds have to come from somewhere. In both Boston and Denver, district officials said that introducing the use of actual salaries across all schools in the district in the same year would have caused significant budgetary strains on the district; however, because schools gradually opted in to using the actual salary approach, the district was able to phase in the additional costs over time. As a district administrator in one of the districts explained, the additional cost each year was about $200,000, which he characterized as "a drop in the bucket" in comparison to the overall operating budget of $400 million.

Prince George's County took a different approach to adjusting for the uneven distribution of more experienced teachers: Rather than directly using actual salaries, it incorporated a measure of schools' differences between actual and average salaries into its weighting scheme. Specifically, Prince George's tailored the base allocation for each school by applying a weight to account for differences in teacher salary levels across schools in the district, as well as the resources that some schools (particularly specialty programs) receive in addition to their WSF dollars. This weight was based on three specific components: (1) the three-year average variance between the average and actual salaries from unlocked instructional positions (positions purchased through WSF funds), (2) the number of locked instructional positions (positions funded and staffed by the central district office) in a school, and (3) the total of the average salaries of these locked positions in the school.

Transparency of WSF Systems

In four case study districts, the majority of respondents characterized budgeting and resource allocation under WSF as largely transparent. Among the remaining case study districts, perceptions were mixed.

Respondents with positive perceptions of the transparency of their WSF system characterized the level of communication from the district and information made available to school-level stakeholders as beneficial. In these districts, principals often received, alongside their total school allocation, specific information on their projected enrollment numbers, the base amount of funding per student, and funding adjustments for specific student characteristics. This allowed principals to visualize how student population counts translate into dollars and to better understand their budgets. Several respondents also emphasized the level of district support as key to promoting transparency and understanding. For example, two districts provided each school with a "budget partner," a district staff person who served as the primary point of contact for guiding principals through the budgeting process. Principals expressed appreciation for those budget partners, with one stating how "they go line by line with you [through the budget], explaining any questions you may have." Similarly, in another district, principals received a budget guide, which one principal described as "invaluable . . . because it gives us . . . the rules of the game: 'Okay, this is what you can do; this is what you can't do.'"

In those districts in which stakeholder perceptions on WSF transparency were mixed, district-level respondents typically held more favorable views than their school-level counterparts. Although both groups generally agreed that districts were sharing more information on budgets and resource allocation than they did before adopting WSF, principals often viewed the materials as highly complex with not enough guidance to help explain the system's technical details. As a result, principals in these districts typically expressed a strong understanding of the broad aspects of their WSF system, but not its particulars. For instance, a principal in one district explained, "For the weights, they give us a comparison every year . . . [but it's] not exactly easy to understand. You have to analyze it and be good at math." Similarly, in another district, a principal indicated that the funding adjustments were unclear: "I mean, I understand how it [operates], but I don't know the exact dollar amounts that those weights carry or receive." In a third case study district, all three principal respondents suggested the system was not adequately transparent. As one principal stated, "It's not very transparent, not due to their unwillingness to explain it but because . . . the average person has a hard time explaining what the metrics were for the formula here."

Across all case study districts, including those in which respondents held largely positive perceptions of their WSF system's level of transparency, there were two commonly cited areas of confusion related to aspects of resource allocation, though independent of WSF. First, some respondents — primarily principals — reported a lack of clarity around locked positions (positions funded and staffed by the central district office). A district administrator in one district explained why the rationale for positions funded centrally was unclear to school principals:

> *For example, in special education, deciding that an ABA [applied behavior analysis] specialist is needed for an autism program for a basic number of students. It's transparent in the sense that it's clear this is what you should be allocating for, but I think schools would feel what's not transparent is, 'Why do I need to do this? Why do I need to have that ABA specialist? Why can't I decide that . . . I'm not going to go with an ABA specialist? I'm going to contract out with [another] group of people because they think they're much more meaningful to my students and they can still meet the IEP [individualized education program] needs. Why do I need to do that?'*

A principal in another district expressed similar frustration with perceived inconsistencies in district mandates for certain positions, explaining that some schools purportedly were granted exemption from having to employ a guidance counselor and adding, "I wished I had known ahead of time that other principals were allowed to say no, because I would have said no too, which would have allowed us to have the behavior coach." In a third district, a district administrator indicated that, because of increased transparency around funds included in the WSF system, principals may turn to locked funds (funds controlled by the central district office), which lack the same transparency, to secure additional resources. Savvier principals who can navigate the budgetary channels and advocate for their schools, may convince the district to provide extra resources through these centrally controlled funds, which could lead to inequities within the district.

Second, and on a note related to the first critique, principals in several districts suggested a lack of transparency around the basis for funding provided to schools through sources outside of WSF, such as special education or Title I of the *ESEA*. Similarly, in one case district, the central office sets aside a limited amount of funds for supplemental budget requests, which one principal respondent reported was "not as transparent as it needs to be." Specifically, the principal contended that the district did not provide any form of explanation for rejecting certain supplemental budget requests.

Predictability and Stability of Resource Allocations

In five WSF case study districts, respondents reported that school budgets were not sufficiently predictable or stable. In three districts, respondents had mixed perceptions of how stable the budgets were.

The majority of respondents in five case study districts shared concerns about the predictability or stability of their school budgets from year to year. In the principal survey, just over half (56 percent) of WSF principals reported that the predictability of school resources from year to year is a major or moderate challenge for them, compared with 35 percent of non-WSF principals. Depending on enrollment numbers — both in the aggregate and by student need category — schools may see large swings in their allocated budget from one year to the next. Respondents in three districts expressed mixed perceptions. While some stakeholders experienced stable resources and were satisfied with their ability to predict and plan ahead, other stakeholders experienced swings in resources from year to year and challenges in retaining teachers.

In all nine districts, the stability of the budget was directly tied to the stability of student enrollment at both the district and the school levels. In multiple districts, demographic shifts and population changes in the geographic area led to declines in enrollment as well as shifts in the types of students whom the districts were serving. One principal explained how rapidly shifting demographic changes in their city may affect a school's ability to plan from year to year:

> *[City demographic changes] can have a huge impact on your budget . . . [a change that might impact us] the next year — revitalizing some of those inner-city housing projects. When they do that and they make a mixed income, that can have a huge impact. [Some students] bused out here are EL, they're poverty, they're — some of them are special ed. They generate quite a lot of funds. . . . If you lose 12 of those students, you've lost a teaching position, if you think of it in just simple dollars and cents.*

Moreover, the timing for publishing final enrollment numbers was another consideration cited as an influence on the stability of school budgets. In many instances, enrollment figures were not complete until October. In cases in which actual enrollment exceeded projected enrollment, schools were obligated to contend with additional students for whom they had no extra funding. Conversely, schools in which actual enrollment was lower than the projected numbers often were required to return funds to the district, with the loss of anticipated funds requiring adjustments to staffing or programs. As one principal explained:

> *For this school year . . . we were given numbers of projections that were higher than what we ended up getting in October . . . then we had to pay back the district the amount that we were short with [WSF] funds, even though we continued to get kids in November and December and January. We're at where the district projected us to be, but we weren't there in October, which [resulted] in us losing out on those funds.*

Respondents across districts reported a few strategies to overcome these challenges and to promote stability and predictability in annual budgets through the WSF system — most notably, the use of hold-harmless provisions, as discussed in the previous section.

School choice policies and charter schools in districts were also perceived as influences on the stability of school budgets in WSF systems. In districts with school choice policies, popular schools may have seen increases in funding yearly, while less popular schools with declining enrollment may have faced decreases in funding. While some principals expressed dissatisfaction with the way school choice policies may decrease their funding, other principals and stakeholders saw the competition between schools and potential for increased funding for popular schools as a positive aspect of school choice.

Chapter Summary

Although the survey and case study findings show commonalities in the student need categories that districts targeted in their WSF systems — in particular, students from low-income families, ELs, and SWDs — there is clear variation in how districts define these student categories and in the magnitudes of the corresponding weights. In addition to these major categories of student need, districts have developed other funding adjustments to reflect their priorities, such as performance-based funding adjustments to provide additional resources for low-performing or at-risk students, and additional resource allocations for specialized programing, such as career and technical education, International Baccalaureate, and performing arts schools.

Although all WSF case study districts reported that their schools use average teacher salaries in developing their budgets, three districts also used actual salaries, either for some of their schools or by incorporating them into their weighting scheme. Two of these districts allowed schools to opt in to using actual teacher salaries — and the schools that did so were generally higher-poverty schools, which were able to increase their effective level of resources by making this choice. Because schools gradually opted in to using the actual salary approach, the two districts were able to phase in the additional costs over time, which may provide a model for other districts for how to shift to using actual salaries without inordinate disruption or budgetary strain.

Case study findings also show WSF design to be an ongoing, iterative process. Over time, the case study districts have made changes to their weighting schemes, such as adding weights for new student need categories or modifying the size of certain weights. These revisions were made to keep pace with shifting student demographics and district priorities, but they also serve to illustrate that setting weights is not an exact science. While districts have included detailed analyses of existing resource allocations in their decision-making processes and have considered research on identifying categories of students most in need, there does not appear to be a strong evidence base from which districts have been able to draw to determine what an *appropriate* value for various weights should be. However, the examples from the case studies at least provide information on the range of weights used in various categories, which may enable districts to make more informed decisions about the size and structure of their own weights.

3. School Autonomy

One of the defining goals of WSF systems is to give principals and their schools more control over educational resources and instructional decisions. In theory, this may enable schools to better serve their students, by putting the money in the hands of those closest to the students, since school personnel who work with their students every day may have a deeper understanding of their needs than staff in the district office. School leaders given expanded autonomy under WSF systems could use this autonomy to make more efficient spending decisions and to implement educational practices and programs intentionally designed to meet their specific students' needs (Roza, Davis, and Guin 2007). Some research suggests that these shifts may be associated with improved school quality (Mizrav 2014) and student achievement (Steinberg 2014), especially when autonomy initiatives are focused on teaching and learning, and principals are given more than token discretion (Honig and Rainey 2013). Although school districts can choose to increase school autonomy through other types of policies, the hallmark of a WSF system is that schools receive a specific allocation of funds over which they have some measure of discretion and control, which may make this autonomy more tangible.

WSF systems also aim to create systems to engage and empower school faculty and staff, parents, students, and other community stakeholders by involving them in school-level resource allocation decisions. Such stakeholder involvement may promote budgets that better support student needs and reflect community priorities. Finally, WSF systems typically also include structures to hold principals accountable for the decisions they now have the discretion to make. This chapter examines how school autonomy, stakeholder engagement, and accountability systems vary among districts with and without WSF systems.

School and Principal Autonomy

On average, WSF district administrators reported that over half (53 percent) of their total operational spending[26] was under school discretion, compared with 8 percent in non-WSF districts.

Most district funds flow through the general fund, which provides unrestricted funding for a wide range of school and district functions, while supplemental funding is provided through various categorical programs such as Title I of the *ESEA*, the *Individuals with Disabilities Education Act*, and state compensatory education programs that provide restricted funding for specific purposes. Though there are rules regarding what restricted funds may be used for, districts may still allow schools the discretion to make decisions about the specific uses of these funds, within those broad rules. For both WSF and non-WSF districts, the average share of funds provided to schools for discretionary use was similar for unrestricted and restricted funds (Exhibit 16). The share of funds reported as under school discretion varied across WSF districts; among the case study districts, the proportion of unrestricted funds over which principals had discretion ranged from 27 percent to 54 percent.

[26] Total operational spending refers to expenditures on day-to-day programs and services; it excludes capital expenditures and debt service.

Exhibit 16. Average percentage of unrestricted and restricted funding provided to schools to use at their discretion, in WSF and non-WSF districts

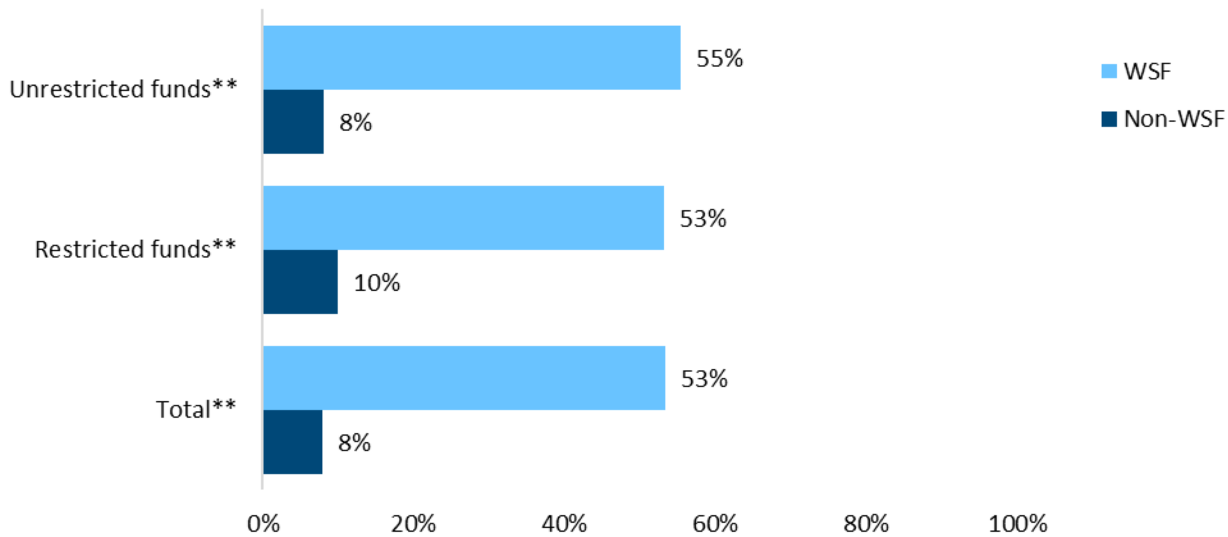


Exhibit reads: On average, WSF districts provided 55 percent of their unrestricted funds to schools to use at their discretion, compared with 8 percent in non-WSF districts; this difference was statistically significant.

Note: Asterisks denote a statistically significant difference between WSF and non-WSF districts (**$p < .05$). In addition to the percentages presented here, regression analyses were run to control for differences in certain district characteristics between WSF and non-WSF districts; the significant differences in this chart persisted after controlling for district size, urbanicity, and percentage of FRPL students (Exhibit D-3 in Appendix D).
Source: District survey, Q12 (n = 9 WSF, 173 non-WSF).

This chapter examines three ways in which principals can allocate resources at their discretion: (1) hiring and selecting staff, (2) selecting non-personnel materials and services, and (3) making instructional programming decisions. For the following analyses, we examine the percentages of WSF principals and district administrators that reported that decisions about allocating various types of resources were mostly made by school staff and stakeholders, in comparison to reports from principals and administrators in non-WSF districts. However, it is important to note that WSF and non-WSF districts differ in size, urbanicity, and student demographics, and potentially on other unobservable characteristics, which could mean that any differences found between them are due to their different characteristics and are not necessarily related to the system used to distribute resources to schools. To explore this issue, we also conducted conditional probability analyses that used multiple regression to control for differences in observable district characteristics between WSF and non-WSF districts, including enrollment size, urbanicity, and percentage FRPL. Some differences that were statistically significant based on the unadjusted percentages were no longer statistically significant after controlling for district size, urbanicity, and percentage of FRPL students. In such cases, the exhibit includes a note indicating which variables do not show statistically significant differences in the conditional analyses. Regardless, all of the comparisons between WSF and non-WSF are only meant to be descriptive and should be interpreted with due caution.

Hiring and Selecting Staff

Principals in WSF districts often reported that decisions about hiring teachers, aides, and instructional coaches were mostly made by school staff and stakeholders.

Over two-thirds of WSF principals reported that school staff and stakeholders mostly made the decisions about hiring regular classroom teachers (85 percent), resource and special area teachers (71 percent), special education teachers (69 percent), instructional aides (80 percent), and instructional coaches (70 percent). Responses of district administrators showed similar patterns, though few district administrators in WSF districts reported that schools had discretion over hiring special education teachers (Exhibit 17).

Exhibit 17. Percentage of principals and district administrators reporting that decisions about hiring staff were mostly made by school staff and stakeholders, in WSF and non-WSF districts

	Principals			District administrators		
	WSF	Non-WSF		WSF	Non-WSF	
Regular classroom teachers	85%	56%	**	95%	36%	**†
Resource teachers and other special area teachers (e.g., music, technology)	71%	39%	**	78%	29%	**
Special education teachers	69%	37%	**	11%	15%	†
Instructional aides	80%	54%	**	68%	47%	*
Instructional coaches	70%	21%	**†	67%	17%	**†
Pupil support staff	33%	18%	**	43%	11%	**
Assistant principals	52%	18%	**	41%	8%	**
Principals	21%	4%	**	12%	2%	**

Exhibit reads: Eighty-five percent of principals in WSF districts reported that decisions about hiring regular classroom teachers were mostly made by school staff and stakeholders, compared with 56 percent of principals in non-WSF districts; this difference was statistically significant.

Notes: Asterisks denote a statistically significant difference between WSF and non-WSF districts (**$p < .05$, *$p < .10$). However, some of these differences were not statistically significant in conditional analyses that controlled for certain differences between WSF and non-WSF districts (enrollment size, urbanicity, and percentage of FRPL students); differences that remained significant in the conditional analyses (or became significant) are indicated with a cross (†)). Exhibit D-4 in Appendix D provides the results of the conditional analyses. Exhibit D-5 provides complete responses to the survey items, including the percentages of respondents reporting that decisions were shared between the district and school or were mostly made by the district.

Sources: Principal survey, Q10 (n = 104 WSF, 213 non-WSF); District survey, Q13 (n = 13 WSF, 238 non-WSF).

Principals in WSF districts were more likely than their counterparts in non-WSF districts to indicate that decisions about hiring school-level staff were mostly made by school staff and stakeholders. For example, 85 percent of principals in WSF districts reported that decisions about hiring regular classroom teachers were mostly made by school staff and stakeholders, compared with 56 percent of principals in non-WSF districts, a statistically significant difference. However, most of these differences were not statistically significant in conditional analyses that controlled for certain differences between WSF and non-WSF districts (enrollment size, urbanicity, and percentage of FRPL students), with the exception of instructional coaches.

Case study principals provided several examples of how they were using their autonomy to select staff to meet the needs of their students. Principals in multiple schools mentioned using autonomy to provide additional academic supports, such as additional in-school tutoring, resource teachers, reading specialists, and paraprofessionals, and principals in three schools reported adding academic supports for special populations, such as ELs and SWDs. In one school, for example, the principal explained how the district had assigned 1.5 EL teachers based on the school's projected EL enrollment, but because she felt this was insufficient to support her EL students — many of whom were newcomers to the country with little or no English proficiency — she used her discretionary funds to add an additional 1.5 FTEs. As a result, the school had a total of three EL teachers "who are implementing a co-teaching model and can pull out small groups for more intensive instruction that the kids might need."

Some of the school principals interviewed focused funds at their discretion on staff providing nonacademic supports. One school hired a dean of students to address the increasing population of students entering the school with "social-emotional deficits," and another school allocated funds for a school social worker and a school psychologist to support its homeless student population and other students with mental health needs.

Selecting Instructional Materials and Other Non-Personnel Resources and Services

WSF principals were more likely than their non-WSF counterparts to report that schools have autonomy in purchasing instructional software, curricular materials, textbooks, and contracted services.

For example, 48 percent of principals in WSF districts reported that decisions about selecting instructional software were mostly made by school staff and stakeholders, compared with 10 percent of principals in non-WSF districts (Exhibit 18). Similarly, WSF principals were more likely to report that school staff and stakeholders mostly made the decisions about selecting curricular materials (31 percent vs. 8 percent), textbooks (25 percent vs. 8 percent), and contracted services (37 percent vs. 7 percent).

Exhibit 18. Percentage of principals and district administrators reporting that decisions about selecting instructional materials and other non-personnel resources and services were mostly made by school staff and stakeholders, in WSF and non-WSF districts

	Principals			District administrators		
	WSF	Non-WSF		WSF	Non-WSF	
Instructional software	48%	10%	**†	51%	8%	**†
Curricular materials	31%	8%	**†	30%	7%	**
Textbooks	25%	8%	**†	25%	7%	**
Office supplies	96%	77%	**	100%	73%	**
Contracted services	37%	7%	**†	61%	9%	**†
Food services	3%	1%	†	0%	2%	*

Exhibit reads: Forty-eight percent of principals in WSF districts reported that decisions about selecting instructional software were mostly made by school staff and stakeholders, compared with 10 percent of principals in non-WSF districts; this difference was statistically significant.

Note: Asterisks denote a statistically significant difference between WSF and non-WSF districts (**$p < .05$, *$p < .10$). However, some of these differences were not statistically significant in conditional analyses that controlled for certain differences between WSF and non-WSF districts (enrollment size, urbanicity, and percentage of FRPL students); differences that remained significant in the conditional analyses (or became significant) are indicated with a cross (†)). Exhibit D-6 in Appendix D provides the results of the conditional analyses. Exhibit D-7 provides complete responses to the survey items, including the percentages of respondents reporting that decisions were shared between the district and school or were mostly made by the district.
Source: Principal survey, Q11 (n = 104 WSF, 213 non-WSF); District survey, Q14 (n = 13 WSF, 238 non-WSF).

Case study data provide examples of how WSF principals used their autonomy to purchase non-personnel materials. Among the WSF case study districts, principals and district staff reported putting funds toward curricular materials. Examples include intervention materials for reading and mathematics, writing programs, books, and other academic resources. One principal explained that her school had used its autonomy to move away from textbooks promoted by the district and toward technology-based resources "because that's not the way our kids are learning these days." In another school, the principal described how they had recently introduced a new science, technology, engineering, arts, and math (STEAM) initiative, which required the purchase of many new instructional and curricular materials.

Some principals in case study districts reported that technology, including information technology equipment and instructional software, was a major non-personnel expenditure over which they had discretion. In six case study districts, principals used WSF allocations to purchase computers and other equipment, and instructional software. One school, for example, used WSF funds to adopt a new literacy program and digital platform, designed to help students grow critical thinking skills through personalized learning (i.e., instruction tailored to the learning preferences, skills, and specific interests of different learners).

School leaders also described the regular need to compromise between spending on personnel and spending on non-personnel resources. Office supplies were often a point of focus in the budgetary trade-offs. As one principal stated,

> *We're pushing our school body to make some hard decisions in terms of sacrifice, like, "Ok, if you want a reading specialist and that costs $100,000, are you willing to sacrifice one box of copy paper per quarter [per teacher]?" Really having them do the math and do the comparison. I think the challenge for some people is that they may not understand economic sustainability. Just making sure we're not wasting our resources and we're being very intentional with resources. . . . Are we being as productive as possible to get the biggest bang for our buck?*

Instructional Programming and Professional Development Decisions

WSF principals were more likely than those in non-WSF districts to report that decisions about instructional programming and professional development were mostly made by school staff and stakeholders.

Overall, 59 percent of WSF principals reported that decisions about before- or after-school programming were mostly made by school staff and stakeholders, compared with 30 percent of non-WSF principals (Exhibit 19). WSF principals were also more likely to report having more discretion over elective or non-core classes (56 percent vs. 26 percent), summer programming (33 percent vs. 9 percent), and professional development (30 percent vs. 9 percent).

Exhibit 19. Percentage of principals and district administrators reporting that instructional programming and professional development decisions were mostly made by school staff and stakeholders, in WSF and non-WSF districts

	Principals			District administrators		
	WSF	Non-WSF		WSF	Non-WSF	
Before- or after-school programming	59%	30%	**†	54%	25%	**
Elective or non-core classes	56%	26%	**†	84%	28%	**†
Summer programming	33%	9%	**†	11%	10%	
Professional development for staff	30%	9%	**†	24%	3%	**
Daily schedule	66%	64%		52%	38%	

Exhibit reads: Fifty-nine percent of principals in WSF districts reported that decisions about before- or after-school programming were mostly made by school staff and stakeholders, compared with 30 percent of principals in non-WSF districts; this difference was statistically significant.

Note: Asterisks denote a statistically significant difference between WSF and non-WSF districts (**$p < .05$). However, some of these differences were not statistically significant in conditional analyses that controlled for certain differences between WSF and non-WSF districts (enrollment size, urbanicity, and percentage of FRPL students); differences that remained significant in the conditional analyses (or became significant) are indicated with a cross (†)). Exhibit D-8 in Appendix D provides the results of the conditional analyses. Exhibit D-9 provides complete responses to the survey items, including the percentages of respondents reporting that decisions were shared between the district and school or were mostly made by the district.
Source: Principal survey, Q12 (n = 104 WSF, 213 non-WSF); District survey, Q15 (n = 13 WSF, 238 non-WSF).

In case studies, one principal expressed appreciation for the flexibility to implement new programs, stating, "I feel like if I wanted to present something, I could bring it forth during my meeting [with the district] and say, 'This is the initiative I want to try.'" Several principals also suggested that independence from district curriculum decisions was a welcome result of WSF.

Case study principals who reported using WSF funds to purchase professional development services explained this choice by highlighting the importance of building teachers' capacity and matching training to the needs of the school. They also felt "freed" from district-sponsored professional development, which they suggested often does not meet the unique needs of their schools. For example, in explaining the choice to employ professional development contracts outside the district, a principal of a Montessori school stated, "[I]t takes special training to be a Montessori teacher."

A district finance officer stated that, with WSF in place and the autonomy that accompanies it, school principals can ". . . have an extra fourth-grade teacher and have smaller class sizes or have this after-school program or have field trips." A principal also offered a good example of this autonomy, describing how he was able to select electives to address student interests:

> *When I got here, there were about three or four electives that the kids had. It wasn't enough. It was all core. I mean, how do we stimulate these kids? How do we intrigue them to be in our building? We began to create different electives such as drama, guitar, piano, that were not available in hopes that we would get more kids interested in our building.*

Other interviewees offered additional instructional programming choices they made using discretion that WSF systems offer. For example, programming changes designed to meet the specific needs of prekindergarten students, ELs, and homeless youth were mentioned in multiple districts.

Stakeholder Inclusion in the Budgeting and Planning Process

Principals in WSF districts often reported that teachers and other school stakeholders have moderate or significant influence over school budget decisions.

Not surprisingly, principals most often reported themselves as having moderate or significant influence over school budget decisions (96 percent). In addition, 81 percent reported that teachers had moderate or significant influence, followed by other school administrative staff (79 percent), district staff (76 percent), school support staff (59 percent), and parents (47 percent). Fewer principals reported that other community stakeholders (24 percent) or students (19 percent) had such influence (Exhibit 20).

Exhibit 20. Percentage of principals reporting that certain stakeholders have moderate or significant influence over schools' budget decisions, in WSF districts

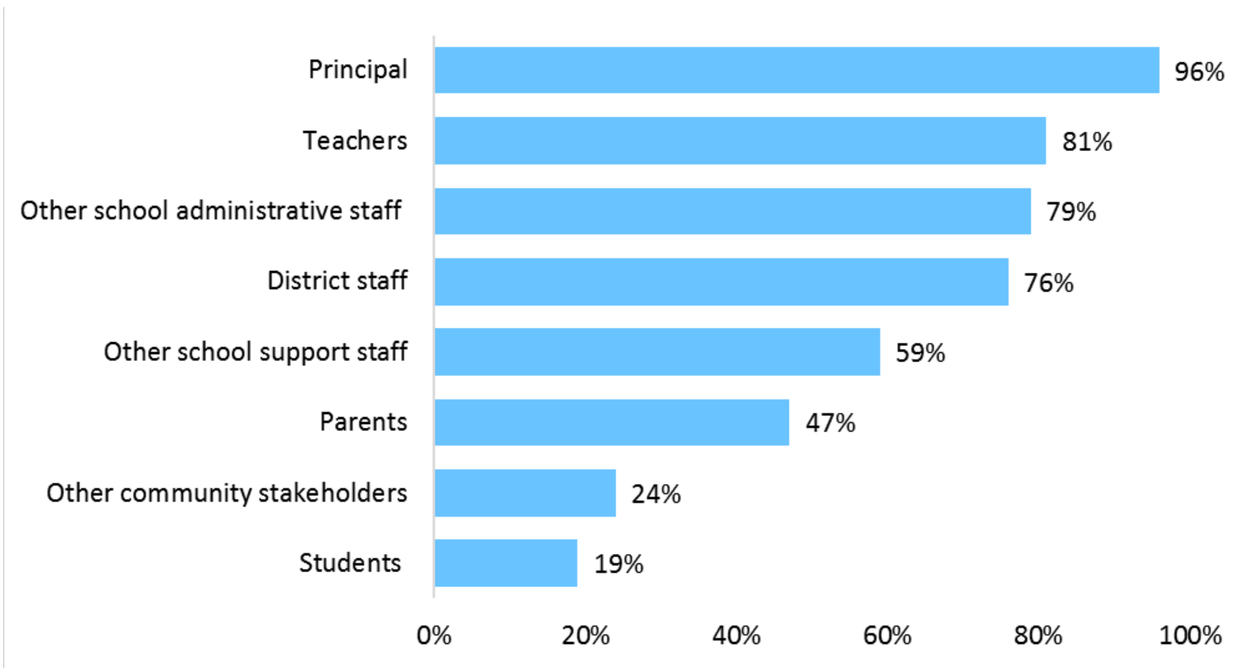


Exhibit reads: Ninety-six percent of principals in WSF districts reported that principals have moderate or significant influence over school budget decisions.

Source: Principal survey, Q17 (*n* = 104).

Respondents in eight of the nine case study districts reported that teachers, parents, and other school stakeholders were involved in the budgeting process, and administrators often emphasized the value of seeking their input.

All of the case study districts had policies requiring principals to engage school stakeholders during the budgeting process, and administrators often reported that stakeholder participation is important to ensure that the budget is aligned with community needs. For example, one district administrator explained that budgets should not be done "in a vacuum" and that stakeholder participation is meant to ground the budgets in school and community needs. In that district, principals make recommendations to a school committee that includes parents, teachers and other staff, and at least one community member, and the committee provides feedback to the principal. The administrator described how this process builds community support for the school, saying "you have to go in with some ideas as a recommendation; then you come out with what the feeling of the school community is."

Challenges to School and Principal Autonomy

Despite the flexibility to make decisions about resources, principals in all nine WSF case study districts reported that their effective autonomy was constrained by district requirements to fill certain non-negotiable staff positions, collective bargaining agreements, and resource limitations.

Principals in WSF systems interviewed as part of the case study reported that they must fill at least some staff positions to meet district requirements. These positions, mandated by the district, must be budgeted as part of the school's annual budget. One principal described how this requirement was presented during principal training:

> *We came to a principals' meeting and were given a guide to WSF, and one of the pages had the new non-negotiables. If you have a school between 500 and 750 kids, you must purchase one of these. We were told, based on the number of kids we have, that we had to have a certain number of school counselors. We also have to purchase a reading specialist. Before WSF, the district would say, "Because we require this, we are paying for every school to have a reading specialist." Now, it's like, "We [the district] are not keeping the money, but you still have to buy it."*

In one district, the district finance officer said that the district has to impose limits on choices that principals can make as a result of the collective bargaining agreement in place between the district and the teachers' union, specifically around class size:

> *We definitely have limits that are imposed based on our contractual obligations with the teacher's union. A school comes in and says, "We want our fifth-grade class size to be 30, because we're projected to have 30 kids. We want to have one class, [and] we have one great teacher who can do it." We have to say "no" because we have an agreement with the teachers' union that says that the class size maximum is 25; you need to have two classes for 30 kids, not one.*

Similar concerns regarding collective bargaining agreements were expressed by principals during the case study interviews. Principals in three districts expressed a concern about the quality of staff available in "the pool," a group of teachers not currently assigned to a particular school from which principals are expected to staff their schools first. Another issue raised in case study interviews was that of minimum staffing requirements that can limit creative staffing solutions, whereby a principal may be required to have an additional position filled that might not align optimally with the needs of the students. For example, one principal stated that she and her assistant principal had decided to use funds to contract with a community organization that would provide staff to support students' social-emotional needs in the classroom, freeing the principal to focus more on instructional leadership. Using the community organization instead of district staff also enabled the school to afford a part-time music teacher. However, the district did not approve the school's budget because of a new requirement for all schools to hire a guidance counselor, leaving no remaining funds to cover the social-emotional support and music teacher.

Case study interviewees also discussed other challenges such as loss of economies of scale and uneasiness about changing roles under WSF.

Both principals and district administrators pointed to the loss of economies of scale when individual schools need to purchase things that previously were bought in larger quantities by the central office. As one district administrator explained:

> *There are economies of scale that principals cannot realize that we can [realize] at the district [level]. For example, if I want to set up a cleaning contract at my school, I would have to go hire someone, set up a contract, and clean for 200 hours a year. If I want some company to clean my 175 schools, I can probably negotiate a better deal. For computer purchases or anything we spend money on, doing this at the school level is sometimes more expensive than doing them on a macro level.*

Interviewees provided other examples where loss of economies of scale could be a concern, including instructional materials, educational technology, office supplies, and contracted services. Some of the case study districts have established systems and procedures to avoid this problem; for example, Denver set up a centralized purchasing system that allows schools to place their own orders while retaining the large-scale buying power with vendors.

Some respondents also expressed uneasiness with changing roles under WSF. For example, some principals and district administrators in case study districts expressed concerns about the evolving role of school leaders as entrepreneurs focused on a "business model" that involves securing funds. Some respondents also reported that the close monitoring of student enrollment for specific types of students and the recruitment of students to increase school budgets required adapting their leadership and their thinking regarding student population shifts.

Perceived Benefits of Increased Autonomy

Principals interviewed as part of the case studies often perceived themselves as being best suited to make staffing decisions to meet the needs of their schools. As one principal asserted, "I know what's best for my school because I'm in the school," adding that the district had never opposed her staffing decisions. In describing the benefits of giving principals autonomy, another principal reported, "Principals likely know more than the [district] what it takes to make their school successful. Principals are engaged in . . . analyzing their data and seeing what their schools need."

Principals also often reported appreciating the opportunity that autonomy gives them to innovate and try new things. One case study principal said: "I love being able to manage budget and being able to make instructional choices. It's allowed us to do cool things like instructional services, the recreation center, the wrap-around services, and the field trips. The contracts we have are very innovative." Another principal noted that "[the] type of latitude [WSF offers] really allows you to do a lot of things to meet the needs of your particular school and the demographic that you serve."

Principal Capacity to Develop and Manage Budgets

In six of the nine WSF case study districts, district administrators reported challenges related to building and sustaining principal capacity around planning and budgeting, specifically citing concerns about principals' understanding of the financial aspects of making resource allocation decisions.

Interviewees often reported that managing the business aspects of running a school is not part of a principal's traditional skill set. Several district respondents spoke about the unevenness in principals' knowledge of budgeting, particularly among less experienced principals and districts with high principal turnover. District respondents focused on principals' inability to connect funding [to budgeting decisions] to effectively support the needs of their students. One school board member stated that there is substantial variation in principal knowledge and that more training is needed:

> *I think [principal knowledge about budgeting] is all over the place. Some are very good. Some of them are clueless. One of the things we do not have in this system is a good principal preparation system. We have relied to some degree on the universities more than we should have. There's no principal academy, and there have been some talks about that, but we haven't ever created it.*

Principals and district administrators in WSF districts reported a variety of district supports for budget development and management.

According to survey responses, principals in WSF districts often reported having a specific district staff person assigned to their school to assist with budget development and management (75 percent). Other supports included making district staff available to provide technical assistance as needed, either by phone (73 percent) or in-person (62 percent), and providing online resources such as documents, videos, and/or training modules (66 percent). Similarly, high percentages of district administrators also reported providing these supports (Exhibit 21).

Exhibit 21. Percentage of principals and district administrators in WSF districts reporting that their district offers schools various supports for budget development and management

	Principals	District administrators
A specific district staff member is assigned to our school to assist with budget development and management	75%	64%
District staff are available by phone to provide technical assistance as needed	73%	89%
District staff are available for in-person technical assistance as needed	62%	89%
Online resources are available, including documents, videos, and/or training modules	66%	88%

Exhibit reads: Seventy-five percent of principals in WSF districts reported that a specific district staff member was assigned to their school to assist with budget development and management.

Source: Principal survey, Q31 (*n* = 104); District survey, Q24 (*n* = 13).

Accountability and Support Systems

Under WSF systems, districts typically implement accountability and support systems to ensure that schools do not spend over or under budget; the goal is to "zero out" the annual allotted budget. In addition, WSF districts may institute accountability measures that focus on ensuring that positive student outcomes arise from schools' budgeting and programming decisions. In many districts across the country, budgetary accountability is overseen by the district finance office, and accountability for student outcomes is overseen by the academic office. Survey findings and case study interviews provide information about both types of accountability systems.

Because district administrator and principal perceptions regarding accountability may differ, we compared the responses between these two groups. However, principal response rates for these survey items were relatively low (about 54 percent of all WSF principals responding to the survey), and we did not conduct tests of statistical differences between the administrator and principal responses due to the small sample sizes, so the reported differences should be interpreted with caution.[27]

District Actions If Schools Overspend

Principals in WSF districts reported that the most common consequence of a school spending more than its allotted amount was that the amount overspent could be deducted from the school's budget the following year.

Fifty-seven percent of principals and 60 percent of district administrators in WSF districts reported that if a school's spending exceeded its budget, the overage could be deducted from the school's budget the following year (Exhibit 22). Approximately two-thirds of district administrators in WSF districts also reported that principals could be given additional training in budget development (60 percent) or budget monitoring (66 percent) if they overspent their budgets. No district administrators and few principals (6 percent) reported that overspending could result in the principal being given control over a smaller proportion of the budget the following year.

District leaders in the case study districts stated that they were providing supports to principals to help them meet accountability requirements related to budgets; district administrators specifically described monitoring school plans throughout the budget process. For example, one administrator commented,

> *From a budgeting perspective, the accountability piece is in the budget collaboratives [budget meetings between district and school staff], along with the back-and-forth of whether the principal's plan for the school will be able to meet the requirements and regulations. Because we have that check early on, they don't have the freedom to do something which will get them out of line from a budget regulations standpoint.*

[27] The principal survey items reported in Exhibits 22 and 23 were only asked of respondents in WSF districts. Several items at the beginning of the survey were intended to identify whether respondents were from WSF or non-WSF districts, but principals in WSF districts often did not answer the filter questions in a way that accurately identified whether they were in a WSF district. Therefore, many principals in WSF districts were skipped out of those survey items even though they were in fact in WSF districts, leading to low response rates for the items in these two exhibits.

Principals in the case study districts reported that, in reality, it is difficult and rare for a school to overspend, given the frequent district oversight and guidance. Indeed, some principals interviewed in WSF districts reported that it is impossible to overspend, given the systems in place.

Exhibit 22. Percentage of WSF principals and district administrators reporting that certain actions could take place if a school's end-of-year spending was more than its discretionary budget

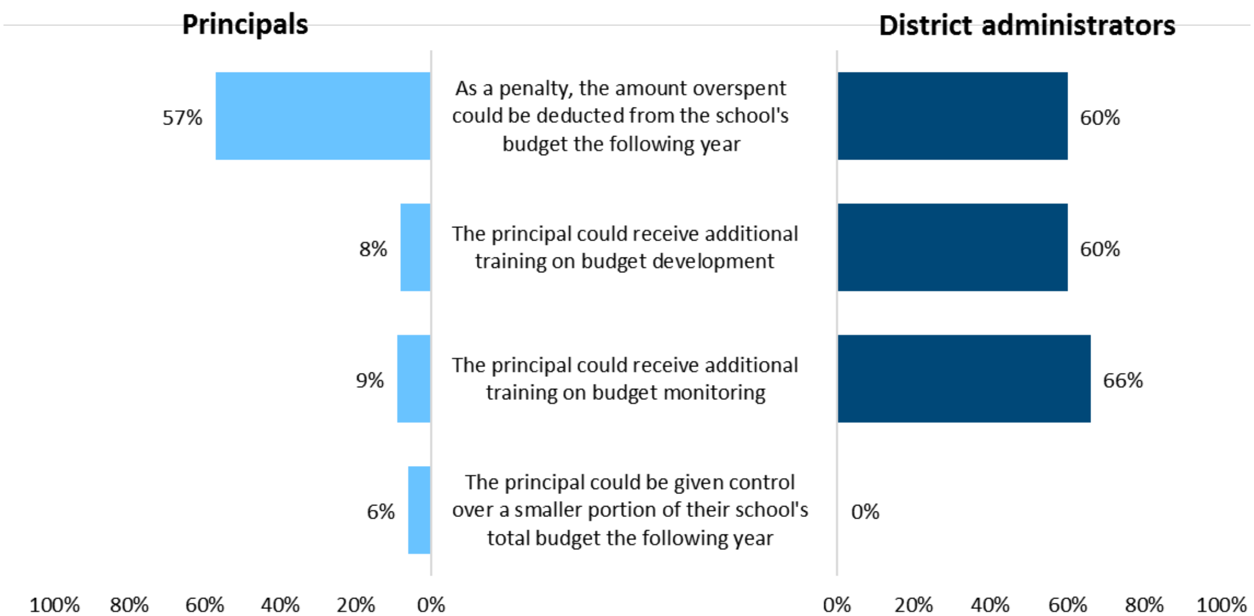


Exhibit reads: In WSF districts, 57 percent of principals reported that if a school spent more than its discretionary budget in a given year, the amount of overspending could be deducted from the school's budget in the following year.

Note: Differences between districts and principals were not tested for statistical significance due to small sample sizes responding to this survey item; therefore, differences should be interpreted with caution.
Source: Principal survey, Q36 (*n* = 56); District survey, Q28 (*n* = 12).

Interviewees in case study districts largely described accountability through district monitoring systems. For example, one district program officer commented,

> *You don't just get your money and do what you want outside of the locked positions. There's a space for you to justify. There are times when they come back throughout the year to look at the plan and see how it is going, in an effort to see a return on investment.*

District Actions If Schools Do Not Meet Academic Performance Targets

More than half of principals and district administrators in WSF districts indicated that not meeting performance targets could result in closer district evaluation and monitoring of budget development and implementation.

For example, 74 percent of principals reported that a school not meeting performance targets could result in the district more closely *evaluating the school's proposed budget* and site plan for the next year, and 52 percent said the district could more closely *monitor implementation of the school's budget* and site plan (Exhibit 23). Smaller percentages reported that principals could lose some of their autonomy over hiring and personnel decisions (27 percent of principals) or be given control over a smaller portion of the school's budget (11 percent).

Exhibit 23. Percentage of WSF principals and district administrators reporting that certain actions could take place if schools did not meet performance targets

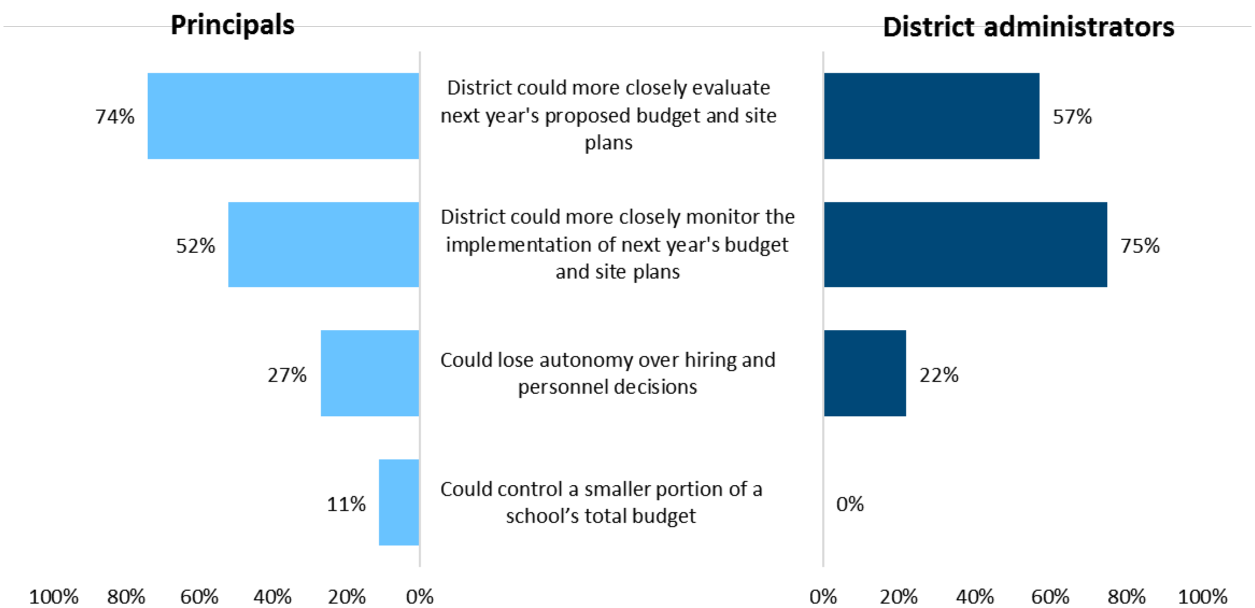


Exhibit reads: Among WSF districts, 74 percent of principals reported that the district could more closely evaluate next year's budget and site plans if a school did not meet performance targets.

Note: Differences between districts and principals were not tested for statistical significance due to small sample sizes responding to this survey item; differences should be interpreted with caution.
Source: Principal survey, Q37 (*n* = 57); District survey, Q29 (*n* = 12).

The case study data suggest that accountability systems for academic performance may not be directly connected to WSF financial systems.

Although the survey results indicated that principals and district administrators often believed that certain consequences related to school-level budgeting "could" occur if a school did not meet academic performance targets, interviewees in the case study districts were unable to point to any specific mechanisms or formal procedures that addressed this. In addition, no interviewees provided specific examples of budgetary consequences that occurred for schools that did not meet performance targets.

Chapter Summary

WSF systems aim to give more spending autonomy to schools, to allow school personnel who work directly with students to make decisions about how to use school resources to meet their students' specific needs. Our survey data show that WSF districts provided more than six times as much discretionary funding to schools than did non-WSF districts. WSF principals reported that decisions about hiring teachers and other staff, selecting instructional materials, and instructional programming were mostly made by school staff and stakeholders. In addition, WSF principals reported having more autonomy in a number of areas than did their counterparts in non-WSF districts, including more school-level control over hiring instructional coaches, selecting curricular materials and instructional software, and making decisions about extended time programs and professional development. However, in the case study interviews, principals often reported that their autonomy was constrained to some degree by non-negotiable staff positions required by districts, collective bargaining agreements, or limited amounts of flexible resources.

WSF districts often experienced challenges with principals' capacity to serve in a planning and budgeting role, which was new to many principals. Districts in turn provided training and other supports to help prepare principals to serve in this capacity. Principals reported that accountability measures for both academic performance and budget management are in place, and that these include consequences such as increased district monitoring or deductions of overspent funds from the following year's budget. Districts, however, often had support and monitoring systems in place to make school overspending unlikely to happen.

4. Funding Equity

A key goal of WSF systems is to improve equity in the distribution of resources among schools within a district — indeed, interviewed staff in seven of the nine case study districts cited equity as the primary motivation for adopting a WSF system. To explore equity outcomes under WSF systems, this chapter uses school-level expenditure data provided by the nine WSF case study districts to examine equity patterns in the most recent available year using two measures: a simple comparison of per-pupil spending levels in higher-need versus lower-need schools, and a statistical analysis that uses multiple regression to compute "implicit weights" for various indicators of student needs. In addition, we examine changes in these two measures before and after implementation of the WSF system, in the five districts that were able to provide school-level expenditure data for at least two years before and after adoption of the WSF system.

Each of the equity analyses in this chapter has limitations, and the results should not be interpreted as evidence of the effectiveness of WSF systems for improving equity. First, the equity analyses were conducted only in the nine WSF case study districts, and we do not have a control group of non-WSF districts with which to compare them. The cross-sectional analyses that include all nine WSF districts are based on a single year, which reflects different timepoints in the evolution of each district's implementation of WSF. For the longitudinal analyses, we excluded four of the nine districts because they were not able to provide school expenditure data for at least two years before and after adoption of the WSF system. Even among the five districts that were able to provide more extensive longitudinal data, one was able to provide data for only two years prior to WSF implementation, and one provided only two years of post-implementation data.

Various factors may influence the effectiveness of WSF systems in promoting an equitable distribution of funds, including the share of total school funding allocated through the WSF formula, the types of weights used, and the relative strength of those weights. In addition, a district's use of average salaries rather than actual salaries to charge personnel expenditures against each school's budget may undermine the potential equity effects of its WSF formula. Higher-poverty schools often have less experienced, lower-paid staff (Goldhaber, Lavery, and Theobald 2015; Roza and Hill 2004), but using average salary figures to charge personnel expenditures against school budgets may mask those differences, with the result that the actual expenditures in those schools may be considerably less than the amounts that they receive "on paper."[28] This is why it is important to examine *actual* expenditures to more accurately examine how equity evolved in WSF districts, and not rely only on analyzing the progressivity of WSF formulas and weights. Indeed, the equity analyses presented in this chapter rely on actual per-pupil expenditure data for individual schools, and not simply the per-pupil allocations provided through the WSF formulas.

For this chapter, we have masked the district identities because the intent here is not to evaluate individual districts' effectiveness and outcomes but rather to explore equity outcomes for a group of WSF districts and to demonstrate some approaches that districts can use to examine their own equity outcomes.

[28] Alternatively, charging those actual, below-average salaries against these schools' budgets would leave them with additional funds "left over" with which they could purchase additional staff or other resources.

Methods Used to Examine Equity Outcomes

All nine WSF case study districts provided school-level expenditure data for at least five school years — in one case for as many as 16 years. However, as noted above, four of the districts were not able to provide data for at least two years before and after the initial implementation of WSF; these districts had adopted WSF either very recently or many (more than eight) years ago. Consequently, most of this section examines change in funding patterns in the five districts that were able to provide at least two years of pre and post data.[29] We do, however, begin with a cross-sectional examination of equity patterns in the most recent available year (2016–17 for eight districts and 2015–16 for one district) for all nine case study districts.

For both the cross-sectional and longitudinal analyses, we focus on expenditures made from unrestricted funds (general funds) and exclude restricted (categorical) funds; however, we also briefly look at how equity patterns differ when restricted funds are included. Whether it is appropriate to include restricted funds in examining the equity outcomes of WSF systems may depend on the specific types of restricted funds under consideration and whether any dollars from those funds are distributed through the WSF formula. For example, federal education funds typically carry a requirement that they supplement, not supplant, state and local funds; to the extent that federal and other restricted funding sources are intended to supplement an equitably distributed base of unrestricted funds, it may be more meaningful to examine the equity of the unrestricted funds. Indeed, in the nine case study districts, the funding distributed through the WSF formula consisted almost exclusively of unrestricted funds. That being said, it is also of interest to better understand how implementation of a WSF may impact resource equity in terms of spending from both restricted and unrestricted funding sources. We therefore present a brief analysis of changes in equity associated with WSF when all funding sources are considered.

Throughout this section, we use two approaches to examine the extent to which student need factors are related to school expenditure levels within a district: 1) a simple comparison of per-pupil spending levels in higher-need versus lower-need schools, and 2) a statistical analysis that computes "implicit weights." For both measures, we use three indicators of student need: students eligible for free and reduced-price lunch, students identified as English learners, and students with disabilities.

For the first approach, we divided schools within each district into three equally sized groups — or terciles — based on the level of a specific student need characteristic, and then compared average per-pupil expenditures in the highest and lowest terciles, calculating the relative (percentage) difference between these two groups for each school year.

For the second approach, we used multiple regression analysis to estimate models that relate school-level, per-pupil spending to various measures of student need and other school characteristics. In addition to variables for the percentage of FRPL students, ELs, and SWDs, we also included measures of school size and the proportions of school enrollment served in the elementary, middle, and high school grade ranges. Each of these regression analyses generates a constant term that represents the estimated base level of per-pupil spending — in a particular district and year — for the average student with no specific need characteristics attending an average-sized school with all of its enrollment in the

[29] These five districts each provided between 8 and 16 years of school expenditure data. The four districts for which we did not conduct longitudinal analyses provided between 5 and 7 years of data; one of these districts could provide data for only one post-implementation year, and the other three were not able to provide any pre-implementation data. Equity outcome results by year for all nine districts are provided in Appendix D, in Exhibits D-14 through D-19.

elementary grades. In addition, the regressions provide coefficients that represent an estimate of the additional amount of per-pupil spending associated with each variable (student need and other school characteristics).

These additional spending amounts are not directly comparable across districts or years because spending levels vary across jurisdictions and time. To create a consistent metric, we divided the additional spending amounts by the estimated base per-pupil spending to produce an implicit weight for each variable. For example, in District 1, the estimated base per-pupil spending amount was $5,487, and the additional per-pupil spending associated with each student with a disability was $1,781, producing an implicit weight of 0.32 (Exhibit 24).

Exhibit 24. Example showing estimated base per-pupil spending level, and additional amount of per-pupil spending and implicit weights associated with various school characteristics in District 1, in 2016–17

	Estimated base per-pupil spending	Estimated additional per-pupil spending	Implicit weight
Percentage of students with disabilities	$5,487	$1,781	0.32**
Percentage eligible for FRPL	$5,487	$1,426	0.26**
Percentage in high school grades (9–12)	$5,487	$875	0.16**
Percentage of English learners	$5,487	−$502	−0.09
Percentage in middle school grades (6–8)	$5,487	−$506	−0.09**
Enrollment (relative to mean)	$5,487	−$1,564	−0.29**

Exhibit reads: In District 1, the estimated base per-pupil spending level was $5,487 and estimated additional amount of spending associated with each student with a disability was $1,781, resulting in an implicit weight of 0.32.

Notes: FRPL = free and reduced-price lunch. "Base spending" represents the estimated amount spent on elementary students with no additional needs attending a school with average enrollment. "Additional spending" represents the estimated additional dollar amount associated with one unit of each variable (e.g., one student with a disability). "Implicit weight" represents the relative difference from the base amount associated with a particular characteristic and is calculated by dividing the additional per-pupil spending by the base per-pupil spending. Asterisks denote a statistically significant difference from zero (**$p < .05$).
Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

The asterisks in Exhibit 24 indicate whether the implicit weights estimated by the regression model are statistically significantly different from zero. In the following analyses, we only discuss implicit weights that are statistically significant. Note that we do not use such asterisks in the analyses of tercile differences because those are based on simple comparisons and not a statistical model.

The two approaches — tercile differences and implicit weights — have different advantages and disadvantages. The tercile approach is simple to calculate and easy to understand, and it provides an intuitive descriptive measure of whether higher-need schools receive more (or less) than lower-need schools.[30] However, it does not take into account other school characteristics that may potentially have a stronger influence on school expenditure patterns. For example, high-poverty schools often have higher concentrations of students with disabilities and EL students than do low-poverty schools, and

[30] A similar approach has been used in studies of the targeting of federal funds among school districts, which have commonly examined the distribution of funds among district poverty quartiles based on census poverty data (for example, Chambers et al. 2009; Stullich, Eisner, and McCrary 2007). For our analysis, we used terciles rather than quartiles due to the relatively small number of schools within each case study district, and we used FRPL data because census data are not available at the school level. Within each district, schools were ranked by their percentage of FRPL students, and high- and low-poverty schools were defined as those in the top and bottom thirds of the ranking.

these factors could contribute to the spending differences found between schools in the high- and low-poverty terciles.

In contrast, the implicit weight approach uses regression analysis to try to disentangle the multiple associations between school-level spending and various school characteristics and isolate the relationship between each individual school characteristic and per-pupil spending while holding other variables constant.[31] However, it is also more complicated to calculate and may be harder for district and school stakeholders to understand.

For both measures, a positive number indicates a *progressive* system, in which higher-need schools have higher per-pupil spending levels than lower-need schools, while a negative number indicates a *regressive* system, in which higher-need schools have lower per-pupil spending levels than lower-need schools.

The line graphs used to present the longitudinal data on trends in tercile differences and implicit weights were designed to present all five districts on a single page, but may be somewhat difficult to read. The full data for each chart are provided in Exhibits D-14 through D-19 in Appendix D.

As a reminder, the per-pupil expenditure data used for these analyses are not the same as the per-pupil allocations provided through the WSF formulas for two reasons. First, the WSF allocations are budgeted amounts determined at the beginning of the school year, whereas expenditure data reflect the amount of funds that were actually spent. Second, WSF allocations per pupil are generally less, sometimes considerably less, than the total expenditures that occur at the school level because of funds that are distributed outside of the WSF formula. This is why when examining equity outcomes, it is important to use actual expenditure data rather than simply examining WSF formulas and allocations.

[31] The regression modeling used is consistent with the body of research on school finance equity analysis (Chambers et al. 2008; Duncombe and Yinger 2005, 2011; Gronberg et al. 2004; Gronberg, Jansen, and Taylor 2011; Imazeki 2008; Levin et al. 2013; Taylor et al. 2018).

Equity With Respect to Student Poverty

In six of the nine WSF case study districts, high-poverty schools had higher per-pupil spending from unrestricted funds, on average, than low-poverty schools, in the most recent year for which data were available.

In three of these six districts, the additional amount in schools in the high-poverty tercile amounted to 18−20 percent over the average per-pupil spending level in the low-poverty tercile of schools. In the other three districts, the additional amount was 5−6 percent of spending levels in low-poverty schools. Among the three districts where high-poverty schools had *lower* per-pupil spending than their low-poverty counterparts, the differential amounted to 22 percent less than the average spending level in low-poverty schools in one district; in the other two districts, this differential was 5 percent (Exhibit 25).

Exhibit 25. Estimates of the relationship between students from low-income families and school per-pupil spending from unrestricted funds, using the tercile and implicit weight approaches, in nine WSF districts, in the most recent year for which data were available

	Tercile Approach			Implicit Weight Approach		
	High-poverty schools	Low-poverty schools	Relative difference	Base spending	Additional spending	Implicit weight
District 1	$7,268	$6,156	18%	$5,487	$1,426	0.26**
District 2	$10,054	$8,404	20%	$5,116	−$1,290	−0.25
District 3	$10,163	$8,497	20%	$6,108	−$507	−0.08
District 4	$7,509	$7,896	−5%	$6,429	−$1,650	−0.26**
District 5	$4,744	$4,520	5%	$4,668	−$226	−0.05
District 6	$5,622	$7,201	−22%	$5,921	−$1,427	−0.24
District 7	$8,491	$8,980	−5%	$8,623	−$1,721	−0.20**
District 8	$7,099	$5,999	18%	$5,452	$2,208	0.40**
District 9	$8,593	$8,162	5%	$7,726	−$2,311	−0.30**

Exhibit reads: In District 1, average per-pupil spending in the high-poverty tercile of schools ($7,268) was 18 percent higher than in the low-poverty tercile of schools ($6,156). Using the implicit weight approach, base per-pupil spending was estimated as $5,487, and additional spending for poor students was estimated as $1,426 per pupil, resulting in an implicit poverty weight of 0.26.

Notes: Data are for 2016–17 for eight districts and 2015–16 for one district. Asterisks denote a statistically significant difference from zero (***p* < .05). Exhibit D-10 in Appendix D provides the regression results used to generate the implicit weights in each of the nine case study districts.
Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

It may seem surprising that not all WSF districts have higher per-pupil spending in their higher-poverty schools, given that WSF formulas allocate funds to schools at least in part based on indicators of student needs. However, equity outcomes may be influenced by a variety of factors, including the specific student categories receiving higher weights and the size of those weights, the share of total funding distributed through the formula, and the use of actual versus average salaries for budgeting the funds that are allocated through the formula.

For example, three of the nine case study districts did not have weights for students from low-income families, and the remaining six case study districts had weights that ranged from 0.02 to 0.15. A district that uses a larger weight for low-income students may be able to achieve a more progressive distribution of funds than a district that uses a smaller weight or no weight for low-income students.

A second factor is the extent to which some funds flow to schools outside the WSF formula. For example, if "side pots" of funding are distributed to schools in a regressive manner (such as to support special programming for higher-performing students), this could counteract the potential benefits of a progressive WSF formula.

A third factor is that if a district uses districtwide average salaries for budgeting and charging salary expenditures against a school's budget, rather than the amounts actually paid to those teachers, then schools with lower-paid teachers will have lower actual per-pupil expenditures than they appear to have "on paper." Multiple studies have found that high-poverty schools tend to have teachers with less experience and lower salaries than teachers in low-poverty schools. Consequently, even if the WSF formula itself is progressive, the use of average salaries could result in lower per-pupil expenditures in higher-poverty schools than in lower-poverty schools.

Two of the nine WSF districts had a positive implicit poverty weight for unrestricted spending that was statistically significant, indicating that higher-poverty schools in that district had higher levels of per-pupil spending, on average, than schools with lower poverty rates, after controlling for other factors that may affect per-pupil spending.

Looking at the second half of Exhibit 25, the implicit weight approach indicates that in Districts 1 and 8, an elementary school with average enrollment, a poverty rate of 100 percent, and no other student needs spent 26 percent and 40 percent more per pupil, respectively, compared with an otherwise similar school with no poor students. An alternative, and perhaps more intuitive, interpretation is as a student weight: An elementary student from a low-income family in District 1, with no additional needs and attending a school with average enrollment, was associated with, on average, 26 percent more spending than an otherwise similar student who is not from a low-income family.

In contrast, three of the districts had a significant negative implicit poverty weight for unrestricted spending, and four had implicit poverty weights that were not statistically different from zero. This outcome indicates that most of the WSF case study districts spent similar amounts or less per pupil on high-poverty schools than did lower-poverty schools with otherwise similar characteristics.

At first glance, the results of the tercile analysis and the implicit weight analysis examining the relationship between the percentage of student poverty and levels of per-pupil spending may appear to be contradictory. However, an important difference between these two methods is that the implicit weight analysis simultaneously controls for other factors thought to drive spending whereas the tercile analysis does not. District 2 showed the largest difference in results between the tercile and implicit weight analysis. As shown in Exhibit 26, the school characteristic associated with the largest increase in per-pupil spending in District 2 was the percentage of students with disabilities, and this percentage was almost twice as high in high-poverty schools as in low-poverty schools (26 percent vs. 14 percent). After controlling for this and other school characteristics, the per-pupil spending differential associated with the implicit poverty weight was negative (−$1,241 in high-poverty schools). This result indicates that the higher spending in high-poverty schools found in the tercile analysis may be driven by differences in other student needs that are associated with poverty (in particular, disability status), rather than poverty itself.

Exhibit 26. Example of using implicit weights to estimate the additional per-pupil spending associated with various school characteristics in high- and low-poverty schools in District 2, 2016–17

		Observed average values		Estimated base spending level and additional spending based on implicit weight	
School characteristic	**Implicit weight**	**High-poverty schools**	**Low-poverty schools**	**High-poverty schools**	**Low-poverty schools**
Base per-pupil amount				$5,116	$5,116
Percentage of students with disabilities	2.89	26%	14%	$3,844	$2,070
Percentage in grades 6–8	0.94	22%	19%	$1,058	$914
Percentage in grades 9–12	0.44	21%	33%	$473	$743
Enrollment (relative to mean)	−0.61	−14%	−9%	$437	$281
Percentage of English learners	0.45	12%	7%	$276	$161
Percentage eligible for FRPL	−0.25	97%	69%	−$1,241	−$883
Estimated overall per-pupil spending (base + estimated additional spending)				$9,963	$8,402

Exhibit reads: In District 2, the school characteristic associated with the largest increase in per-pupil spending was the percentage of students with disabilities (SWDs), with an implicit weight of 2.89, and high-poverty schools have a higher concentration of SWDs than low-poverty schools (26 percent vs. 14 percent). The additional per-pupil spending that was associated with SWDs was $3,844 in high-poverty schools and $2,070 in low-poverty schools.

Notes: The additional spending amounts associated with each school characteristic was calculated by multiplying the implicit weight by the base spending level and the observed average values for high- and low-poverty schools. For example, for high-poverty schools, the additional spending amounts associated with SWDs is calculated as 2.89 × $5,116 × 26% = $3,844.

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

Looking at total school-level expenditures, rather than just spending from unrestricted funds, provides a more positive view of school spending patterns in relation to poverty.

Restricted funds are those that are targeted to specific student groups or programs, such as Title I of the *ESEA* and other federal programs, state or local compensatory education programs, and programs serving English learners and students with disabilities. Typically these restricted funds are not allocated to schools through WSF formulas, which is why our primary analyses focus on unrestricted funding. However, when districts design their WSF formulas, they may take into consideration certain restricted funding streams as they choose specific categories and weighting levels. For example, a district might decide not to use weights for ELs in allocating unrestricted funds to schools because state categorical programs are providing funds to meet the additional needs of those students.[32]

Exhibit 27 compares the tercile and implicit weight outcomes when using spending from only restricted funds and when using spending from both unrestricted and restricted funds. For the tercile analysis, the number of districts showing that high-poverty schools received more than low-poverty schools rose from five to seven districts. For the implicit weight analysis, the three districts showing that high-poverty schools received less than low-poverty schools, after controlling for other factors, all changed to

[32] However, a district may not use federal Title III funds to provide English learners with the core instructional program that it is required to provide to meet its civil rights obligations. Those funds may only be used to supplement and not supplant state, local, and other federal funds.

showing no statistically significant differences related to poverty rate. Overall, seven of the eight districts showed no significant difference when examining both unrestricted and restricted funds, and one showed a significant positive implicit poverty weight of 0.50, indicating that an elementary school with average enrollment, a poverty rate of 100 percent, and no other student needs spent 50 percent more per pupil, compared with an otherwise similar school with no poor students.[33]

Exhibit 27. Estimates of the relationship between students from low-income families and school per-pupil spending from unrestricted funds and total funds (unrestricted plus restricted)

	Tercile differences		Implicit weights	
	Unrestricted funds	**Unrestricted + Restricted**	**Unrestricted funds**	**Unrestricted + Restricted**
District 1	18%	NA	0.26**	N/A
District 2	20%	33%	−0.25	−0.18
District 3	20%	22%	−0.08	0.05
District 4	−5%	1%	−0.26**	−0.18
District 5	5%	16%	−0.05	0.11
District 6	−22%	−19%	−0.24	−0.12
District 7	−5%	3%	−0.20**	−0.03
District 8	18%	24%	0.40**	0.50**
District 9	5%	18%	−0.30**	0.03

Exhibit reads: In District 2, the high-poverty tercile of schools spent 20 percent more than the lowest poverty tercile when considering just unrestricted funds, but 33 percent more when restricted funds are also included.

Notes: District 1 is not included in the analyses of total funds because it did not provide data on school-level spending from restricted revenue sources. Data are for 2016–17 for eight districts and 2015–16 for one district. Asterisks denote a statistically significant difference from zero (**$p < .05$).

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

[33] Exhibit D-13 in Appendix D shows similar comparisons of equity outcomes (based on unrestricted funds alone versus both unrestricted and restricted funds) in relation to EL students and SWDs.

Equity Trends With Respect to Student Poverty

Examining equity trends in WSF districts is challenging due to the difficulty in obtaining detailed school-level expenditure data both before and after the implementation of WSF. Although the nine case study districts were asked to provide expenditure data for years prior to WSF implementation, sometimes the data systems were limited in their ability to provide this information, especially if the data systems and/or WSF systems were old. Even among the five districts that were able to provide more extensive longitudinal data, one was able to provide data for only two years prior to WSF implementation, and one provided only two years of post-implementation data. **Because of the lack of more extensive pre-implementation and post-implementation data, the trend analyses in this report should be interpreted with caution. More specifically, they are presented as descriptive analyses and should not be interpreted as the causal effect of WSF systems on equity.**

In four of the five districts with sufficient data to examine trends before and after WSF implementation, the high-poverty tercile of schools showed gains in per-pupil spending from unrestricted funds, relative to low-poverty schools, after adopting WSF.

Three of the four districts showed a progressive relationship between poverty and per-pupil spending that became more progressive after the adoption of WSF (Districts 1, 2, and 3). District 5 showed a regressive relationship prior to WSF that became progressive after WSF; this district — for which we have 14 years of post-implementation data — lost some ground after about seven years of implementation, but the most recent years appear to show a trend toward increasing progressivity based on the tercile measure. In contrast, District 4 became more regressive after WSF, continuing a trend that appeared in the years prior to WSF adoption (Exhibit 28).

Trends in implicit poverty weights appear to show some improvement in three of the five districts after WSF implementation.

District 3 showed the clearest pattern of improvement. Before WSF implementation, District 3's implicit poverty weight was regressive, ranging between −0.30 and −0.54 during the four years prior to WSF. In the first year of WSF implementation, the implicit weight for poverty showed an immediate improvement, falling from −0.46 to −0.24, and it continued to improve over the next several years, reaching −0.03 in the fourth year of implementation.

District 1 is the only one of the five districts that showed positive implicit poverty weights prior to WSF, and this relationship became more progressive in the first two years under WSF. Because this district began its WSF system very recently, data are not yet available to examine longer-term outcomes.

In District 5, the implicit poverty weights show a fluctuating pattern similar to that for its tercile differences — initially they became less regressive (particularly in the first four years of implementation), but then worsened, reaching levels similar to their pre-WSF implicit weights. In the most recent year, the implicit weight improved again, but it remains to be seen whether this is the beginning of a trend toward more equity or simply another data fluctuation.

For Districts 2 and 4, the implicit poverty weights showed regressive funding patterns before and after WSF implementation, with no discernible progress on this measure after the adoption of WSF.

Exhibit 28. Trends in tercile differences and implicit weights for school per-pupil spending from unrestricted funds relative to students from low-income families, in five WSF districts

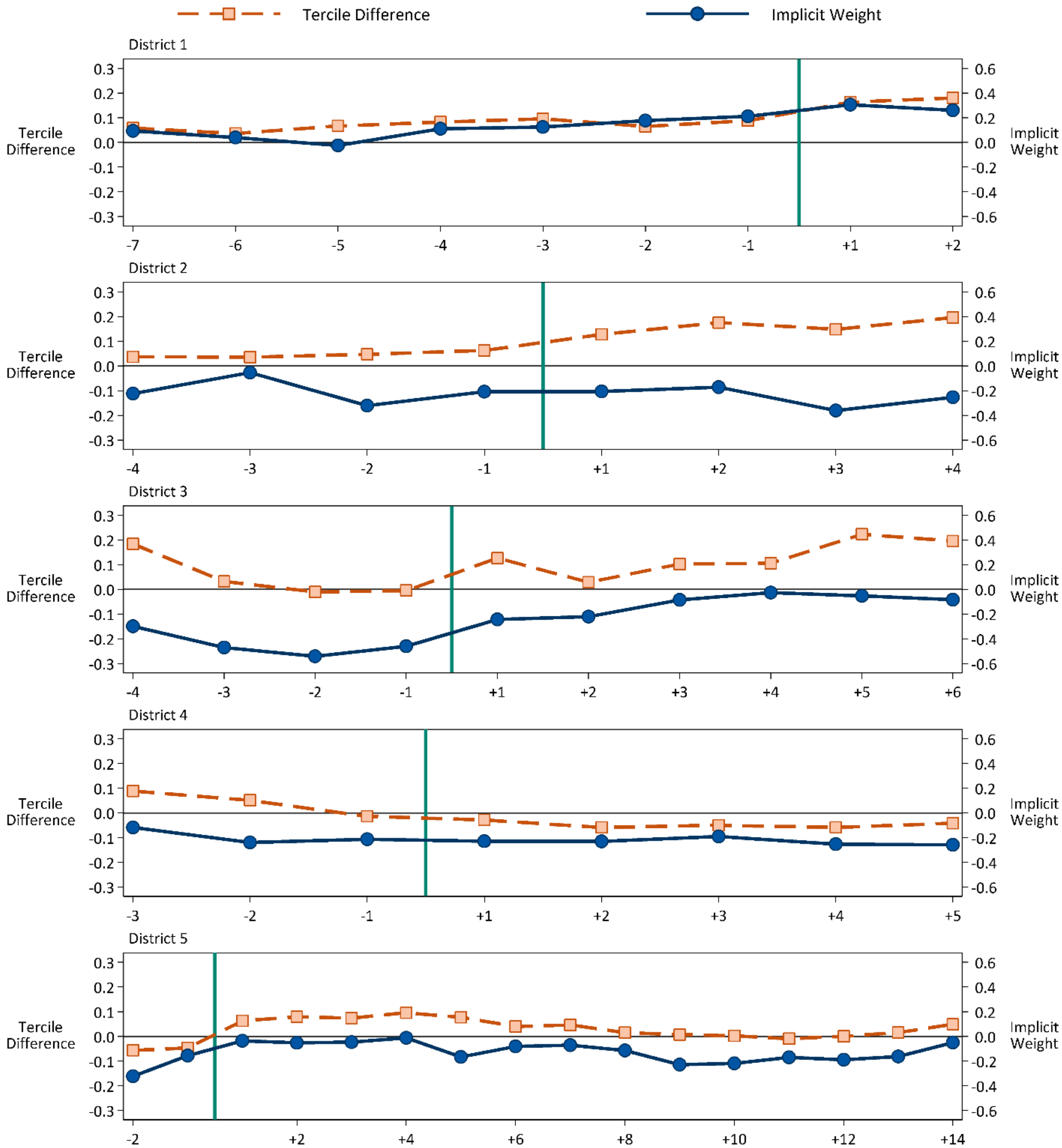


Exhibit reads: In District 1, schools in the high-poverty tercile had higher per-pupil spending from unrestricted funds than low-poverty schools, indicating a progressive funding pattern, and the degree of progressivity increased after the adoption of WSF. In the same district, the implicit weights for student poverty also indicate a progressive pattern, after controlling for other school characteristics, that increased after WSF implementation.

Note: The vertical green line in each panel represents the first year of WSF implementation. Tercile differences and implicit weights for each year are provided in Exhibits D-14 and D-15 in Appendix D.

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

Equity With Respect to English Learners

In four of the nine WSF case study districts, schools with higher concentrations of English learners spent more on average than low-EL schools.

District 8 had the highest tercile difference for this measure, with high-EL schools spending 14 percent more than low-EL schools. In the other three districts with higher spending in high-EL schools, the relative differences ranged from 2 percent to 8 percent. In contrast, five districts had lower average spending levels in high-EL schools than in low-EL schools. Among these districts, the range of relative differences was from −5 percent to −18 percent (Exhibit 29).

Exhibit 29. Estimates of the relationship between English learners and school per-pupil spending from unrestricted funds, using the tercile and implicit weight approaches, in nine WSF districts, in the most recent year for which data were available

	Tercile approach			Implicit weight approach		
	High-EL schools	Low-EL schools	Relative difference	Base spending	Additional spending	Implicit weight
District 1	$6,151	$7,009	−12%	$5,487	−$502	−0.09
District 2	$9,151	$8,842	4%	$5,116	$2,284	0.45**
District 3	$9,459	$8,731	8%	$6,108	$901	0.15
District 4	$7,906	$8,503	−7%	$6,429	$2,015	0.31**
District 5	$4,688	$4,575	2%	$4,668	$267	0.06
District 6	$5,576	$6,838	−18%	$5,921	−$1,233	−0.21
District 7	$8,649	$9,134	−5%	$8,623	−$264	−0.03
District 8	$7,017	$6,149	14%	$5,452	−$1,219	−0.22
District 9	$8,063	$8,681	−7%	$7,726	$717	0.09

Exhibit reads: In District 1, average per-pupil spending in high-EL schools ($6,151) was 12 percent lower than in low-EL schools ($7,009). Using the implicit weight approach, base per-pupil spending was estimated as $5,487 and the per-pupil spending differential associated with EL students was estimated as −$502 per pupil, resulting in an implicit EL weight of −0.09.

Notes: EL = English learners. Data are for 2016–17 for eight districts and 2015–16 for one district. Asterisks denote a statistically significant difference from zero (**p < .05). Exhibit D-10 in Appendix D provides the regression results used to generate the implicit weights in each district.

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

Two of the nine WSF districts had a positive implicit weight for EL students for unrestricted funds that was statistically significant, indicating that higher-EL schools in those districts had higher levels of spending on average than otherwise similar schools with lower percentages of EL students.

In Districts 2 and 4, the implicit weights for ELs were 0.45 and 0.31, indicating an EL student in these districts was associated with 45 percent and 31 percent more funding, respectively, than an otherwise similar student. In the other seven districts, the implicit EL weights were not statistically significant (Exhibit 29).

Among the five districts with sufficient trend data, two showed relative gains after WSF implementation for the high-EL tercile of schools, and three showed increases in implicit EL weights.

For Districts 3 and 5, the tercile measure showed the relative level of per-pupil spending in high-EL schools increased after WSF adoption; however, District 5 later began to lose ground, and after 14 years of implementation, the relative spending level in the high-EL schools was about the same as prior to WSF adoption. In contrast, District 4 became more regressive after WSF, continuing a trend that appeared in the years prior to WSF adoption. The remaining two districts showed fluctuations with no clear pattern (Exhibit 30).

In the implicit weight analysis, Districts 1 and 2 showed increases in the implicit EL weight after implementing WSF. District 5 also showed increases in about half of the 14 post-WSF years available for this district, but its implicit weight in the most recent year was similar to those in the two years before WSF implementation. In the other two districts, the implicit EL weight in the post-WSF time period was either lower (District 3) or stayed relatively constant (District 4).

Exhibit 30. Trends in tercile differences and implicit weights for school per-pupil spending from unrestricted funds relative to English learners, in five WSF districts

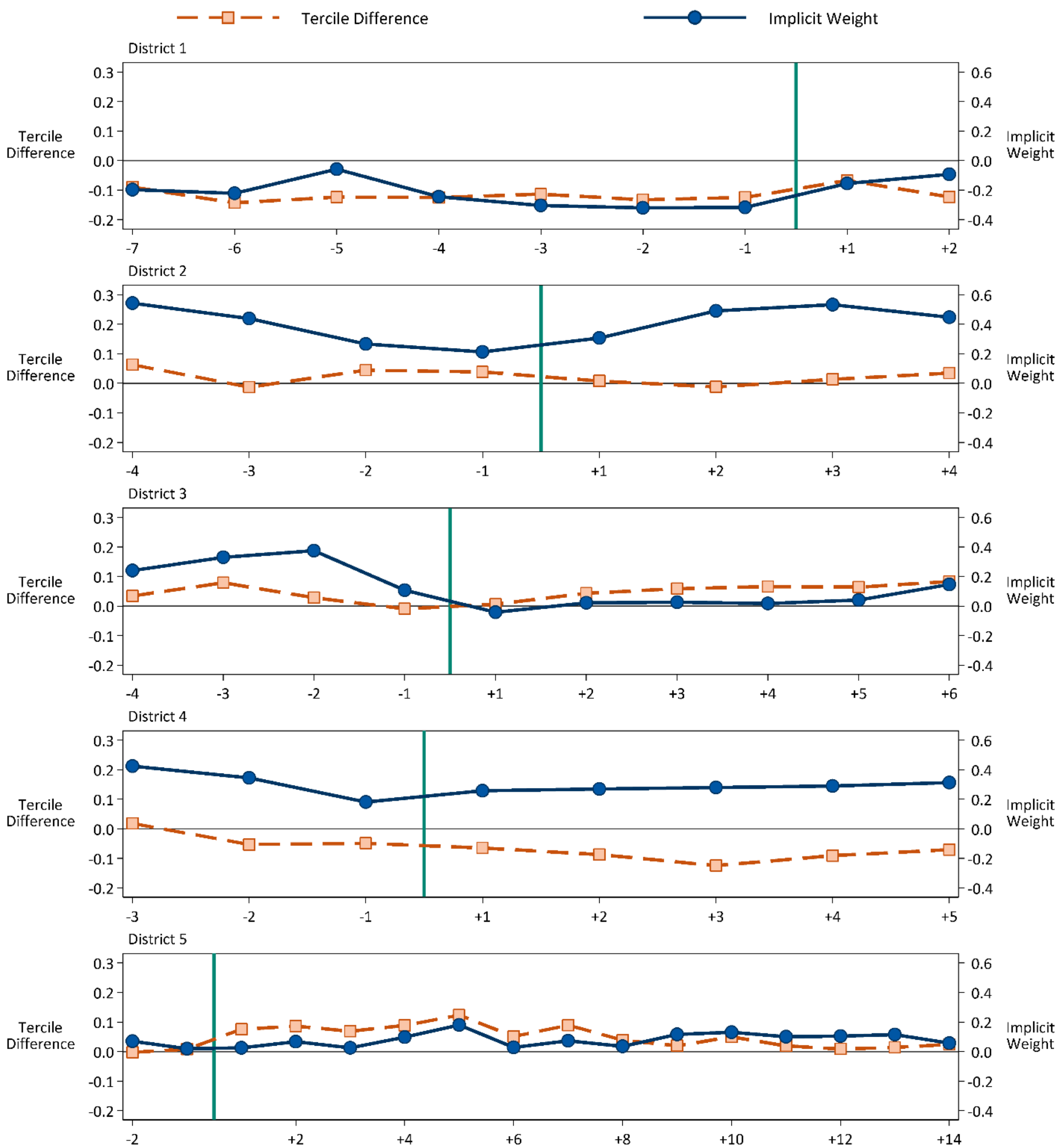


Exhibit reads: In District 1, schools in the high-EL tercile had lower per-pupil spending from unrestricted funds than low-EL schools, and their relative funding level did not increase after the adoption of WSF. In the same district, the implicit weights for EL students, after controlling for other school characteristics, increased after WSF adoption.

Notes: EL = English learners. The vertical green line in each panel represents the first year of WSF implementation. Tercile differences and implicit weights for each year are provided in Exhibits D-16 and D-17 in Appendix D.

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

Equity With Respect to Students With Disabilities

In eight of the nine WSF case study districts, both the tercile approach and implicit weights indicated that schools with higher concentrations of students with disabilities had higher spending levels than other schools.

Additionally, the relative tercile differences and the estimated implicit weights were much higher than the implicit weights for poverty or EL. Whereas the largest implicit weights for poverty and EL were 0.40 and 0.45, respectively, those for students with disabilities were greater than 1.20 in six districts and greater than 2.60 in three districts. District 5, however, shows quite different results, with negative figures for both the tercile and implicit weight analyses, indicating that in this district, schools with higher concentrations of students with disabilities tended to have lower per-pupil spending levels than other schools (Exhibit 31).

Exhibit 31. Estimates of the relationship between students with disabilities and school per-pupil spending from unrestricted funds using the tercile and implicit weight approaches, in nine WSF districts, in the most recent year for which data were available

	Tercile Approach			Implicit Weight Approach		
	High-SWD schools	Low-SWD schools	Relative difference	Base spending	Additional spending	Implicit weight
District 1	$7,155	$6,076	18%	$5,487	$1,781	0.33*
District 2	$10,677	$8,208	30%	$5,116	$14,791	2.91**
District 3	$11,175	$7,909	41%	$6,108	$17,099	2.80**
District 4	$9,401	$7,680	22%	$6,429	$17,278	2.69**
District 5	$4,583	$4,698	−2%	$4,668	−$3,326	−0.71**
District 6	$6,887	$5,726	20%	$5,921	$7,316	1.24*
District 7	$9,986	$8,490	18%	$8,623	$11,835	1.37**
District 8	$7,103	$6,029	18%	$5,452	$5,180	0.95
District 9	$9,463	$7,701	23%	$7,726	$12,236	1.59**

Exhibit reads: In District 1, average per-pupil spending in high-SWD schools ($7,155) was 18 percent higher than in low-SWD schools ($6,076). Using the implicit weight approach, the additional spending associated with students with disabilities was estimated as $1,781 per pupil, resulting in an implicit SWD weight of 0.33.

Notes: SWD = students with disabilities. Data are for 2016–17 for eight districts and 2015–16 for one district. Asterisks denote a statistically significant difference from zero (**$p < .05$, *$p < .10$). Exhibit D-10 in Appendix D provides the regression results used to generate the implicit weights in each district.

Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

While improvements in the distribution of spending with respect to poverty (and perhaps ELs) might be expected when implementing a WSF system, it seems less obvious that WSF systems would be expected to target more resources from unrestricted funding sources to their SWDs than they had prior to adopting WSF. Under *IDEA*, individualized education programs determine the specific services that must be delivered to eligible SWDs, and requirements for the level of resources to support these students must be met regardless of whether a WSF system is in place;[34] this type of requirement does not exist for ELs or students from low-income families. Readers may want to take this context into account when examining the trend data.

Four of the five case study districts with pre- and post-WSF data on special education largely maintained their distribution of resources with respect to students with disabilities in the post-WSF time period.

Only District 2 appears to have consistently targeted more school-level spending for special education students in the post-WSF time period than it had prior to the adoption of WSF. District 3 showed increases in Years 5 and 6 after WSF adoption, though not in earlier years. District 4 showed some declines in funding for SWDs after WSF, but its implicit weights were relatively high both before and after WSF adoption. Districts 1 and 5 showed fluctuating patterns with no clear trends after WSF implementation (Exhibit 32).

[34] District 3, for example, largely determined the special education weights in its WSF formula by calculating what weights would be needed to maintain the necessary ratios of staff to special education students.

Exhibit 32. Trends in tercile differences and implicit weights for school per-pupil spending from unrestricted funds relative to students with disabilities, in five WSF districts

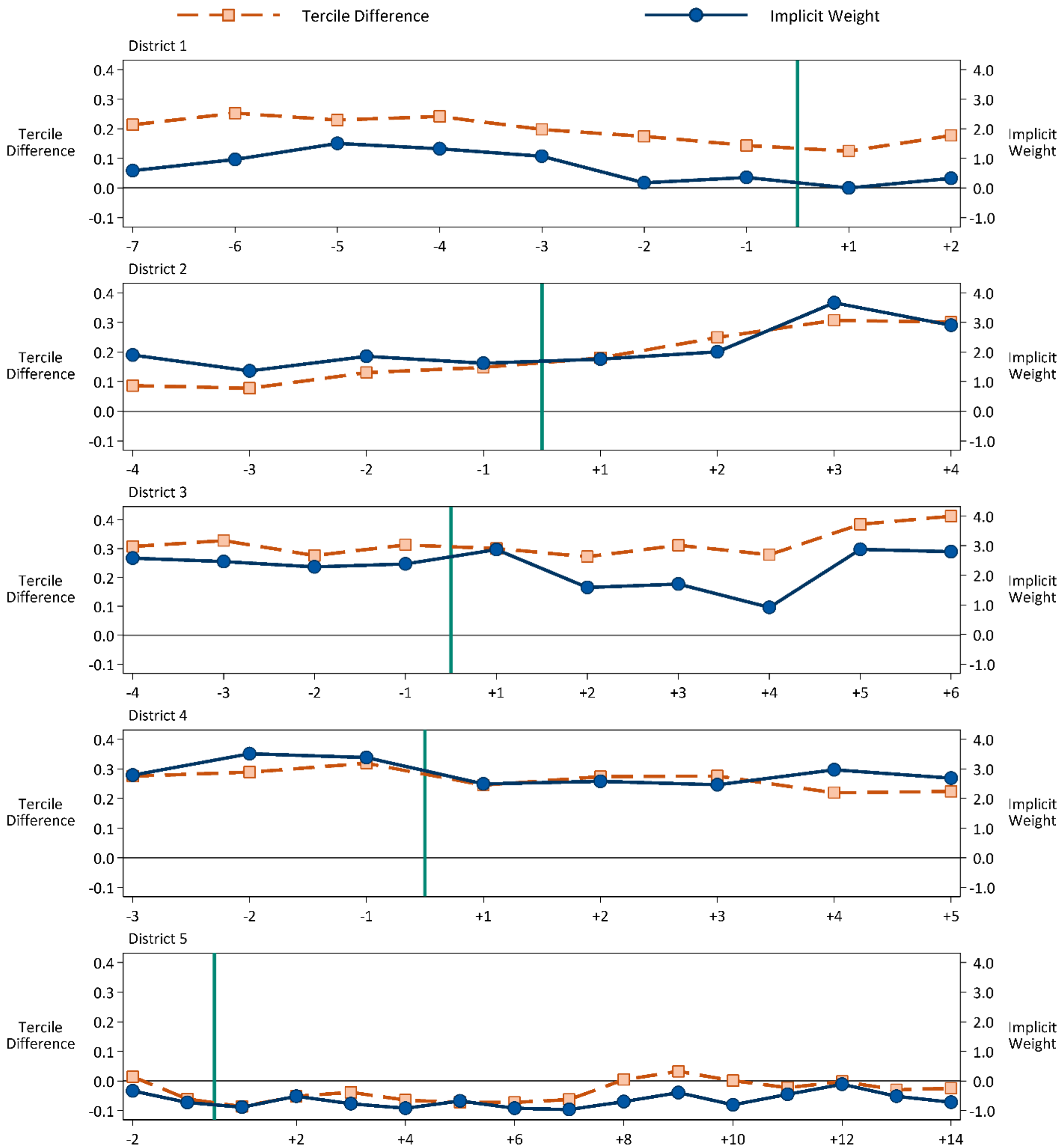


Exhibit reads: In District 1, schools in the high-SWD tercile had higher per-pupil spending from unrestricted funds than low-SWD schools, and this relationship did not change substantially after the adoption of WSF. In the same district, the implicit weights for SWDs were positive, after controlling for other school characteristics, and did not increase after WSF implementation.

Notes: SWD = students with disabilities. The vertical green line in each panel represents the first year of WSF implementation. Tercile differences and implicit weights for each year are provided in Exhibits D-18 and D-19 in Appendix D.
Source: Calculations based on district-provided data on school-level expenditures, student enrollment, and other demographic characteristics.

Chapter Summary

Examining equity funding outcomes in WSF districts is challenging, due to the difficulty in obtaining detailed school-level expenditure data before and after the implementation of WSF. Because of the limited amount of pre- and post-WSF implementation data, the trend analyses in this report are presented as descriptive, not causal, analyses.

The findings from this study regarding equity are mixed. While some WSF districts had progressive equity outcomes and appeared to make equity gains after WSF implementation, others did not. In six of the nine WSF case study districts, higher-poverty schools had higher per-pupil spending levels than lower-poverty schools in the most recent year of data. However, after controlling for other school characteristics, only two had a statistically significant positive relationship between poverty and spending, while three had a statistically significant negative relationship. Among the five districts with sufficient data to examine school spending patterns before and after WSF implementation, three appeared to show some gains in relative funding levels for high-poverty schools after WSF implementation, after controlling for other school characteristics.

For EL students, two of the nine districts tended to have higher per-pupil spending in schools with higher concentrations of EL students than in those with lower EL rates, after controlling for other factors. Two of the five districts with sufficient trend data showed a more positive relationship between school percentage of EL students and per-pupil spending after WSF was implemented. For students with disabilities, all but one of the case study districts had substantially higher spending levels in schools with higher concentrations of students with disabilities than other schools before adopting WSF; these patterns were generally sustained after WSF was implemented.

The question that remains is why we did not observe stronger positive equity outcomes for WSF districts. One contributing factor may be the types of weights used and the relative sizes of those weights. Three of the nine case study districts did not have weights for students from low-income families, and the remaining six districts had weights that ranged from 0.05 to a high of 0.275. A second factor is the extent to which some unrestricted funds flow to schools outside the WSF formula. For example, if "side pots" of funding are distributed to schools in a regressive manner (such as to support special programming for higher-performing students), this could counteract the potential benefits of a progressive WSF formula.

A third factor is the use of districtwide average salaries rather than actual salaries for budgeting the funds that WSF formulas allocate to schools. If WSF systems use actual salaries, then a high-poverty school with below-average salaries would have additional funds left over after paying for a standard allotment of teachers, which it could use for supplemental resources such as additional teachers or instructional materials and equipment. However, if they use average salaries, then schools with lower-paid teachers may end up with lower per-pupil expenditures even if the WSF formula itself is progressive. Although all WSF case study districts reported using average teacher salaries, two districts allowed schools to opt in to using actual teacher salaries — and the schools that did so were generally higher-poverty schools.

In short, WSF is a tool that may be used to direct higher levels of funding to schools with greater needs, but its effectiveness in improving the equitable distribution of funds will be influenced by the details of the formula, the share of funds distributed through the formula, and the use of actual versus average salaries for budgeting the funds that are allocated to schools through the WSF formula.

5. Conclusions

A growing number of policymakers and educators have shown interest in the WSF approach as a means for promoting principal and school autonomy over budget decisions and increasing funding equity among schools. As of the 2018–19 school year there were 27 school districts nationwide, predominantly large urban districts, that were implementing WSF. In addition, the 2015 authorization for a SCF pilot program was intended to encourage more districts to implement WSF systems, although so far few have expressed interest and none are currently approved. This study is not directly examining the SCF pilot program, but its findings may help to illuminate some of the options and challenges facing districts and policymakers as they seek to implement the program, as well as more broadly informing those who are considering adopting a WSF system or refining their existing system.

The surveys of principals and district administrators indicate a number of differences between WSF districts and those with traditional resource allocation systems. Respondents in WSF districts were more likely than their non-WSF counterparts to indicate that principal autonomy and transparency were key priorities. WSF districts reported allocating, on average, over half of their total operational spending to schools to be used under principals' discretion — more than six times the amount reported by non-WSF districts. However, the share of funds reported as under school discretion varied and was as low as 27 percent in one case study district.

Principals themselves reported more autonomy in WSF districts than in non-WSF districts in a number of areas, including hiring instructional coaches, selecting curricular materials and instructional software, and making decisions about extended time programs and professional development. In the case study interviews, however, principals often said their autonomy was constrained by requirements to fill specific staff positions, collective bargaining agreements, and the amount of resources under their control. District and principal interviewees also discussed challenges related to principals' budgeting skills and additional workload for principals that may extend beyond their training.

The specifics of the WSF formulas varied considerably across the nine districts examined in the case studies. Although the districts often used weights to direct additional funding to schools with higher concentrations of students from low-income families, English learners, and students with disabilities, they varied considerably in the magnitudes of the weights they chose — with weights for low-income students, for example, ranging from a low of 0.05 to a high of 0.275. In addition, the districts developed other funding adjustments to reflect their priorities, such as performance-based funding adjustments to provide additional resources for low-performing or at-risk students, and supplemental allocations for specialized programing, such as career and technical education, International Baccalaureate programs, and performing arts schools. Although all WSF case study districts reported that their schools use average teacher salaries in developing their budgets, some also used actual salaries, either for some of their schools or by incorporating them into their weighting scheme — which may suggest strategies that districts applying for the federal SCF pilot could propose to meet this requirement.

In case study interviews, district leaders in seven of nine WSF districts indicated that improving equity of resource distribution was a driving motivation for implementing the WSF system. However, the findings from this study on whether they achieved that goal is mixed. Analyses of expenditure data in the nine case study districts found that while some WSF districts showed progressive equity patterns and appeared to make equity gains after WSF implementation, others did not. This is perhaps unsurprising given the variation in the size and structure of the weights that these districts used, and the fact that most used average rather than actual salaries for budgeting school personnel expenditures. Although WSF is a tool that may be used to direct higher levels of funding to schools with greater needs, its effectiveness in improving the equitable distribution of funds is influenced by the types and sizes of weights used, the share of total funding distributed through the formula, and whether schools use of actual or average salaries for budgeting the funds that are allocated to them.

The WSF districts in this study have grappled with a variety of challenges in their efforts to use this approach to increase equity and school autonomy. Their ability to direct more funds to schools with greater needs — as well as principals' ability to use flexibility to produce meaningful changes in school programming and quality — may depend in part on the broader fiscal environment, such as whether the overall district budget is expanding or contracting. Other challenges may include navigating district policies and practices that potentially conflict with the goal of school autonomy and the need to provide additional training and support for principals to help them use their autonomy effectively. Some districts have just begun to implement their WSF approach or are in the process of deciding whether to embark on this path, while others have seen their systems evolve over many years and changes in leadership — yet all may benefit from learning from the examples and experiences of other districts that have pursued this approach to improving equity and governance in education.

References

Baker, Bruce. 2016. *Does Money Matter in Education? Second Edition.* Washington, DC: Albert Shanker Institute. Accessed May 28, 2019. http://www.shankerinstitute.org/sites/shanker/files/moneymatters_edition2.pdf

Baker, Bruce, and Scott Thomas. 2006. *Review of Hawaii's Weighted Student Formula.* Honolulu: Hawaii Board of Education.

Boston Public Schools. 2018. "FAQ: Opportunity Index." Accessed December 8, 2018. https://www.bostonpublicschools.org/Page/6745

Chambers, Jay, Irene Lam, Kanya Mahitivanichcha, Phil Esra, Larisa Shambaugh, and Stephanie Stullich. 2009. *State and Local Implementation of the No Child Left Behind Act, Volume VI–Targeting and Uses of Federal Education Funds*. Washington, DC: U.S. Department of Education. Accessed August 16, 2019. https://www2.ed.gov/rschstat/eval/disadv/nclb-targeting/nclb-targeting.pdf

Chambers, Jay, Larisa Shambaugh, Jesse Levin, Mari Muraki, and Lindsay Poland. 2008. *A Tale of Two Districts: A Comparative Study of Student-Based Funding and Decentralized Decision Making in San Francisco and Oakland Unified School Districts.* Palo Alto, CA: American Institutes for Research. Accessed July 24, 2019. https://www.air.org/sites/default/files/A_Tale_of_Two_Districts_Final.pdf

Chingos, Matthew. 2016. "No More Free Lunch for Education Policymakers and Researchers." Accessed December 7, 2018. https://www.brookings.edu/research/no-more-free-lunch-for-education-policymakers-and-researchers/

Cochran, William. 1968. "The Effectiveness of Adjustment by Subclassification in Removing Bias in Observational Studies." *Biometrics* 24: 295–313.

Duncombe, William, and John Yinger. 2005. "How Much More Does a Disadvantaged Student Cost?" *Economics of Education Review* 24, no. 5: 513–32.

Duncombe, William, and John Yinger. 2008. "Measurement of Cost Differentials." In *Handbook of Research in Education Finance and Policy*, edited by Helen Ladd and Edward Fiske, 238–56. New York: Routledge.

Duncombe, William, and John Yinger. 2011. "Are Education Cost Functions Ready for Prime Time? An Examination of Their Validity and Reliability." *Peabody Journal of Education* 86, no. 1: 28–57.

Education Resource Strategies. 2018. *Transforming School Funding for Equity, Transparency, and Flexibility: An Introduction to Student-Based Budgeting.* Accessed February 1, 2019. https://www.erstrategies.org/cms/files/4007-transforming-school-funding-for-equity-transparency-and-flexibility-a-nuts-and-bolts-guide-to-implementing-student-based-budgeting.pdf

Food Research and Action Center. 2018. *Direct Certification Improves Low-Income Student Access to School Meals: An Updated Guide to Direct Certification*. Washington, DC: Author. Accessed September 23, 2019. http://frac.org/wp-content/uploads/direct-cert-improves-low-income-school-meal-access.pdf

Goldhaber, Dan, Lesley Lavery, and Roddy Theobald. 2015. "Uneven Playing Field? Assessing the Teacher Quality Gap Between Advantaged and Disadvantaged Students." *Educational Researcher* 44, no. 5: 293–307.

Gronberg, Tim, Dennis Jansen, Lori Taylor, and Kevin Booker. 2004. *School Outcomes and School Costs: The Cost Function Approach*. College Station: Texas A&M University. Accessed September 26, 2019. https://www.researchgate.net/publication/266866526_School_Outcomes_and_School_Costs_The_Cost_Function_Approach

Gronberg, Tim, Dennis Jansen, and Lori Taylor. 2011. "The Adequacy of Educational Cost Functions: Lessons From Texas." *Peabody Journal of Education* 86, no. 1: 3–27.

Hoffman, Lee. 2012. *Free and Reduced-Price Lunch Eligibility Data in EDFacts: A White Paper on Current Status and Potential Changes.* Washington, DC: U.S. Department of Education. Accessed December 8, 2018. https://files.eric.ed.gov/fulltext/ED556048.pdf

Honig, Meredith, and Lydia Rainey. 2013. "Autonomy and School Improvement: What Do We Know and Where Do We Go From Here?" *Educational Policy* 26, no. 3: 465–95.

Imazeki, Jennifer. 2008. "Assessing the Costs of Adequacy in California Public Schools: A Cost Function Approach." *Educational Finance and Policy* 3, no. 1: 90–108.

Indianapolis Public Schools. 2018. "2018–19 SBA FAQs." Indianapolis: Indianapolis Public Schools.

Koteskey, Tyler, and Lisa Snell. 2016. *Trends in the National Student-Based Budgeting Landscape: Exploring Best Practices and Results*. Los Angeles: Reason Foundation. Accessed September 26, 2019. https://allovue.com/files/fefs2016/session-d/trends-sbb/trends-sbb-fefsummit.pdf

Levin, Jesse, Jay Chambers, Diana Epstein, Nick Mills, Mahala Archer, Antonio Wang, and Kevin Lane. 2013. *Evaluation of Hawaii's Weighted Student Formula*. San Mateo: American Institutes for Research.

Malen, Betty, Justin Dayhoff, Laura Egan, and Robert Croninger. 2015. "The Challenges of Advancing Fiscal Equity in a Resource-Strained Context." *Education Policy* 31, no. 5: 615–42. Accessed May 2, 2019. https://journals.sagepub.com/doi/pdf/10.1177/0895904815613445

Miller, Kristy. 2018. *FY 2019 Student-Based Budgeting Funding Model and Reference.* Upper Marlboro, MD: Prince George's County Public Schools.

Mizrav, Etai. 2014. *Could Principal Autonomy Produce Better Schools? Evidence From the Schools and Staffing Survey*. Accessed May 1, 2019. https://repository.library.georgetown.edu/handle/10822/709855

Roza, Marguerite, Tricia Davis, and Kacey Guin. 2007. *Spending Choices and School Autonomy: Lessons From Ohio Elementary Schools* (Working Paper 21). Seattle: University of Washington Center on Reinventing Public Education, School Finance Redesign Project. Accessed May 1, 2019. http://www.crpe.org/sites/default/files/wp_sfrp21_rozaohio_jul07_0.pdf

Roza, Marguerite, and Paul Hill. 2004. *How Within-District Spending Inequities Help Some Schools to Fail*. Brookings Papers on Education Policy 2004, 201–218. Brookings Institution Press. Accessed May 2, 2019. https://www.crpe.org/sites/default/files/roza_hill.withindistrictinequities.pdf

Rubenstein, Ross, Amy Ellen Schwartz, and Leanna Stiefel. 2006. *Rethinking the Intradistrict Distribution of School Inputs to Disadvantaged Students*. Paper prepared for the conference "Rethinking Rodriguez," Boalt Hall School of Law, Berkeley, CA. Accessed May 28, 2019. https://www.law.berkeley.edu/files/rubenstein-schwartz-stiefel_paper.pdf

Seattle Public Schools. 2008. *2020 Facilities Master Plan*. Seattle: Seattle Public Schools. Accessed December 14, 2018. https://www.seattleschools.org/UserFiles/Servers/Server_543/File/District/Departments/Capital%20Projects%20and%20Planning/facilities_master_plan/2020fmp_chapter1-5.pdf

Seattle Public Schools. 2019. *Adopted Budget: 2018–19 School Year*. Seattle: Seattle Public Schools. Accessed April 12, 2019. https://www.seattleschools.org/UserFiles/Servers/Server_543/File/District/Departments/Budget/2019%20Budget%20Development/adoptedbudget19.pdf

Shambaugh, Larisa, Jay Chambers, and Danielle DeLancey. 2008. *Implementation of the Weighted Student Formula Policy in San Francisco: A Descriptive Study of an Equity-Driven, Student-Based Planning and Budgeting Policy* (REL 2008-061). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. Accessed May 1, 2019. https://ies.ed.gov/ncee/edlabs/regions/west/pdf/REL_2008061_sum.pdf

Snell, Lisa, and Katie Furtick. 2013. Weighted Student Formula Yearbook 2013. Los Angeles, CA: Reason Foundation. Accessed May 28, 2019. https://reason.org/policy-study/weighted-student-formula-yearbook/

Steinberg, Matthew. 2014. "Does Greater Autonomy Improve School Performance? Evidence From a Regression Discontinuity Analysis in Chicago." *Education Finance and Policy* 9, no. 1: 1–35. Accessed May 1, 2019. http://www.mitpressjournals.org/doi/pdf/10.1162/EDFP_a_00118

Stullich, Stephanie, Elizabeth Eisner, and Joseph McCrary, Policy and Program Studies Service, Office of Planning, Evaluation and Policy Development. 2007. *National Assessment of Title I, Final Report: Volume I: Implementation*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Accessed July 24, 2019. https://ies.ed.gov/ncee/pdf/20084012_rev.pdf

Taylor, Lori, Jason Willis, Alex Berg-Jacobson, Karina Jaquet, and Ruthie Capras. 2018. *Estimating the Costs Associated with Reaching Student Achievement Expectations for Kansas Public Education Students: A Cost Function Approach*. San Francisco: WestEd. Accessed September 26, 2019. https://kasb.org/wp-content/uploads/2018/03/Kansas_Adequacy-Study_Cost-Function_20180315FINAL_02.pdf

U.S. Department of Education, Office of Elementary and Secondary Education. 2018. *Local Flexibility Demonstration Agreements for Student-Centered Funding Authorized by Section 1501 of the ESEA: Frequently Asked Questions*. Washington, DC: U.S. Department of Education. Accessed September 11, 2019. https://www2.ed.gov/policy/elsec/leg/essa/scfp/faqs.pdf

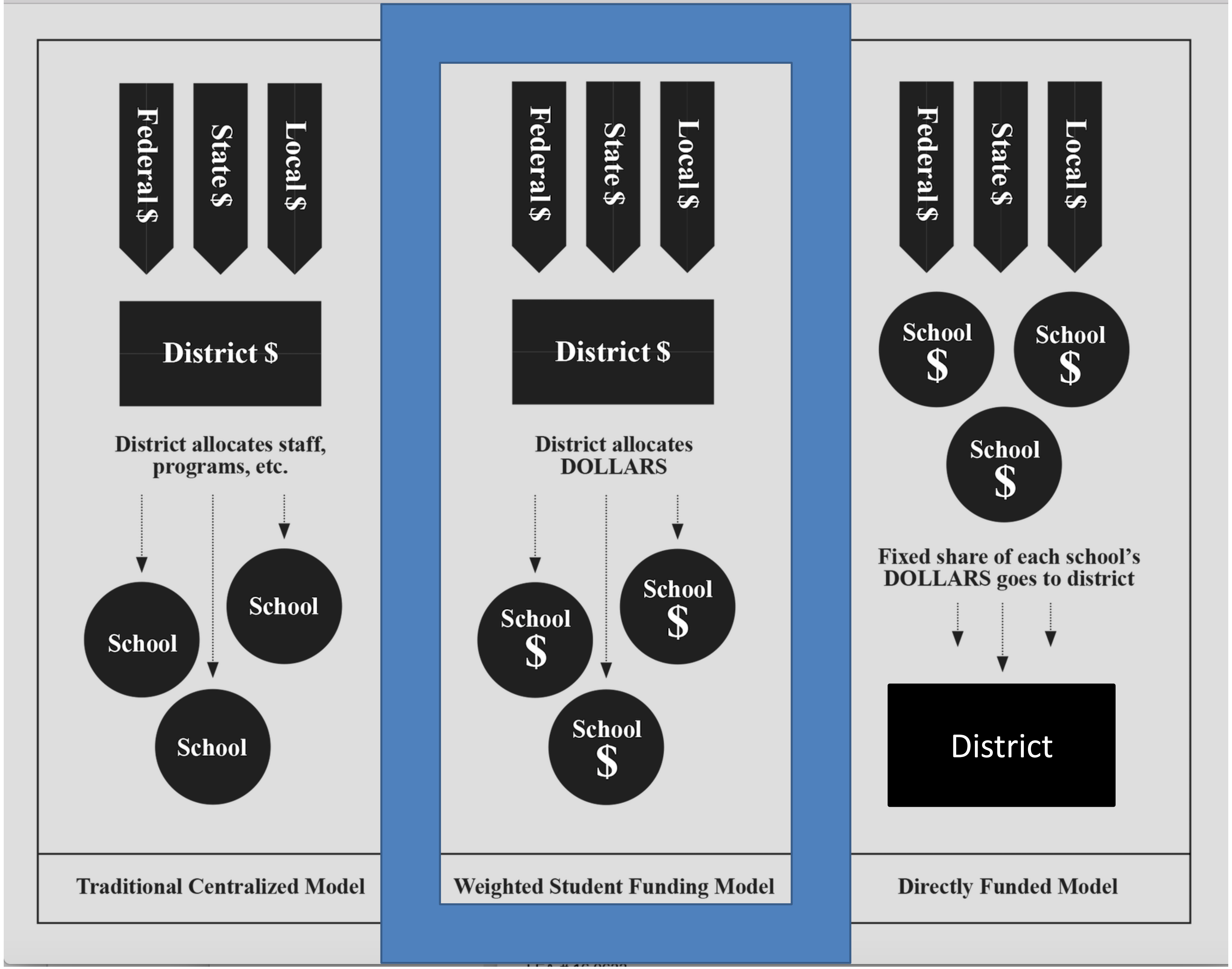
The Department of Education's mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.
www.ed.gov

15

Student Centered Formula Update

March 23, 2021

What is Weighted Student Funding?



A Student-Centered Funding model can help improve the strength of the funding system:

Equity

An equitable system …

- Distributes resources equitably based on student need.
- Allocates similar funding levels to students with similar characteristics, regardless of which school they attend.

Transparency

A transparent system …

- Includes clear and easily understood rules for where, how, and why dollars flow.
- Makes it clear to all stakeholders who gets what and *why* (Note: the why is often the missing piece).

Flexibility

A flexible system …

- Balances local autonomy and accountability in a way that is in alignment with district strategy.
- Reduces barriers to a school's ability to maximize spending power, e.g., blending general and non-general funds where possible.

Stability & Sustainability

A stable and sustainable system …

- Provides predictable allocations to support school and district multi-year strategic plans.
- Is in alignment with the district's financial outlook and supports overall district strategy.

Why are we doing this?

CHANGE IN
RESOURCE ALLOCATION AND USE

Better **align school funding with school and student needs**, while making effective use of scarce resources.

Support school leaders to meet the heightened learning, physical, and social- emotional needs of students, family and staff by **offering targeted flexibilities that allow them to adapt their budgets** based on their unique needs.

CHANGE IN
UNDERSTANDING

Increased understanding of how the **district's funding system supports district's strategy.**

Increased understanding of **bright spots & challenges of current funding system** in relation to equity, transparency, flexibility, and sustainability.

Increased **support for and ownership of new funding formula** among school leaders and other community members.

CHANGE IN
SCHOOL DESIGN & SERVICE DELIVERY

School leaders **design their schools differently** to better meet the district's vision for a high-quality student experience.

CHANGE IN
STUDENT EXPERIENCE & OUTCOMES

All students experience high quality instruction and supports, no matter the school they attend, or their individual student identities.

Accelerate learning for all students.

Improved student outcomes across all of the district's LCAP priority areas.

Source: Education Resource Strategies, 2020


OUR STRUCTURE
OUR RELATIONSHIPS
OUR MINDSET
OUR INVESTMENTS
STUDENTS ARE AT THE CENTER OF EVERYTHING WE DO
SCHOOLS ARE THE HEART OF THE COMMUNITY
LOS ANGELES UNIFIED IS A PLACE WHERE PEOPLE THRIVE
WE ARE BOLD AND WE EMBRACE INNOVATION

Alignment with LAUSD Vison for Communities of Schools

Implementing a student-centered funding model aligns and accelerates LA Unified's vision for communities of schools

LA Unified's Vision of Communities of Schools:

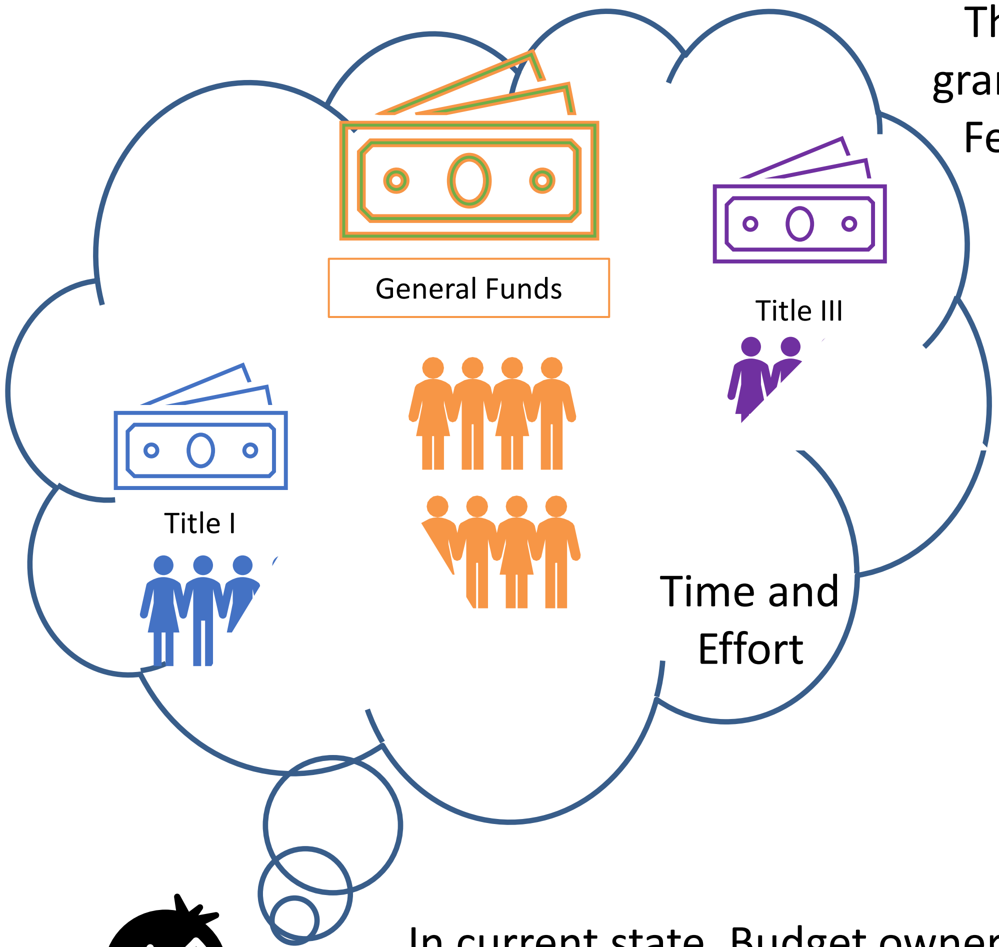
- Provide our communities of schools with the services and supports they need to improve student achievement and equity
- Provide our communities of schools with autonomy tied to accountability
- Align our resources, systems, policies and processes to LA Unified's communities of schools model

Services and Supports moved closer to students

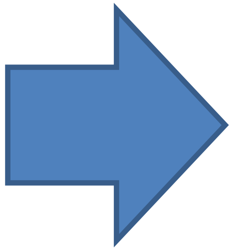
Long-term financial sustainability – ensuring LAUSD's viability and alignment of resources in support of student outcomes

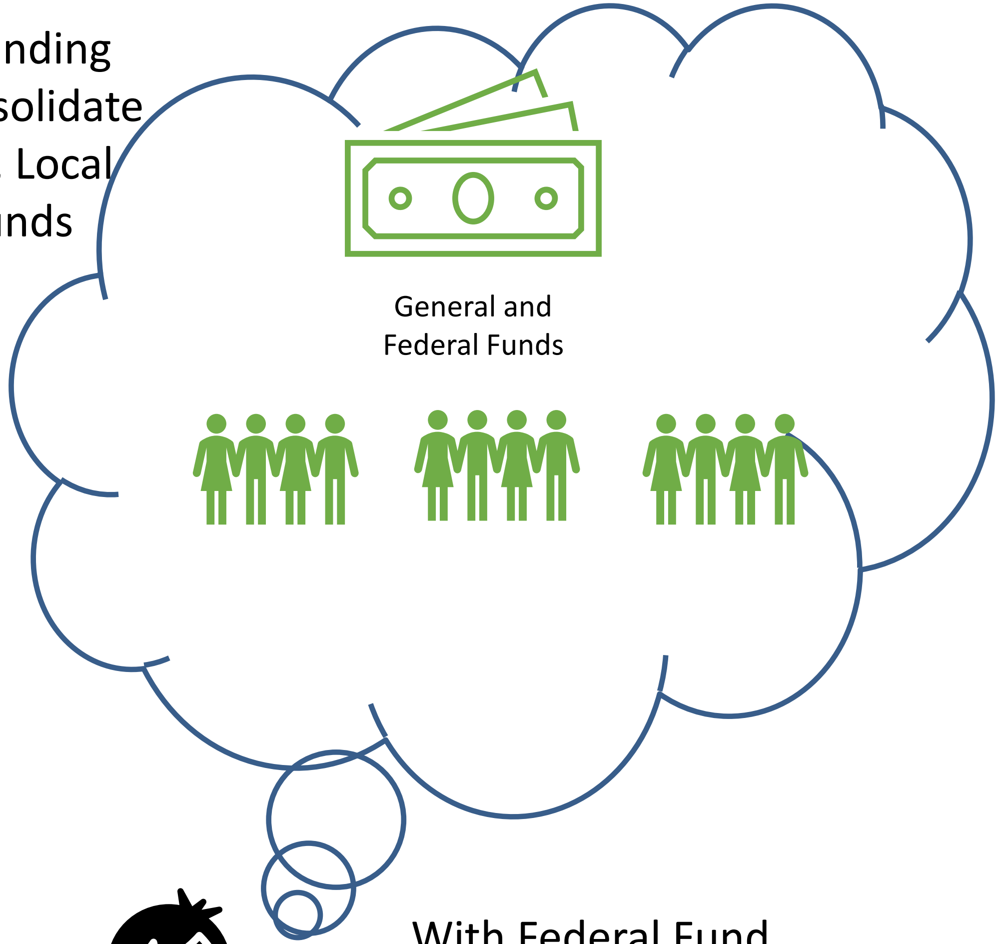
Student Centered Funding model increases autonomy and flexibility closer to students

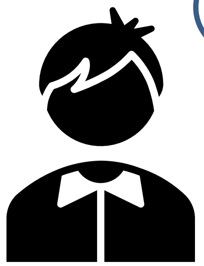
Federal Funds Simplification



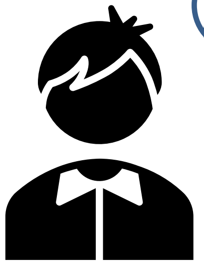
The Student-Centered Funding grant allows LAUSD to consolidate Federal Funds with State, Local and other sources of funds







In current state, Budget owners have to account for and balance multiple funding sources within their school budget – including onerous time and effort and other compliance requirements



With Federal Fund consolidation/simplification, budget owners can focus more on student outcomes without onerous accounting and compliance requirements

In an SCF system, schools are allocated dollars based on the characteristics of their students

Illustrative

Northwest High School

Total Enrollment: 1,750 | ELL: 27% | Econ. Disadvantaged: 85% | Below Proficient: 53%

Traditional School Budgeting

Personnel	Non-Personnel
60 Teachers	$65,000 for Instructional Supplies
5 Principal and AP's	$20,000 for Athletic Supplies
2 Counselors	$6,000 for Custodial Supplies
3 Office Techs	Etc.
Etc.	

Student-Centered Funding

	Enrollment	Weight	Total
All Students	1,750	1.0 = $4,250	$7,437,500
Below Proficient	928	0.10 = $425	$394,400
Economically Disadvantaged	1,488	0.05 = $212	$315,456
ELL	473	0.20 = $850	$402,050
		Total:	**$8.6M**

Schools receive staff, programs and supplies

- Central office determines how much funding schools receive and how the funding is spent
- Schools have limited flexibility over how their total budget is used across personnel and non-personnel resources

Schools primarily receive $s, not staff and programs

- Central office supports principals by setting guardrails and guidance for how to use new flexibilities
- Many programs continue to be allocated outside of the SCF formula to ensure compliance and meet unique student needs
- Multi-year process of expanding flexibilities and SCF pool

Hypothetical example -- not intended to reflect LA Unified numbers.
Source: Education Resource Strategies, 2020

In most district SCF systems, the student weights are additive – aka "duplicated" – where students receive all the weights they are eligible for

Illustrative

Ella

1.0 base weight

Base Weight
1.0x

Mark

1.6x base weight

English Language Learner
0.3x

Economically Disadvantaged
0.3x

Base Weight
1.0x

Step 2: Specific student need (e.g. ELL or SPED)
Schools get an additional allocation for each individual student's need profile – weights are additive, so students receive all the weights they meet the criteria for.

Step 1: Base Weight
Schools get a **base amount** of money for every single student

Hypothetical example -- not intended to reflect LA Unified numbers.
Source: Education Resource Strategies, 2020

Districts make different decisions on what student characteristics to weight in their SCF system

	Atlanta (SY1819)	Baltimore (SY1718)	Boston (SY1718)	Cleveland (SY1718)	Denver (SY1617)	Indianapolis (SY1718)	Nashville (SY1819)	San Francisco (SY1718)	Shelby County (SY1819)
Poverty	X		X		X	X	X	X	
ELL	X		X	X	X		X	X	
SWD	X		X	X			X		
Grade Weight	X		X	X		X	X	X	X
Low Performance	X	X		X	X		X		X
High Performance/ Gifted	X	X		X	X				X
Other Weights		Dropout Prevention	Community Index Factors	Mobility, Attendance				SWD Supplies	Mobility

Source: Education Resource Strategies, 2020

School leaders then use their budget to determine the mix of staff and other resources to match school needs and priorities

Illustrative

Northwest High School

Total Enrollment: 1,750 | ELL: 27% | Econ. Disadvantaged: 85% | Below Proficient: 53%

I can use the additional funding for my below-proficient students to purchase two additional teacher FTEs and lower class sizes to 18 in 9th grade ELA and Math…

... I will also move to a distributive leadership model in my school so I spend less on administrators (like assistant principals), and more on stipends for my teacher leaders.

Item	FTEs	Avg Salary	Total
Classroom Teacher	65	$85,000	$5,525,000
Principal and AP's	4	$100,000	$400,000
Stipends for Teacher Leaders	8	$10,000	$80,000
Etc…			
		Total:	**$8.6M**

Hypothetical example -- not intended to reflect LA Unified numbers.
Source: Education Resource Strategies, 2020

Districts also make different decisions about what resources principals have flexibility over:

	Atlanta	Baltimore	Boston	Cleveland	Denver	Indianapolis	Nashville	San Francisco	Shelby County
Instructional Staff									
Elementary School Homeroom Teachers	X	X	X	X	X	X	X	X	X
Secondary School Core Subject Teachers	X	X	X	X	X	X	X	X	X
ELL Teachers			X	X	X		X	X	
Special Ed Tchrs- Mainstreamed/Resource			X	X	X		X		
Special Ed Teachers –Self-Contained			X	X (Partial)	X (Partial)		X		
Special Ed 1-to-1 Aides (IEP-driven)					X (Partial)				
Instructional Coaches			X		X		X	X	
Librarian	X	X	X	X	x	X	X		X
Pupil Services Staff									
Counselors	X	X	X	X	X	X	X		
Social Workers	X			X	X	X			
Psychologists					X				
Nurses & Health Services Supplies					X				
Related Services Staff (OT/PT/Speech)									
School Administration Staff									
Principals	X		X	X	X		X	X	
Assistant Principals	X	X	X	X	X	X	X	X	X
Secretarial/Clerical Staff	X	X	X	X	X	X	X	X	X
Operations Staff									
Maintenance Staff (Plumber, Electrician,)									
Custodial Staff (Custodians, Cleaners)		X							
Security Staff (Guard, Sentries, etc.)									
Staff Overtime or Substitutes									
Short-term Substitutes	X	X	X	X	X	X		X	X
Long Term Substitutes			X		X				
Instructional Supplies and Services									
Extracurricular/Athletic supplies/materials			X					X	
Instructional Supplies	X	X	X	X (Partial)	X	X	X	X	X
Library Books and Materials	X	X	X	X	X	X	X	X	
Textbooks	X	X	X	X (Partial)					
Instructional Supplies and Services									
Custodial Services and Supplies		X							
Maintenance Services and Supplies									
Office/Admin Services and Supplies		X	X	X	x	X	X		X
Security Services and Supplies							X		
Utilities									

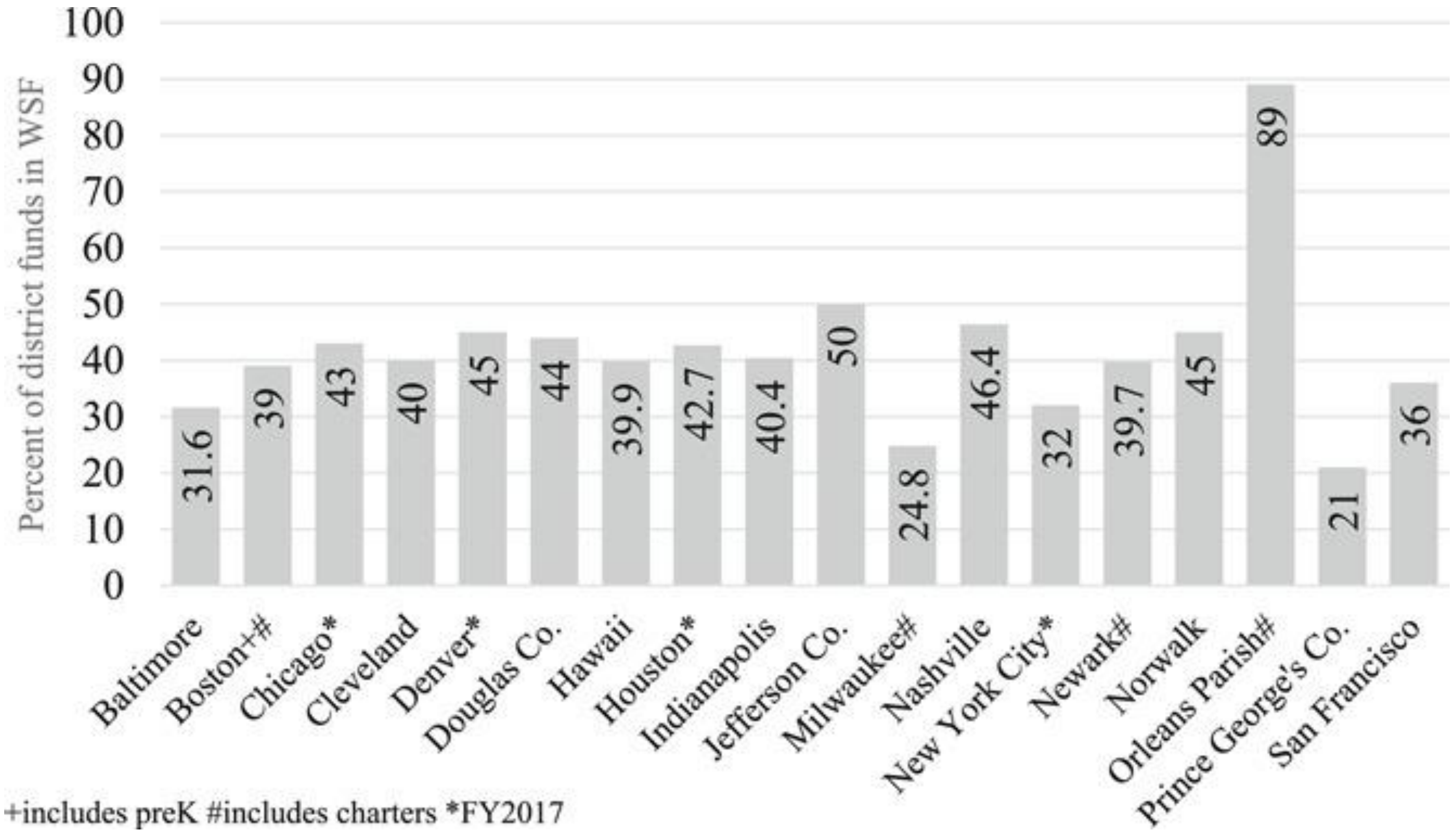
Source: Education Resource Strategies, 2020

No two SCF formula looks the same

Weight	LEAs using	Weights
Grade level	17	1% - 45%
ELL	12	4% - 110%
Special Education	12	12% - 400%
Low-income/FRL	11	5% - 20%
Low academic performance	6	<1% - 26%
Gifted	6	<1% - 26%
At-Risk	6	1% - 17%
CTE	3	5% - 10%
High academic performance	2	15% - 31%
SIFE	2	12% - 94%
Refugee/homeless	1	5%

Source: Education Resource Strategies, 2020

Most LEAs allocate fewer than 50% of funds through a Student Centered Formula



+includes preK #includes charters *FY2017

Public Budgeting & Finance, Volume: 41, Issue: 1, Pages: 3-25, First published: 10 November 2020, DOI: (10.1111/pbaf.12276)

Key considerations for what is included in the formula:

1. Does this resource fall outside of the **VISION OF THE PRINCIPAL'S ROLE**?
2. Is this resource **CRITICAL TO LA UNIFIED'S STRATEGY**, such that the district needs to determine where and how it is provided?
3. What **CONSTITUTES BASE PER PUPIL** funding?
4. How does this **IMPROVE STUDENT OUTCOMES** in a measurable way?
5. Is there such a **HIGH LEVEL OF EXTERNAL COMPLIANCE** around this resource that including it in the SCF pool would require unreasonable levels of monitoring and evaluation to ensure compliance?
6. Does this resource have **ECONOMIES OF SCALE**?
7. Is this resource needed **INFREQUENTLY OR UNPREDICTABLY**, making it difficult for schools to adequately budget for it?
8. Does the resource **REQUIRE SPECIALIZED SKILLS** that school staff is unlikely to have access to?

In most SCF districts, 45-60% of school-based resources are flexible and allocated out via SCF formula; the rest are allocated outside of SCF

Hypothetical School Budget under SCF:

		# Students or # FTE	*$*
Student-Centered Funding	Base Weight	300	$1.9M
	English Language Learner	15	$0.03M
	Special Education	60	$0.1M
	Economically Disadvantaged	60	$0.2M
Centrally allocated staff	SPED Teachers, Aides and Staff	15 FTEs	$1.1M
	ELL Teachers, Aides and Staff	0.5 FTEs	$0.04M
	Other Staff (e.g., Principal, Mental Health, Custodial)	20 FTEs	$1.0M
Centrally allocated programs/ funds	IB School Program	-	$0.04M
	Program/Grant X	-	-
	Program/Grant	-	$0.04M
	Others	-	$0.07M

LA Unified will need to develop guidelines and guardrails for these flexible SCF resources and define what level of autonomy principals have over them:

For example

- **Full Autonomy**: Principals have full decision-making power as long as they meet any state/compliance requirements. The district may offer guidance and suggestions, but schools are not required to adopt them.
- **Partial Autonomy:** Principals have some autonomy but there are clearly defined limits or constraints, e.g., menu of option to choose from, minimum thresholds/benchmarks, etc.
- **No Autonomy**: Principals are required to use the funds in a certain way, e.g., meet a 1:40 ratio, spend at least $200 per pupil, etc.

Hypothetical example -- not intended to reflect LA Unified numbers.
Source: Education Resource Strategies, 2020

Timeline

January	February	March	April	May - August	September - January	First Year of SCF School Budgets with Initial SCF formula
• SCF readiness assessment • Flexibility Audit • Launch Operating / Steering Committees	• School need and funding analysis • Equity Analysis • Design Team Launched	• Finalize school need and funding analysis • Flexibility audit • Equity Analysis completed • Imagining of funding sources to be included in formula and phasing-in plans	• Design team formula modeling and analysis • Design implementation scenarios and analysis • Launch Stakeholder Engagement Committee • Begin Stakeholder Engagement	• Determine final funding model and appropriate phasing • Flexibility recommendations • Apply for Agreement with DoE on funding formula • Stakeholder Engagement • Design training and capacity development requirements	• Initial Budget and School preparation for implementation the FY 2022-23 School Year • Staff Development • Community Outreach	

Thank You

16

Center for American Progress

GETTY IMAGES/HERO IMAGES

A Quality Approach to School Funding

Lessons Learned From School Finance Litigation

By Carmel Martin, Ulrich Boser, Meg Benner, and Perpetual Baffour November 2018

Center for American Progress

A Quality Approach to School Funding

Lessons Learned From School Finance Litigation

By Carmel Martin, Ulrich Boser, Meg Benner, and Perpetual Baffour

November 2018

Contents

Introduction and summary

In 1968, a sheet metal worker named Demetrio Rodriguez decided to file a lawsuit against the Edgewood Independent School District, a high-poverty district located just outside of San Antonio, Texas, serving a predominately Mexican American population. Rodriguez, the father of four children enrolled in the Edgewood district, was frustrated that the schools were dramatically underfunded and marred by dilapidated facilities and weak instruction.[1]

As part of his suit, Rodriguez joined 15 other parents who sued the state for an inequitable system of financing public schools. The case was filed under Rodriguez's name because he had been a longtime, leading voice in the community for equal rights. The suit, *San Antonio Independent School District v. Rodriguez*, eventually landed in the Supreme Court.[2]

The court's decision, however, did not live up to the dream of equal educational opportunity for which Rodriguez and the other parents had hoped. The court struck down the case, arguing that education was not a guaranteed, fundamental right under the U.S. constitution and that Texas' school finance system did not violate any protected rights.[3]

More than 40 years later, one of Rodriguez's children now teaches in the Edgewood Independent School District—the same district that he sued.[4] The district still gets less than its fair share of funds from the state of Texas. In fact, according to one recent analysis, Edgewood receives about $5,000 less per pupil in education funding than Alamo Heights, a wealthier, neighboring school district.[5] Just as bad, the district continues to lag behind on academic measures, and many of its students score below grade level.[6]

This is a national problem. Since the 1970s, advocates across the country have filed dozens of school finance lawsuits. That litigation spurred critical conversation and important progress, but many large and pressing problems remain. In nearly half of all states, affluent districts still receive more funding from state and local governments for their schools and students than poorer districts.[7] In some states, the issue is particularly egregious; for instance, high-poverty districts in Illinois receive 22 percent less in per-pupil funds in state and local dollars than the wealthiest school districts.[8]

Dollars must be at the start of every conversation around equity. Funding is a central component to providing a high-quality education and often leads to improved outcomes. A 2016 study found that, between 1990 and 2011, states that reformed school finance policies in order to allocate more funding to high-poverty school districts narrowed the achievement gap by an average of one-fifth.[9]

But allocating equal funding for every student does not guarantee that all students will have a rigorous educational experience.[10] School finance reform must focus on the quality of every school, from the excellence of the instruction to the rigor of the classes.

This idea is at the heart of this report. The authors argue that the efforts to resolve inequities through the courts or with legislation need to move beyond funding. Furthermore, reforms must focus on both funding levels and equal access to resources shown to be fundamental to a quality education. True educational equity will require two central reforms. First, there needs to be additional resources—not the same resources—in order to meet the needs of at-risk students.[11] Second, there should be accountability frameworks to ensure that the key ingredients to student success—access to early childhood programs, effective teachers, and rigorous curriculum—are available to students irrespective of their race, zip code, or economic status.

The authors came to these conclusions after examining the remedies implemented at the state level in response to a court order or as a result of political pressure created by state litigation. Past cases, which have focused on the equity or adequacy of school funding, have increased resources for low-income students but have not consistently ensured that all students have access to a high-quality education. Moreover, in some instances, remedies implemented under these frameworks have led to unintended consequences, including the leveling out of education funding in cases that focus on equity of dollars alone.

Overview of the findings

Based on an analysis of school finance litigation and research on school funding, the authors found the following:

- **Money matters for student achievement.** A growing body of evidence shows that increased spending on education leads to better student outcomes. When states invest in their public schools and create more equitable school finance systems, student achievement levels rise, and the positive effects are even greater among low-income students. States, districts, and schools must spend their money wisely, targeting their funds toward evidence-based interventions, such as high-quality early childhood programs. Overall, efforts to cut funding for education or services that support children are short-sighted and defy current research.

- **Students in high-poverty communities continue to have less access to core academic services that increase student outcomes.** Core services that have a significant influence on instructional quality and student performance are systematically unavailable to students in low-income schools relative to students in higher-income schools. These critical services include early childhood education, quality teachers, and exposure to rigorous curriculum.

- **Districts, states, and the federal government play crucial roles in equity.** States will have the greatest opportunity to guarantee that all students under their purview have access to a high-quality education, but local, state, and federal governments all play important roles in minimizing inequities in education funding.

  Historically, the federal government has focused its investment in supporting education and related services on the most at-risk children, and it can uniquely address inequities in per-pupil spending across states. While students within the same school district can receive starkly different levels of funding, the widest variation in per-pupil spending exists across state boundaries. The differences in average state per-pupil spending ranges from around $5,700 to $17,000.[12]

- **While state legal cases have been powerful in closing spending gaps, litigation is inadequate.** School funding advocates have won a slew of court cases over the past four decades. Many fiscal equity lawsuits were important and led to additional resources for students; however, some cases had unintended consequences on overall levels of spending, for example, in California.[13] In many cases, a state's political climate and fiscal capacity proved to be just as important—if not more important—than court rulings in deciding fiscal reform.

- **Evaluating school finance policies based on equity or adequacy is insufficient.** The most common frameworks used in state school finance cases—evaluating school funding policies based on their "equity" or "adequacy"—do not acknowledge that students in poverty need more from their schools than their more affluent peers. Moreover, neither framework requires courts and policymakers to consider the quality of education, including teachers, curriculum, programs, and social supports.

Next steps

The school funding debate is as important today as it was in 1968 when Rodriguez demanded a better education for his children. Given these findings, the authors recommend principles to guide a new framework for school finance reform: a high-quality finance system. While the past few decades of state litigation focusing on equity or adequacy have increased awareness of the importance of fiscal equity, policymakers must refine the debate in order to achieve a high-quality education for all students.

The authors propose that the following key principles should guide school finance reform at the federal and state levels:

- **School funding systems should ensure equal access to core educational services.** School equity debates must go beyond funding, and states and local actors must support access to robust services. The Supreme Court of New Jersey described this issue well: The focus should shift from "financing [to the issue of] education itself."[14] In other words, advocates should be focused on the quality of educational opportunities as the driving goal of an equitable education financing system. Using this as a model, advocates should prioritize increased access to high-quality educational opportunities that raise student achievement as part of an equitable education financing system.

- **School funding should provide significant additional resources for low-income students.** It costs more to educate low-income students and provide them with a robust education. To overcome issues of poverty, low-income students need significant additional funds. Research shows that increases in school spending result in greater educational and economic outcomes for all students, but these were "more pronounced for children from low-income families."[15] Additional funding should help to attract highly qualified teachers, improve curriculum, and fund additional programs such as early childhood education. Weighted student funding—which differentiates school budgeting based on the demographics that each school serves—can fund quality programs that will have the greatest impact on the student population.

- **Outcomes-based accountability should serve as a check on school funding systems.** Student achievement and outcomes matter. Any approach to supporting school finance reform should ensure that the money supports the resources, programs, and services that all students need to be prepared to fully participate in the workforce and their community. Policymakers must simultaneously refine education standards so they are aligned to the changing society and implement rigorous accountability systems to assess if schools are meeting these goals. States should use these outcomes, rather than dollars or other inputs, to evaluate if schools are providing all students with a high-quality education.

- **Education and child welfare programs should be fully funded.** Research shows that money matters, especially for students in poverty. States should restore, and exceed, funding to pre-Great Recession levels to allocate sufficient funding. In addition, the federal government should maintain or increase funding for necessary programs to support children and working families. Federal funding accounts for 38 percent of states' education budget—and 8.5 percent of overall spending for public education—so significant cuts to federal programs have severe and lasting effects on the services and opportunities that states can offer to all students.[16]

The argument for a new framework for school finance reform

A high-quality education is fundamental to our modern economy and democracy

The goals of public education must evolve with the changing world, and today, schools must prepare students for college, career, and civic engagement.

Ensuring educational opportunities is critical to the health of U.S. democracy, especially as the nation becomes more diverse.[17] Most state constitutions include some language indicating that education is the state's responsibility and a critical public service, and federal policymakers have long recognized that education strengthens the nation.[18] For example, Thomas Jefferson once said, "An educated citizenry is a vital requisite for our survival as a free people."[19]

A just K-12 public schooling system should meaningfully prepare all students, including the most disadvantaged, for their roles in public service or democratic governance. This is key to ensuring America's next generation of leaders serve, defend, and represent the various interests of society. Not surprisingly, the nation's military also depends on well-educated students. Without a robust education system, the armed forces would lack qualified recruits.

The strength of the economy is also closely tied to education. Recent studies show that gross domestic product (GDP) has a strong relationship with educational outcomes.[20] Moreover, education's importance to the economy continues to grow. In the 1970s, the majority of jobs were available to individuals with a high school diploma or less.[21] Today, virtually all well-paying jobs require some college.[22] By 2020, only 36 percent of all jobs will require a high school diploma or less. During the recent economic recovery, 95 percent of the jobs created went to workers with postsecondary education or training.[23]

Furthermore, education is one of the best predictors of future income. Over a lifetime, a college graduate earns $1 million more, on average, than a student with only a high school diploma.[24] Another study found that a millennial with a college degree earns, on average, $17,500 more annually than a millennial with only a high school diploma.[25]

Persistent inequities in education funding: The local, state, and federal role

After 50 years of state school finance litigation and school finance reform, some states have minimized inequities in per-pupil education across districts within state lines. However, significant inequities remain. Local, state, and federal governments all contribute to overall education funding and perpetuate some of these inequities. As a result, local, state, and federal actors must all work to revamp school funding systems with a focus on quality. States, specifically, will have a central role. The right to an education rests with the state, as articulated in state constitutions, and local and state governments provide the vast majority of school funding. Meanwhile, the federal government must continue to focus its funding and support on high-poverty schools and address inequities that exist across state lines.

Funding inequities with local and state contributions

Although state constitutions indicate that the right to education rests with the state, schools have historically been primarily funded at the local level. Specifically, local property taxes had been the main source of funding for public education. Because districts have vastly different property tax bases, the poorest districts raise less money than more affluent districts, creating disparities in per-pupil expenditures.[26] In fiscal year 2012—the most recent year for which data are available—local governments contributed 45 percent of overall education funding; state governments matched local contribution; and the federal government made up for the remaining 10 percent.[27]

New analyses disaggregate the allocations of local, state, and federal governments. Data compiled by the Urban Institute show that local education funding across the country is still highly regressive—although it has become slightly more progressive between 1995 and 2015. Students in poverty continue to receive less funding than their more affluent peers. High-poverty school districts in only four states—Minnesota, Louisiana, Tennessee, and Vermont—receive more local funds per pupil than more affluent districts.[28]

State funding formulas generally compensate for regressive local funding.[29] A 2018 report by The Education Trust found that in 20 states, high-poverty districts receive at least 5 percent more per pupil in combined state and local dollars than affluent districts. In 23 states, high-poverty and affluent districts receive about the same amount per pupil in state and local dollars. In four states, the highest-poverty districts receive significantly less per pupil in state and local funding than more affluent districts. And in Illinois, high-poverty districts received 22 percent less per pupil in state and local funds than more affluent districts.[30]

The federal role: Addressing inequities across state lines

Times have changed dramatically since the *Rodriguez* decision, and there is deepening consensus that federal government has an important role in supporting the education of students with the greatest needs.

The passage of the Elementary and Secondary Education Act (ESEA)—which was reauthorized in 2015 as the Every Student Succeeds Act—highlighted Congress' recognition of the need for a federal role in ensuring equal educational opportunities. In fact, the ESEA was passed shortly after the Civil Rights Act, and then-President Lyndon B. Johnson, who championed the bill's passage, saw the legislation as part of the broader movement for equality.[31] In his signing speech, Johnson stated, "By passing this bill, we bridge the gap between helplessness and hope for more than five million educationally deprived children."[32] The ESEA's clear purpose was to ensure a level playing field for low-income and minority students.

The federal investment in education increases the share of funding allocated to high-poverty districts.[33] However, the current federal investment does not minimize funding inequities across state lines, which are greater than the inequities among districts within states. These differences are so stark that students in certain states only receive a fraction of funds that students in other states receive. For example, according to a recent study by the Education Law Center, students in Mississippi only receive about 40 percent of the per-pupil funds of New Jersey students, while students in Alabama receive slightly less than 50 percent of the per-pupil funds as students in Connecticut.[34] Not surprisingly, both New Jersey and Connecticut outrank most states in academic performance, whereas Mississippi and Alabama fall toward the bottom of the list.[35]

The rise of a new equity divide

While some states have made progress in addressing disparities within states, unequal access still exists within states. At the same time, inequities are greatest across states lines, as per-pupil spending across states varies dramatically.

Although school finance advocates and policymakers often compare spending between the poorest and wealthiest districts within a state, the differences in district-level spending across states are far starker. On average, school districts in the United States spend about $11,885 per pupil—the cost of living adjusted for the 2012-13 school year.[36] However, some districts spend twice as much as districts in other states. For instance, the per-pupil spending among the 100 largest districts ranged from $6,798 in Texas' Cypress-Fairbanks Independent School District to $20,331 in New York City Public Schools.[37] These disparities persist even when taking into account districts with similar enrollment sizes and demographics.

The research: Money does matter

These extreme spending inequities have an impact, and a large body of research suggests that money does matter in education. When school districts spend money wisely, they have better outcomes, including higher test scores, increased graduation rates, and other improved indicators of student achievement.[38] More money also helps ensure that students have schools with better facilities and more curriculum options. This has clear implications for the public school system, as students who do not get their fair share of dollars do not get an equal chance to compete with their more advantaged peers.

For instance, according to a recent National Bureau of Economic Research (NBER) study, state fiscal reforms have had a positive impact on student outcomes—particularly among low-income students. In fact, the study found that spending increases improved high school graduation rates among low-income students and increased their adulthood earnings by 10 percent.[39] The study also found that, of the various approaches to school spending reform, fiscal initiatives that guaranteed a baseline amount of per-pupil funds—otherwise known as "foundation plans"—were the most effective in increasing overall per-pupil spending and reducing the wealth-based funding disparities between poor and affluent districts. Note that, when it comes to policy approaches, foundation plans are most similar to an adequacy framework—a point explored in greater detail below.[40]

Another recent NBER study confirmed this idea that fiscal reforms in adequacy cases have led to more progressive funding systems and increased student outcomes. In this study, researchers found that over the past 25 years, fiscal reforms—either as a result of a court order or a legislative effort—improved states' education spending priorities and reduced funding disparities between high- and low-poverty districts. These reforms also contributed to student gains in reading and mathematics, with the largest increases among low-income students.[41]

Relatedly, beginning in 2010, a decline in public spending on education has negatively affected student outcomes. During the Great Recession, state and district funding for public education declined dramatically. As of 2017, 29 states' funding had yet to rise to prerecession levels.[42] One study found that districts with the largest declines in public education spending during the recession had lower student achievement levels, which worsened throughout the recession.[43] C. Kirabo Jackson, a professor of human development and social policy at Northwestern University, asserts that the decline in National Assessment of Educational Progress (NAEP) scores in 2015 and 2017 is tied to the decline in education spending following the Great Recession.[44]

There are dramatic gaps in access to core educational services

Inequities go beyond money. Core services, which make a huge difference in instructional quality and student performance, are systematically unavailable to students in low-income schools relative to students in higher-income schools. Put simply, school funding debates must go beyond the raw numbers and evaluate whether students have equitable access to the resources needed for success, including early childhood education, quality teachers, and exposure to challenging curriculum.

Early childhood education is a critical tool to level the playing field for students in poverty who generally start school academically behind their more affluent peers. For example, some studies suggest that, compared with their higher-income peers, low-income students start school with a smaller vocabulary.[45] High-quality early childhood education can lessen the differences and have a lasting impact on student achievement.[46]

Yet students in poverty are less likely to attend preschool programs. In 2013, about 54 percent of children with family incomes below $50,000 did not attend any preschool, while only 36 percent of children with high-income families did not attend any preschool.[47] Expanding access to high-quality preschool is a focus of many district and state policymakers, but only three states and the District of Columbia have universal preschool.[48]

The effectiveness and experience of teachers also have a pronounced impact on instructional quality. No other in-school factor has as significant an impact on student achievement as the teacher at the front of the room.[49] And yet, high-poverty schools generally employ fewer effective teachers. In Washington, D.C., for instance, a much smaller percentage of highly effective teachers work in high-needs areas versus affluent ones.[50] Another report examined data from Los Angeles Unified School District and found that teachers in the top 25 percent of effectiveness are less likely to instruct lower-income students, as well as students who are Latino or black.[51]

Higher-poverty schools also have fewer experienced teachers and greater teacher turnover.[52] In school year 2012-2013, there was 22 percent teacher turnover in the highest-quartile-poverty schools, whereas there was only 13 percent turnover in schools with less than 34 percent of students in poverty.[53] Teacher experience most significantly increases effectiveness in the first five years in the classroom, but teachers with 20 years or more of experience achieve larger student gains, on average, than teachers with five years or less of experience.[54] Moreover, high teacher turnover creates instability and negatively affects student achievement within schools.[55]

Rigorous curriculum can significantly increase academic outcomes and prepare students for college and the workforce. [56] Unfortunately, again, students in high-poverty schools have inequitable access to rigorous curriculum, which undercuts their long-term academic outcomes and earning potential. For instance, a smaller percentage of high-poverty students have access to high school curriculum that prepares them for college and/or career. Fifty-three percent of low-income students graduate high school without college or career preparatory coursework, compared with 44 percent of their affluent peers.[57]

In some states, such as New York, the issue is particularly pressing. According to a 2018 study from The New York Equity Coalition, "White students had 230 percent more opportunities to earn college credit than their Latino and Black peers, despite representing only 8 percent more high school enrollees."[58]

Studies by the federal government demonstrate that the unequal access to rigorous courses is a national problem. Data from the 2015-16 school year show that high schools with higher percentages of black and Latino students offer math and science courses at a lower rate relative to all high schools. The difference is greatest in terms of access to advanced mathematics, calculus, and physics.[59]

Research shows that more rigorous courses can have a transformative effect on student outcomes, regardless of a student's previous academic record. A study conducted in New York City examined the performance of students who previously struggled academically but were incorrectly placed on an instructional track intended for students with greater mathematical ability, finding that they performed well when placed in a rigorous instructional setting that held them to higher expectations.[60] For instance, an average student assigned to a low-achieving track had only a 2 percent chance of completing two college preparatory math classes over the course of high school. However, when placed on a high-achieving track, that same student had a 91 percent chance of completing two such classes.[61]

Furthermore, an analysis of the cost of different interventions found that transitioning to higher-quality curriculum provides a higher return on investment than many other reforms—for example, almost 40 times the return of class-size reduction.[62] Adopting rigorous curriculum, however, requires thoughtful selection of instructional materials and additional intensive academic services to students so they can meaningfully access more challenging coursework.

School finance litigation: Powerful yet inadequate

Litigation has heightened awareness of the importance of fiscal equity in education and spurred necessary change in states across the country. The U.S. Supreme Court struck down *San Antonio Independent School District v. Rodriguez* by arguing that education was not a guaranteed federal right. Some litigants continue to attempt to overturn *Rodriguez* in order to establish a federal right to education, but until then, many advocates turn to the states. Numerous state courts have reinforced meaningful provisions in state constitutions and required legislative action to improve educational opportunities for all students. Advocates in various states have taken different approaches to advance equity—some with success and some with unintended outcomes.

The following section describes the decision in *Rodriguez* and examines examples of the different approaches that advocates have used to advance school finance reform within states. The authors highlight some of the unintended outcomes, as well as the most positive aspects of the remedies, in order to inform a new framework for a potential federal right moving forward.

Where it all began: *San Antonio Independent School District v. Rodriguez*

In *Rodriguez,* the plaintiffs argued that education was a fundamental interest under the U.S. Constitution because of its vital importance to both the right to vote and freedom of expression. In other words, the plaintiffs contended that education was a constitutional right because a certain level of education is necessary for the proper exercise of these rights.[63]

Yet the Supreme Court decided that public education was not guaranteed by the federal Constitution. Instead, it found that education was an important but voluntary service provided by the government, arguing that while the Constitution does guarantee its citizens the right to vote, it does not guarantee that individuals should be able to exercise this right to the best of their abilities or at their highest potential.[64] Therefore, according to the court, an education of the highest quality is not necessary for the proper exercise of rights.[65]

The Supreme Court also found that the Texas approach was constitutional because it provided the bare minimum necessary.[66] Texas was not refusing to provide any education to poor students. According to the court, the fact that some students—based on their parents' income or ZIP code—received better education than others was not enough for the state to be in violation of the Constitution's Equal Protection Clause.[67]

While the court refused to find a substantive right to education in the Constitution, it did hint at a potential minimum education requirement by emphasizing the adequacy of Texas' system of providing education for each child.[68] In their dissent, former Justices Thurgood Marshall and William J. Brennan Jr. refuted the substantive right assertion, contending that funding disparities had a negative effect on school quality. Marshall argued that the burden of proof fell on the state to show that funding disparities did not grossly affect the quality of education that students received.[69] Moreover, this notion of a "quality education" also appeared in the majority opinion. The appellant's brief, for instance, conceded that there were wide variations in education spending; but the document argued that the minimum level of funding provided by the state was still "enough."[70]

The debate around the federal right to education is ongoing. In recent years, litigants in multiple states have filed suits to overturn *Rodriguez*. In 2016, families with students in Detroit Public Schools filed a suit arguing that Michigan violated the constitutional right to learn by failing to provide many students in underperforming schools "access to literacy."[71] In July 2018, a federal judge agreed that the conditions in these schools "were nothing short of devastating" but that access to literacy, or a "minimally adequate education," was not a fundamental right.[72]

Similarly, in 2016, a group of parents and students filed a federal lawsuit in Connecticut arguing that state laws systematically prevent some students from receiving minimally acceptable education.[73] And in 2017, the Southern Poverty Law Center challenged the federal constitutionality of education conditions in Mississippi.[74] A judge has yet to rule in either case.[75]

The debate over equity: First generation of school funding reform

Two of the earliest and best-known instances of state equity cases occurred during the mid-1970s. Both cases resulted in victories: one in California (*Serrano v. Priest*) and the other in New Jersey (*Robinson v. Cahill*). In both cases, the respective courts used state constitutional provisions requiring equal protection to strike down local property tax-based systems and to order states to build new funding systems that did not heavily rely on a district's property wealth.[76]

Following these successes, equity cases were brought in virtually every state. Many states have modified, although not completely eradicated, their property tax-based systems by increasing the state's share in total education spending. As a result, resource differences among districts in some states have declined.[77]

However, in other states, equity cases have had a negative impact on total spending due to the narrow focus on ensuring parity among districts within a state. In California, the *Serrano* cases provide the most notorious example. The frame of equalized funding pitted high- and low-wealth districts against each other. Therefore, rather than lifting up the system as a whole, it drove toward the lowest common denominator.

In 1976, the California court's ruling in *Serrano* declared that the state's school finance system violated the Equal Protection Clause and was unconstitutional. Following *Serrano*, California prioritized a property tax-based solution that would close spending gaps between poor and wealthy districts. The court ordered the state to equalize property tax rates and revenues between districts so that, by 1980, disparities in per-pupil spending levels would be no more than $100.[78]

In 1978, Proposition 13, a resolution that placed a cap on property tax rates and restricted annual increases on property value, limited the opportunity to use tax cases as a means to equalize school funding.[79] Instead, local districts could only rely on state revenue for funding parity, making it nearly impossible for any district to pay for new policies and initiatives.

California's primary concern was equity of per-pupil funding levels, not the adequacy of funding levels. By 1986, more than 90 percent of California students resided in school districts with a per-pupil funding disparity of less than $100 between them.[80] But the victory was shortsighted. The state and districts lowered their overall expenditures, and California no longer led the nation in education spending.[81] In fact, in 1965, before the *Serrano* ruling, California ranked fifth in the nation in per-pupil spending, but by 1995, the state fell to 42nd.[82] As a result, student achievement also began to drop. In 2017, California ranked 44th based on NAEP scores, graduation rate, college readiness, and access to preschool.[83] In 2013, California implemented a new policy to tackle school funding and created the Local Control Funding Formula—a formula that is not based on property taxes and provides additional resources for students in need of additional supports, including those from low-income families, English language learners, and students with disabilities.[84]

Similarly, in Texas, the *Edgewood Independent School District v. Kirby* case, which was filed after the *Rodriguez* decision, turned the issue of school finance into a zero-sum game. In 1989, the court ruled the state finance system unconstitutional on grounds of equity.[85] In response, the Texas Legislature attempted to reduce differences in local tax revenues by recapturing a wealthy district's excess revenues and redistributing them to poorer districts—in what some label a "Robin Hood" approach—or by placing a cap on districts' property taxes.[86]

Under this reform, by the early 2000s, Texas successfully reduced funding disparities between wealthier and poorer districts from 700 to 1, as was the case during the first *Edgewood* decision, to 28 to 1.[87] However, the Robin Hood approach in Texas proved problematic, with advocates on both the left and right railing against the provision. The "recapture" approach, in particular, created a disincentive for taxpayers in wealthier districts to support an increase in local property taxes. According to one news report: "While those in economically challenged areas said funding was inadequate, districts in well-to-do locales argued that voters often refuse to approve local tax increases because much of the money would go elsewhere."[88]

The state legislature also attempted to place a cap on a district's property tax rates as a way to restrict wealthier districts from raising too much in revenue. However, in *Neeley v. West Orange*, the Texas Supreme Court ruled that this was essentially a statewide property tax, which is prohibited in the state constitution.[89]

In 2006, the state legislature passed H.B. 1, a new policy to equalize funding across districts by supplementing district budgets with state funds; but Texas struggled to allocate sufficient funds.[90] The average per-pupil spending declined—except for during 2009 through 2011, when Texas received additional funding from the American Recovery and Reinvestment Act.[91]

Little is likely to change. In 2016, the Texas Supreme Court ruled that the state met its minimal constitutional duty and that the court should not "usurp legislative authority" in deciding how Texas allocates funds to education.[92]

In the end, equity cases spurred policy change to minimize funding inequities. Yet in some states, the focus on equal dollars, rather than the quality of services provided to students, led to a leveling out of public investment in education.[93] In later cases, litigants and courts moved beyond the concept of equal funding levels, instead adopting "adequacy" as the framework.

Issues of adequacy: Second generation of school funding reform

Over the past few decades, an increasing number of state fiscal cases have focused on issues of adequacy, or a minimum amount of per-pupil funds. These cases rely on states to articulate clear educational goals for all students, identify programs or resources to meet those expectations, and allocate the funds to support necessary inputs.[94] In some cases, this frame has created a context for weak policy, as courts have interpreted "adequate" to mean a bare minimum defined by the state. However, in several cases, this frame has driven efforts to articulate what level of funding and what types of resources are necessary to ensure equal educational opportunity. Cases in New Jersey and Massachusetts provide examples of the latter.

Abbott v. Burke: Raising the bar for school funding in New Jersey

Abbott v. Burke is often cited as a success story under an adequacy framework. Although the road to advocacy was a long one, which involved a series of compliance suits following the original court decision, the ultimate remedies implemented were substantial.

Abbott focused on New Jersey's poorest urban districts—28 districts at first, later expanded to 31.[95] The plaintiffs argued that the state was failing to provide high-poverty districts with the funds necessary for a "thorough and efficient education," which was required by the state constitution.[96] While *Abbott* was decided on adequacy grounds, the court orders called for reforms that both equalized funding across districts and provided funds for specific programs—above and beyond equalization.[97]

In the initial rulings, the court explicitly called for "parity," or equality, in funding.[98] Following the first major *Abbott* ruling in 1990, the New Jersey Legislature responded with the Quality Education Act (QEA).[99] While the QEA did not give the Abbott districts full equity, it substantially improved funding for the districts. In 1996, the state legislature made another attempt to equalize funding with the Comprehensive Education Improvement and Financing Act, but the court found this effort insufficient. The court also continued to order parity in foundation funding, and by the 1997-98 school year, state aid increased by $246 million.[100]

In later rulings, the court began mandating funding for specific programs that could improve student outcomes and close achievement gaps.[101] In the 1998 *Abbott V* decision, the court mandated full-day kindergarten, half-day preschool, whole-school reform for elementary schools, college-transition programs for secondary schools, and other supplemental programs in Abbott districts. The court also granted districts the right to seek additional funding for on-site social services and other supplemental programs as needed.[102]

In 2000, the court clarified its requirements on the implementation of "high-quality preschool" in the Abbott districts, including clear standards, a qualified teaching staff, and smaller class sizes.[103] A series of later *Abbott* rulings also focused on the provision of state funding to schools for renovations and constructions. In 2008, the legislature earmarked almost $3 billion to help build schools in the state's cities.[104]

The court order for whole-school reform in elementary schools also spurred the New Jersey commissioner of education to implement Success for All, a literacy initiative for low-income, at-risk students, statewide.[105] This national program has a long record of increasing reading achievement, closing test score gaps, reducing assignments of students to special education classes, and reducing rates of grade retention.[106]

The *Abbott* decisions have been critical in improving both fiscal equity and school quality in the state. New Jersey's approach was aggressive and expansive, and the court was actively involved in enforcing parity and providing increased resources to under-resourced districts. The court even asserted its new focus on quality, stating, "The comprehensive whole-school reform and supplemental programs approved by the Court amount to a marked shift in emphasis from financing as such to education itself."[107]

New Jersey consistently ranks high in education performance and quality, as well as progress in narrowing the achievement gap.[108] Many observers believe that the fiscal remedies established by *Abbott* have helped to increase student outcomes in the state.[109]

McDuffy v. Secretary of the Executive Office of Education: Equitable school funding in Massachusetts

In Massachusetts, *McDuffy v. Secretary of the Executive Office of Education* propelled education funding reform.[110] In 1993, the Massachusetts Supreme Judicial Court sided with the plaintiff's argument that the state failed to meet its constitutional duty to provide all students with an adequate education of sufficiently high quality. After the ruling, the Massachusetts Legislature passed one of the most comprehensive reform bills of its time, the Massachusetts Education Reform Act (MERA), which restructured the state's school finance system and made changes to other areas of education, including new standards, an accountability system, and an authorization of charter schools.[111]

One hallmark of the bill was its introduction of a foundation formula, which aimed to bring all Massachusetts school districts to an adequate level of per-pupil funding by 2020 or over a seven-year phase-in period.[112] By 2000, all districts were at or above their targeted foundation level.[113] By 2002, the total funding doubled to nearly $3 billion. [114] In 2005, the court ruled in *Hancock v. Commissioner of Education* that the state had established a system that sufficiently addressed inequities and met the constitutional standard.[115]

Student outcomes remain strong. Massachusetts has some of the highest growth rates of any state.[116] Observers have argued that the state's fiscal reforms are partially behind these gains.[117] Other research supports this view, showing that an adequacy frame does more to improve outcomes for students. For example, a 2016 NBER study showed that of the various approaches to school spending reform, fiscal initiatives that guarantee a baseline amount of per-pupil funds—otherwise known as foundation plans—were the most effective in increasing overall per-pupil spending and reducing funding disparities between poor and affluent districts. Foundation plans are similar to the adequacy framework; compared with equalization plans, they tend to result in increases in spending across all districts over time.[118]

To be sure, adequacy has its limitations as a policy. When defined narrowly, the reforms can serve as a barrier to progress. For instance, the U.S. Supreme Court discussed adequacy in *Rodriguez* but held that "the State's contribution … was designed to provide an adequate minimum educational offering in every school in the State."[119] Similarly, in *Connecticut Coalition for Justice in Education Funding v. Rell*, the Connecticut Supreme Court ruled that the state allocated sufficient funding for minimally adequate facilitations, materials, curricula, and teachers, ultimately determining that decisions about the types of services a district provides were "quintessentially legislative in nature."[120]

Recommendations

The nation needs a third way to understand school funding. Drawing from this analysis, the authors recommend that school finance reform emphasize a high-quality education program for all students. To reach this aim, students with greater needs must receive additional funding, and that funding needs to be targeted at the reforms that matter. Finally, accountability systems and academic standards are necessary to measure quality and shine a light on inequities.

Putting forth a federal high-quality finance system: The third wave of school finance

The issue of quality has long been a part of the school funding debate. Justice Marshall mentioned the delivery of high-caliber education in his dissenting opinion in the *Rodriguez* case.[121] As Marshall wrote, "The Court today decides, in effect, that a State may constitutionally vary the quality of education which it offers its children in accordance with the amount of taxable wealth located in the school districts within which they reside."[122] But the issue of quality needs to move front and center and drive school funding debates moving forward. In short, low-income students need more than equity or adequacy; they need sufficient funding to ensure success—which means more funding, not equal funding—as well as equal access to core services with accountability for outcomes.

The following principles should guide school finance reform based on quality at the federal, state, and local levels, but states must drive reform to school funding systems, as local and state dollars account for the vast majority of overall education funding.

- **School funding systems should ensure equal access to core educational services.** School equity debates must go beyond funding, and states must support equal access to robust services. The New Jersey Supreme Court described this issue well in the *Abbott* ruling: The focus should shift from "financing [to the issue of] education itself."[123] The New Jersey court minimized educational disparities by requiring the legislature to implement high-quality policies and programs that are linked to improved student outcomes.

Using this as a model, school finance advocates should identify the core components of a high-quality education and ensure equal access to those services as a check on a weighted student funding formula. There are many factors that contribute to a school's and a student's success, but research shows that, at a minimum, a next-generation system should have systems to ensure access to a strong teaching workforce,[124] access to high-quality early childhood programs,[125] and a robust curriculum and instructional tools.[126]

Specifically, policymakers should fund critical programs to increase the quality of all teachers. Policymakers and school funding advocates should protect and increase funding for teacher compensation and professional development, targeting low-income schools. Programs designed to reduce the cost of teacher preparation—such as the federal Teacher Education Assistance for College and Higher Education (TEACH) loan forgiveness program—should be enhanced for those willing to teach in high-poverty schools.[127]

The federal government and state policymakers must play a role in ensuring an equitable distribution of skilled and experienced teachers. Under the recently passed Every Student Succeeds Act (ESSA), states are required to describe how they will ensure that low-income students and students of color are not more likely to be taught by teachers who are less effective or experienced. Some states took this requirement seriously and used it as an opportunity for developing clear goals and timelines for reducing these inequities, as well as specific strategies for reaching these goals and reporting requirements that ensure transparency should the state fail to reach their goals.[128] However, many states did not make nearly this effort and have significant room to improve, both on the equitable distribution of teachers and their response to the problem.[129]

Access to rigorous standards, curricula, and courses is also a key ingredient to a high-quality education. At a minimum, states should ensure that all students have access to algebra in eighth grade and to Advanced Placement (AP) or similar rigorous courses in high schools.

Indiana provides one such example. Starting in 2007, the state made a rigorous high school curriculum—named Core 40—aligned to entry coursework in the state's public universities the default for all students.[130] Before enrolling in less rigorous coursework, students and their families must meet with a high school counselor and agree that lower academic standards are better suited for the student's need.[131]

Indiana wanted to incentivize and support its low-income students to complete rigorous coursework. Therefore, "students who complete a Core 40 diploma and meet other financial aid and grade requirements can receive up to 90 percent of approved tuition and fees at eligible colleges."[132] In 2017, 87 percent of Indiana's public school students earn at least a Core 40 diploma, including 78 percent of black students, 83 percent of Hispanic students, 90 percent of white students, and 83 percent of low-income students.[133]

Finally, policymakers and school funding advocates must ensure equitable access to early childhood programs and other programs that offer child care. This would require federal and state governments to increase their investment in early childhood in order to ensure that all families, regardless of income, are able to access high-quality early childhood programs.[134] Moreover, to improve the quality of all early childhood programs, public investment should incentivize programs to adopt rigorous standards and offers teachers in early childhood programs a suitable wage.

- **School funding should provide extra money for low-income students and end across-state inequities.** In order to overcome issues of poverty, low-income students need additional funds. Some research shows that students in poverty require twice the funding as students from affluent backgrounds.[135] These dollars should attract effective teachers, improve curriculum, and fund programs such as early childhood education.

States with successful remediation efforts have provided more total funds to their low-income students, and in some areas, low-income students receive more than 20 percent more in total funding than their affluent peers.[136] In New Jersey, for instance, students in the poorest districts receive $3,000 more in per-pupil revenue per year than students in the wealthiest districts. [137] Similarly, in California's new funding system, the state now spends about a third more on low-income students.[138] An innovative and robust funding system should follow these models and heed the research that proves that money matters, especially for low-income students.

Weighted student funding can help navigate the balance between higher-quality and better supports. Under this program, districts give low-income students, students with disabilities, and other at-risk populations extra "weights" so that additional funding is provided above the base per-pupil level. Funding is allocated to schools based on the number and demographics of students they serve.[139] Weighted student funding models provide principals with discretion over the use of schools' budgets. Principals can build their school budget, staff, and program options to best serve their students.

Several states, including California and Rhode Island, have rolled out comprehensive school funding reforms that include weighted student funding. The impact of these programs is yet to be determined, but early results show at least some promise. California's new policy, it seems, has had a positive impact on high school graduate rates. Specifically, the graduation rate of high-need students who received an additional $1,000 in per-pupil spending from the state increased by an average of 5 percent.[140]

Weighted student formulas should be tied to accountability frameworks that look at outcomes as well as equal access to core services, including early childhood education, effective teachers, and rigorous college- and career-ready curriculum.

- **Outcomes-based accountability should serve as a check on school funding systems.** Fiscal reform must include efforts to increase the rigor of academic standards and strengthen accountability provisions. Such reforms make more data available to evaluate the quality of every public school and ensure that students are held to the same high levels of performance—irrespective of their race, income, or ZIP code.

Indeed, research has shown that states that adopt rigorous academic standards are more successful in increasing outcomes of low-income students. For example, a 2016 analysis found that states that fully embrace standards-based reform are more successful at improving the academic outcomes of low-income students, while states that are more resistant to adopting rigorous assessments post poorer results.[141]

In other words, school funding reform is not a replacement for accountability systems. ESSA requires all states to adopt rigorous standards and hold schools accountable for student performance. It also maintains a requirement that every school must disaggregate student performance by student population—such as students from low-income families, English language learners, homeless and foster youth, and more.[142]

Relatedly, weighted student funding also works best in conjunction with other reforms that emphasize quality and outcomes. In the last decade, many districts have implemented weighted student funding, including Houston, Baltimore, and New York City. The districts that have also included thoughtful indicators on student performance and maximized principal budget autonomy appear to be most successful in narrowing achievement gaps.[143]

Given the level of flexibility afforded to local actors in most weighted student formula frameworks, accountability for outcomes is essential to ensuring that the additional resources reach the students most in need. In addition, there must be a check to ensure that weighted formulas increase access to fundamental core services such as early childhood education.

Accountability systems should also require districts to report transparent school-level outcome data. School report cards should specify students' outcomes as well as the availability and quality of core services that research shows are essential to provide a high-quality education. Such reporting must also be married with efforts to turn around low-performing schools and ensure support for schools that need the most help.

- **Education and child welfare programs should be fully funded.** Both research and successful school finance reform show that money matters. Federal, state, and local policymakers should maintain or increase investments in education and child welfare programs. This is particularly important following the economic downturn in 2008, which negatively affected education funding as most states cut funding for education. As of 2015, 29 states had yet to restore funding to pre-2008 per-pupil funding levels.[144]

The Trump administration has consistently proposed significant cuts to education and child welfare programs that would devastate states' attempts to maintain or restore funding levels.[145] Federal funding accounts for 38 percent of states' education funding—and 8.5 percent of overall public elementary and secondary education—so significant cuts to federal programs would have severe and lasting effects on the services and opportunities that states can offer to all students.[146] If states receive less federal funding, state constitutions' balanced budget provisions would force states to either reduce spending or raise taxes.[147]

Moreover, President Donald Trump has advocated to reduce federal funding for other child welfare programs, including Medicaid.[148] Currently, districts leverage Medicaid funding to provide screening, diagnosis, and treatment services. They also supplement their budgets to provide medical services to students with disabilities.[149]

When students' medical needs are met, schools can focus their limited dollars on students' academic and social development. With less Medicaid funding, however, schools may further struggle to provide a quality education for students who do not have access to vision or hearing screenings or have an undiagnosed chronic condition.

When considering creating equitable services and opportunities for all students, federal, state, and district actors must preserve funding for education and other funding streams that meet children's needs.

Conclusion

Since *Rodriguez*, state litigation and legislative action have increased awareness of the importance of fiscal equity in education. Much can be learned from these efforts, and it is clear that neither equity nor adequacy alone is enough. Looking forward, federal, state, and local governments should learn from certain states' successes in order to develop funding systems that focus on quality and outcomes. School finance systems should be progressive and student-centered. States must set clear expectations, align funding and programming with these standards, and recognize the extra support that disadvantaged students need in terms of effective programs.

Justice Marshall once argued, "Sometimes history takes things into its own hands," and no doubt, he was right.[150] Yet at the same time, policymakers—especially those at the state level—must take school finance into their own hands and do right by students.

About the authors

Carmel Martin is a distinguished senior fellow at the Center for American Progress.

Ulrich Boser is a senior fellow at the Center.

Meg Benner is a senior consultant at the Center.

Perpetual Baffour is a former research associate at the Center.

Endnotes

1 Cynthia E. Orozco, "Rodriguez v. San Antonio ISD," Texas State Historical Association, June 15, 2010, available at https://tshaonline.org/handbook/online/articles/jrrht.

2 *San Antonio Independent School District v. Rodriguez*, 411 U.S. 1 (1973).

3 Ibid.

4 National Center for Education Statistics, "Revenue Per Student," school year 2013-2014 data, available at https://nces.ed.gov/edfin/search/peergroupdata.asp?dataid=1&mt=0&subdataid=1&bleaid=4807590&jobid=%7bEBD97C69-8B38-4ADC-B122-A56445ECB58B%7d (last accessed October 2018).

5 Ibid.

6 Texas Education Agency, "2016-2017 Texas Academic Performance Report," available at https://rptsvr1.tea.texas.gov/cgi/sas/broker?_service=marykay&year4=2017&year2=17&_debug=0&single=N&title=2017+Texas+Academic+Performance+Reports&_program=perfrept.perfmast.sas&prgopt=2017%2Ftapr%2Ftapr.sas&ptype=P&level=district&search=district&namenum=Edgewood&district=015905 (last accessed June 2018).

7 The Education Trust, "Funding Gaps: An Analysis of School Funding Equity Across the U.S. and Within Each State" (2018), available at https://1k9gl1yevnfp2lpq1dhrqe17-wpengine.netdna-ssl.com/wp-content/uploads/2014/09/FundingGapReport_2018_FINAL.pdf.

8 Ibid.

9 Julien Lafortune, Jesse Rothstein, and Diane Whitmore Schanzenbach, "Can school finance reforms improve student achievement?" (Washington: Washington Center for Equitable Growth, 2016), available at http://equitablegrowth.org/research-analysis/can-school-finance-reforms-improve-student-achievement/.

10 Ibid.

11 Valerie E. Lee and David T. Burkam, "Inequality at the starting gate: Social background differences in achievement as children begin school" (Washington: Economic Policy Institute, 2002), available at https://www.epi.org/publication/books_starting_gate/.

12 Bruce Baker and others, "Is School Funding Fair? A National Report Card" (Newark, NJ: Education Law Center, 2016), available at http://www.edlawcenter.org/assets/files/pdfs/publications/National_Report_Card_2016.pdf.

13 Michael B. Marois and James Nash, "California Schools Suffer Under Proposition 13 Tax Cap's Chaos," Bloomberg, July 12, 2011, available at http://www.bloomberg.com/news/articles/2011-07-12/california-schools-suffering-as-proposition-13-tax-cap-breeds-fiscal-chaos.

14 *Abbott v. Burke*, 153 N.J. 480 (1998), available at https://www.courtlistener.com/opinion/1898631/abbott-by-abbott-v-burke/.

15 C. Kirabo Jackson, Rucker C. Johnson, and Claudia Persico, "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms," *The Quarterly Journal of Economics* 131 (1) (2016): 157–218, available at https://www.nber.org/papers/w20847.

16 Lisette Partelow and others, "Trickle-Down Cuts to Education" (Washington: Center for American Progress, 2017), available at https://www.americanprogress.org/issues/education-k-12/reports/2017/10/26/441418/trickle-down-cuts-to-education/; Stephen Q. Cornman and others, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2014–2015 (Fiscal Year 2015)" (Washington: National Center for Education Statistics, 2018), available at https://nces.ed.gov/pubs2018/2018301.pdf.

17 Elizabeth Anderson, "Fair Opportunity in Education: A Democratic Equality Perspective," *Ethics* 117 (4) (2007): 595–622, available at http://www.mit.edu/~shaslang/mprg/AndersonFOE.pdf.

18 Emily Parker, "50-State Review: Constitutional obligations for public education" (Denver: Education Commission of the States, 2016), available at https://www.ecs.org/wp-content/uploads/2016-Constitutional-obligations-for-public-education-1.pdf.

19 Anna Berkes, "An educated citizenry is a vital requisite for our survival as a free people (Spurious Quotation)," Thomas Jefferson Encyclopedia, March 30, 2010, available at https://www.monticello.org/site/jefferson/educated-citizenry-vital-requisite-our-survival-free-people-spurious-quotation.

20 Eric A. Hanushek and Ludger Wößmann, "Education Quality and Economic Growth" (Washington: World Bank Group, 2007), available at http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079934475/Edu_Quality_Economic_Growth.pdf.

21 Anthony P. Carnevale, Nicole Smith, and Jeff Strohl, "Help Wanted: Projections of Jobs and Education Requirements Through 2018" (Washington: Georgetown University Center on Education and the Workforce, 2010), available at https://1gyhoq479ufd3yna29x7ubjn-wpengine.netdna-ssl.com/wp-content/uploads/2014/12/fullreport.pdf.

22 Anthony P. Carnevale, Nicole Smith, and Jeff Strohl, "Recovery: Job Growth and Education Requirements Through 2020" (Washington: Georgetown University Center on Education and the Workforce, 2013), available at https://1gyhoq479ufd3yna29x7ubjn-wpengine.netdna-ssl.com/wp-content/uploads/2014/11/Recovery2020.FR_.Web_.pdf.

23 Anthony P. Carnevale, Tamara Jayasundera, and Artem Gulish, "America's Divided Recovery: College Haves and Have-Nots" (Washington: Georgetown University Center on Education and the Workforce, 2016), available at https://1gyhoq479ufd3yna29x7ubjn-wpengine.netdna-ssl.com/wp-content/uploads/Americas-Divided-Recovery-web.pdf.

24 Anthony P. Carnevale, Ban Cheah, and Andrew R. Hanson, "The Economic Value of College Majors" (Washington: Georgetown University Center on Education and the Workforce, 2015), available at https://cew.georgetown.edu/wp-content/uploads/Exec-Summary-web-B.pdf.

25 Pew Research Center, "The Rising Cost of *Not* Going to College" (2014), available at http://assets.pewresearch.org/wp-content/uploads/sites/3/2014/02/SDT-higher-ed-FINAL-02-11-2014.pdf.

26 The President's Commission on School Finance "Schools, People, & Money: The Need for Educational Reform" (1972), available at https://eric.ed.gov/?id=ED058473.

27 Stephen Q. Cornman, "Revenues and Expenditures for Public Elementary and Secondary School Districts: School Year 2011–12 (Fiscal Year 2012)" (Washington: National Center for Education Statistics, 2015), available at https://nces.ed.gov/pubs2014/2014303.pdf.

28 Urban Institute, "How Has Education Funding Changed Over Time?" (2017), available at http://apps.urban.org/features/education-funding-trends/.

29 Ibid.

30 The Education Trust, "Funding Gaps: An Analysis of School Funding Equity Across the U.S. and Within Each State."

31 Miller Center, "Conversation with Martin Luther King and Office Secretary (January 15, 1965)," available at https://millercenter.org/the-presidency/secret-white-house-tapes/conversation-martin-luther-king-and-office-secretary (last accessed October 2018).

32 LBJ Presidential Library, "Johnson's Remarks on Signing the Elementary and Secondary Education Act (April 11, 1965)," available at http://www.lbjlibrary.org/lyndon-baines-johnson/timeline/johnsons-remarks-on-signing-the-elementary-and-secondary-education-act (last accessed October 2018).

33 Urban Institute, "How Has Education Funding Changed Over Time?".

34 Baker and others, "Is School Funding Fair? A National Report Card."

35 U.S. News & World Report, "Pre-K - 12 Rankings: Measuring how well states are preparing students for college," available at https://www.usnews.com/news/best-states/rankings/education/prek-12 (last accessed June 2018).

36 Stephen Q. Cornman, "Revenues and Expenditures for Public Elementary and Secondary School Districts: School Year 2012-2013 (Fiscal Year 2013)" (Washington: National Center for Education Statistics, 2016), available at https://nces.ed.gov/pubs2015/2015303.pdf.

37 Ibid.

38 Bruce D. Baker, "Does Money Matter in Education?" (Washington: Albert Shanker Institute, 2016), available at http://www.shankerinstitute.org/sites/shanker/files/moneymatters_edition2.pdf.

39 Jackson, Johnson, and Persico, "The Effects of School Spending on Educational and Economic Outcomes."

40 Ibid.

41 Julien Lafortune, Jesse Rothstein, and Diane Whitmore Schanzenbach, "School Finance Reform and the Distribution of Student Achievement," *American Economic Journal: Applied Economics* 10 (2) (2018): 1–26, available at https://pubs.aeaweb.org/doi/pdfplus/10.1257/app.20160567.

42 Michael Leachman, Kathleen Masterson, and Eric Figueroa, "A Punishing Decade for School Funding" (Washington: Center on Budget and Policy Priorities, 2017), available at https://www.cbpp.org/research/state-budget-and-tax/a-punishing-decade-for-school-funding.

43 Kenneth Shores and Matthew P. Steinberg, "The Impact of the Great Recession on Student Achievement Evidence from Population Data." Working Paper 17-09 (Stanford Center for Education and Policy Analysis, 2017), available at https://cepa.stanford.edu/sites/default/files/wp17-09-v201708.pdf.

44 C. Kirabo Jackson, "Could the Disappointing 2017 NAEP Scores Be Due to the Great Recession?", *Education Next*, April 10, 2018, available at http://educationnext.org/could-disappointing-2017-naep-scores-due-to-great-recession/.

45 Roberta Michnick Golinkoff and others, "Talking with children matters: Defending the 30 million world gap," Brookings Institution, May 21, 2018, available at https://www.brookings.edu/blog/education-plus-development/2018/05/21/defending-the-30-million-word-gap-disadvantaged-children-dont-hear-enough-child-directed-words/.

46 Christopher Ruhm and Jane Waldfogel, "Long-Term Effects of Early Childhood Care and Education." Discussion Paper 6149 (Institute for the Study of Labor, 2011), available at http://ftp.iza.org/dp6149.pdf.

47 Child Trends, "Appendix 2 - Percentage of Three- to Five-Year-Olds, not in Kindergarten or Elementary School, and not Enrolled in Prekindergarten or Preschool Programs: Selected Years, 1994-2013" (2015), available at https://www.childtrends.org/wp-content/uploads/2012/04/103_appendix2.pdf.

48 National Institute for Early Education Research, "The State of Preschool 2017" (2018), available at http://nieer.org/wp-content/uploads/2018/07/State-of-Preschool-2017-Full-7-16-18.pdf.

49 Raj Chetty, John N. Friedman, and Jonah E. Rockoff, "The Long-Term Impacts of Teachers: Teacher Value-Added and Student Outcomes in Adulthood." Working Paper 17699 (National Bureau of Economic Research, 2012), available at http://www.nber.org/papers/w17699.pdf.

50 Bill Turque, " 'Highly effective' teachers are spread unevenly across District," *The Washington Post*, November 13, 2010, available at http://www.washingtonpost.com/wp-dyn/content/article/2010/11/13/AR2010111303552.html.

51 Carrie Hahnel and Orville Jackson, "Learning Denied: The Case for Equitable Access to Effective Teaching in California's Largest School District" (Oakland, CA: The Education Trust—West, 2012), available at https://1k9gl1yevnfp2lpq1dhrqe17-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/ETW-Learning-Denied-Report_0.pdf.

52 Matthew Di Carlo, "Update On Teacher Turnover In The U.S.", Albert Shanker Institute, 2015, available at http://www.shankerinstitute.org/blog/update-teacher-turnover-us.

53 Ibid.

54 Helen F. Ladd, "Teacher Effects: What Do We Know?". Paper prepared for the Teacher Quality Conference at Northwestern University, May 1, 2008, available at https://pdfs.semanticscholar.org/b91e/62faf2f7b64abf80bd25106db2bf80325b0d.pdf.

55 Byron Auguste, Paul Kihn, and Matt Miller, "Closing the talent gap: Attracting and retaining top-third graduates to careers in teaching" (New York: McKinsey & Company, 2010), available at https://www.mckinsey.com/~/media/mckinsey/industries/social%20sector/our%20insights/closing%20the%20teaching%20talent%20gap/closing-the-teaching-talent-gap.ashx.

56 Douglas N. Harris, "Toward Policy-Relevant Benchmarks for Interpreting Effect Sizes: Combining Effects With Costs," *Educational Evaluation and Policy Analysis* 31 (1) (2009): 3–29, available at http://journals.sagepub.com/doi/abs/10.3102/0162373708327524?journalCode=epaa.

57 Marni Bromberg and Christina Theokas, "Meandering Toward Graduation: Transcript Outcomes of High School Graduates" (Washington: The Education Trust, 2016), available at https://1k9gl1yevnfp2lpq1dhrqe17-wpengine.netdna-ssl.com/wp-content/uploads/2014/09/MeanderingTowardGraduation_EdTrust_April2016.pdf.

58 The New York Equity Coalition, "Within Our Reach: An agenda for ensuring all New York Students are prepared for college, careers and active citizenship" (2018), available at http://equityinedny.edtrust.org/wp-content/uploads/sites/14/2018/05/Within-Our-Reach.pdf.

59 Office for Civil Rights, "2015–2016 Civil Rights Data Collection: Stem Course Taking" (U.S. Department of Education, 2018), available at https://www2.ed.gov/about/offices/list/ocr/docs/stem-course-taking.pdf.

60 Paula A. White and others, "Upgrading the High School Math Curriculum: Math Course-Taking Patterns in Seven High Schools in California and New York," *Education Evaluation and Policy Analysis* 18 (4) (1996): 285–307, available at http://journals.sagepub.com/doi/abs/10.3102/01623737018004285?journalCode=epaa.

61 Adam Gamoran and others, "Upgrading High School Mathematics Instruction: Improving Learning Opportunities for Low-Achieving, Low-Income Youth," *Educational Evaluation and Policy Analysis* 19 (4) (1997): 325–338, available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.854.8452&rep=rep1&type=pdf.

62 Ulrich Boser, Matthew M. Chingos, and Chelsea Straus, "The Hidden Value of Curriculum Reform" (Washington: Center for American Progress, 2015), available at https://www.americanprogress.org/issues/education-k-12/reports/2015/10/14/122810/the-hidden-value-of-curriculum-reform/.

63 Orozco, "Rodriguez v. San Antonio ISD."

64 Ibid.

65 Ibid.

66 Ibid.

67 Ibid.

68 Ibid.

69 Ibid.

70 *San Antonio Independent School District v. Rodriguez*.

71 Jacey Fortin, " 'Access to Literacy' Is Not a Constitutional Right, Judge in Detroit Rules," *The New York Times,* July 4, 2018, available at https://www.nytimes.com/2018/07/04/education/detroit-public-schools-education.html.

72 Ibid.

73 Derek W. Black, "The constitutional right to education is long overdue," The Conversation, December 4, 2017, available at https://theconversation.com/the-constitutional-right-to-education-is-long-overdue-88445.

74 Southern Poverty Law Center, "Indigo Williams, et. al. v. Phil Bryant et. al.", available at https://www.splcenter.org/seeking-justice/case-docket/indigo-williams-et-al-v-phil-bryant-et-al (last accessed October 2018).

75 Derek W. Black, "The constitutional right to education is long overdue."

76 *Serrano v. Priest,* 5 Cal.3d 584 (1971), available at https://scocal.stanford.edu/opinion/serrano-v-priest-27628; *Robinson v. Cahill,* 69 N.J. 449 (1976), available at https://law.justia.com/cases/new-jersey/supreme-court/1976/69-n-j-449-0.html.

77 Urban Institute, "How Has Education Funding Changed Over Time?".

78 *Serrano v. Priest*; *Edgewood Independent School District v.* Kirby, 804 S.W.2d 491 (Tex. 1991), available at https://casetext.com/case/edgewood-independent-school-dist-v-kirby.

79 Kenneth L. Karst, "Serrano v. Priest's Inputs and Outputs," *Law and Contemporary Problems* 38 (3) (1974): 333–349, available at https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=3414&context=lcp.

80 Justia, "Serrano v. Priest," available at https://law.justia.com/cases/california/supreme-court/3d/5/584.html (last accessed October 2018).

81 Michael A. Rebell, "Education Adequacy, Democracy, and the Courts." In Timothy Ready, Christopher Edley Jr., and Catherine E. Snow, eds., *Achieving High Educational Standards for All: Conference Summary* (Washington: National Academies Press, 2002), available at https://www.gpo.gov/fdsys/pkg/ERIC-ED465845/pdf/ERIC-ED465845.pdf.

82 Ibid.

83 U.S. News & World Report, "Pre-K-12 Rankings: Measuring how well states are preparing students for college."

84 California Department of Education, "Local Control Funding Formula," available at https://www.cde.ca.gov/fg/aa/lc/ (last accessed October 2018).

85 *Edgewood Independent School District v. Kirby*, 777 S.W.2d 391 (Tex. 1989), available at https://nces.ed.gov/edfin/pdf/lawsuits/Edgewood_v_Kirby_TX.pdf.

86 ABC13, " 'Robin Hood' school funding formula OK'd by Texas Supreme Court," May 13, 2016, available at http://abc13.com/politics/robin-hood-school-funding-okd-by-texas-supreme-court-/1337142/.

87 Angela Marie Shimek, "The Road Not Taken: The Next Step for Texas Education Finance," *The Scholar* 9 (3) (531) (2007): 542–543.

88 ABC13, " 'Robin Hood' school funding formula OK'd by Texas Supreme Court."

89 *Neeley v. West Orange Cove Consolidated Independent School District*, 04-1144, 05-0145, 05-0148 (Tex. 2005), available at https://caselaw.findlaw.com/tx-supreme-court/1153227.html.

90 Texas H.B. 1, 79th Legislature, 3d sess. (2006), available at https://capitol.texas.gov/tlodocs/793/billtext/html/HB00001F.HTM.

91 Chandra Villanueva, "The Texas School Finance Challenge and What to Do About It" (Washington: Center for Public Policy Priorities, 2016), available at https://forabettertexas.org/images/EO_2016_04_SchoolFinancePolicyPage.docx.pdf; *American Recovery And Reinvestment Act of 2009*, Public Law 111-5, 111th Cong., 1st sess. (February 17, 2009), available at https://www.gpo.gov/fdsys/pkg/PLAW-111publ5/pdf/PLAW-111publ5.pdf.

92 Robert Henneke, "Michael Williams, Et Al. V. The Texas Taxpayer & Student Fairness Coalition, Et Al.", Texas Public Policy Foundation, August 21, 2015, available at https://www.texaspolicy.com/cases/detail/michael-williams-et-al-v-the-texas-taxpayer-student-fairness-coalition-et-al; *Mike Morath v. Texas Taxpayer and Student Fairness Coalition*, 14-0776 (Tex. 2016) Available at http://www.txcourts.gov/media/1371141/140776.pdf.

93 Matthew G. Springer, Keke Liu, and James W. Guthrie, "The impact of school finance litigation on resource distribution: a comparison of court-mandated equity and adequacy reforms," *Education Economics* 17 (4) (2009): 421–444, available at https://my.vanderbilt.edu/matthewspringer/files/2015/02/Springer-et-al-2009.pdf.

94 Rebell, "Education Adequacy, Democracy, and the Courts."

95 Education Law Center, "The History of Abbott v. Burke," available at http://edlawcenter.org/litigation/abbott-v-burke/abbott-history.html (last accessed October 2018).

96 *Abbott v. Burke*.

97 Ibid.

98 Ibid.

99 David E. Weischadle, "Thorough and Efficient Education: School Finance Reform in New Jersey," *Kappan* 60 (2) (1978): 121–123; Education Law Center, "The History of Abbott v. Burke."

100 Education Law Center, "The History of Abbott v. Burke."

101 *Abbott v. Burke*.

102 Ibid.

103 *Abbott v. Burke*, 163 N.J. 95 (2000), available at http://www.edlawcenter.org/assets/files/pdfs/abott-v-burke/Abbott_VI.pdf.

104 Education Law Center, "The History of Abbott v. Burke."

105 New Jersey Department of Education, "Whole School Reform in Abbott Districts," available at https://www.state.nj.us/education/archive/abbotts/wsr/wsrback.htm (last accessed October 2018).

106 Geoffrey D. Borman and Gina M. Hewes, "The Long-Term Effects and Cost-Effectiveness of Success for All," *Educational Evaluation and Policy Analysis* 24 (4) (2002): 243–266.

107 *Abbott v. Burke*.

108 Education Law Center, "Education Reform New Jersey Students Need," available at http://www.edlawcenter.org/news/archives/school-funding/education-reform-new-jersey-students-need.html (last accessed June 2018).

109 Baker, "Does Money Matter in Education?".

110 *McDuffy v. Secretary of the Executive Office of Education*, 415 Mass. 545 (1993), available at https://law.justia.com/cases/massachusetts/supreme-court/1993/415-mass-545-3.html.

111 Mitchell D. Chester, "Building on 20 Years of Massachusetts Education Reform" (Massachusetts Department of Elementary and Secondary Education, 2014), available at http://www.doe.mass.edu/commissioner/BuildingOnReform.pdf.

112 Ibid.

113 Ibid.

114 Noah Berger and Jeff McLynch, "Public School Funding in Massachusetts: Where We Are, What Has Changed, and Options Ahead" (Boston: Massachusetts Budget and Policy Center, 2006), available at http://www.massbudget.org/reports/pdf/Public_School_Funding-Where_We_Are_What_Has_Changed_-_FINAL.pdf.

115 *Hancock v. Commissioner of Education*, 443 Mass. 428 (2005), available at http://masscases.com/cases/sjc/443/443mass428.html.

116 Authors' analysis is based on data provided by the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, and National Assessment of Educational Progress (NAEP) 2003 and 2015 mathematics and reading assessments.

117 Phuong Nguyen-Hoang and John Yinger, "Education Finance Reform, Local Behavior and Student Performance in Massachusetts," *Journal of Education Finance* 39 (4) (2014): 297–322, available at https://www.researchgate.net/publication/259384694_Education_Finance_Reform_Local_Behavior_and_Student_Performance_in_Massachusetts.

118 Jackson, Johnson, and Persico, "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms."

119 *San Antonio Independent School District v. Rodriguez*.

120 *Connecticut Coalition for Justice in Education Funding Inc. v. Rell*, SC 19768 (2018), available at https://caselaw.findlaw.com/ct-supreme-court/1886390.html.

121 Orozco, "Rodriguez v. San Antonio ISD."

122 *San Antonio Independent School District v. Rodriguez.*

123 *Abbott v. Burke*.

124 Linda Darling-Hammond, "Teacher Quality and Student Achievement: A Review of State Policy Evidence," *Education Policy Analysis Archives* 8 (1) (2000): 32–33, available at https://www.researchgate.net/publication/240273279_Teacher_Quality_and_Student_Achievement_A_Review_of_State_Policy_Evidence.

125 Ellen Frede and W. Steven Barnett, "Why Pre-K Is Critical to Closing the Achievement Gap," *Principal* (2011): 8–11, available at https://www.naesp.org/principal-mayjune-2011-early-childhood/why-pre-k-critical-closing-achievement-gap.

126 Amy M. Hightower and others, "Improving Student Learning By Supporting Quality Teaching: Key Issues, Effective Strategies" (Bethesda, MD: Editorial Projects in Education, 2011) available at https://www.edweek.org/media/eperc_qualityteaching_12.11.pdf.

127 Federal Student Aid, "TEACH Grants," available at https://studentaid.ed.gov/sa/types/grants-scholarships/teach (last accessed May 2018).

128 National Council on Teacher Quality, "Fall 2017 ESSA Educator Equity Best Practices Guide," available at https://www.nctq.org/dmsView/NCTQ_ESSA_Educator_Equity_Best_Practices_Guide_714249 (last accessed October 2018).

129 Madeline Will, "States' ESSA Plans Fall Short on Educator Equity, NCTQ Analysis Finds," *Education Week*, November 14, 2017, available at http://blogs.edweek.org/edweek/teacherbeat/2017/11/state_essa_plans_dont_have_suf.html.

130 Indiana Department of Education, "Indiana Graduation Requirements," available at https://www.doe.in.gov/student-services/student-assistance/indianas-diploma-requirements (last accessed October 2018).

131 Indiana Department of Education, "Opt-Out Process for Indiana's New Graduation Requirements," available at https://www.doe.in.gov/sites/default/files/ccr/scopt-outprocess1.pdf (last accessed May 2018).

132 Indian Department of Education, "Core 40 General Information," available at https://www.doe.in.gov/student-services/student-assistance/core-40-general-information (last accessed May 2018).

133 Indiana Department of Education, "2017 Graduation Rate Data" (2018), available at https://www.doe.in.gov/accountability/find-school-and-corporation-data-reports.

134 Katie Hamm and Carmel Martin, "A New Vision for Child Care in the United States" (Washington: Center for American Progress, 2015), available at https://www.americanprogress.org/issues/early-childhood/reports/2015/09/02/119944/a-new-vision-for-child-care-in-the-united-states-3/; *Child Care for Working Families Act,* H.R. 3773, 115th Cong., 1st sess. (2017), available at https://www.congress.gov/bill/115th-congress/house-bill/3773/text.

135 William D. Dumcombe and John Yinger, "How Much More Does a Disadvantaged Student Cost?". Working Paper 60 (Syracuse University Center for Policy Research, 2004), available at https://surface.syr.edu/cgi/viewcontent.cgi?article=1102&context=cpr.

136 National Center for Education Statistics, "Table A-6: Current expenditures per pupil in membership, by poverty quartile and state, FY 2011–2012," available at https://nces.ed.gov/edfin/Fy11_12_tables.asp.

137 Ibid.

138 National Center for Education Statistics, "National Teacher and Principal Survey (NTPS)," available at https://nces.ed.gov/surveys/ntps/tables/ntps_3t_051617.asp (last accessed May 2018).

139 Mike Petko, "Weighted Student Formula (WSF): What Is It and How Does It Impact Educational Programs in Large Urban Districts?" (Washington: National Education Association, 2005), available at http://www.nea.org/assets/docs/HE/formula.pdf.

140 Rucker Johnson and Sean Tanner, "Money and Freedom: The Impact of California's School Finance Reform" (Palo Alto, CA: Learning Policy Institute, 2018), available at https://learningpolicyinstitute.org/product/ca-school-finance-reform-brief.

141 Ulrich Boser and Catherine Brown, "Lessons From State Performance on NAEP" (Washington: Center for American Progress, 2016), available at https://www.americanprogress.org/issues/education-k-12/reports/2016/01/14/128091/lessons-from-state-performance-on-naep/.

142 *Every Student Succeeds Act*, Public Law 114-95, 114th Cong., 1st sess. (December 10, 2015), available at https://www.gpo.gov/fdsys/pkg/PLAW-114publ95/html/PLAW-114publ95.htm.

143 Lisa Snell and Katie Furtick, "Weighted Student Formula Yearbook 2013" (Los Angeles: Reason Foundation, 2013), available at https://reason.org/policy-study/weighted-student-formula-yearbook/.

144 Leachman, Masterson, and Figueroa, "A Punishing Decade for School Funding."

145 Andrew Ujifusa, "Trump Seeks to Cut Education Budget by 5 Percent, Expand School Choice Push," *Education Week*, February 12, 2018, available at http://blogs.edweek.org/edweek/campaign-k-12/2018/02/trump_education_budget_2019_5_percent_cut_school_choice_push.html.

146 Center on Budget and Policy Priorities, "Policy Basics: Where Do Our State Tax Dollars Go?", updated July 25, 2018, available at https://www.cbpp.org/research/state-budget-and-tax/policy-basics-where-do-our-state-tax-dollars-go; Cornman and others, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2014–2015 (Fiscal Year 2015)."

147 National Conference of State Legislatures, "State Constitutional and Statutory Requirements for Balanced Budgets," available at http://www.ncsl.org/research/fiscal-policy/state-constitutional-and-statutory-requirements-fo.aspx (last accessed October 2018).

148 Office of Management and Budget, "An American Budget: Major Savings and Reforms" (U.S. Government Publishing Office, 2018), available at https://www.whitehouse.gov/wp-content/uploads/2018/02/msar-fy2019.pdf.

149 Sasha Pudelski, "Cutting Medicaid: A Prescription to Hurt the Neediest Kids" (Alexandria, VA: The School Superintendents Association, 2017), available at http://aasa.org/uploadedFiles/Policy_and_Advocacy/Resources/medicaid.pdf.

150 David Kurtz, "A Long Road Ahead," Talking Points Memo, March 26, 2013, available at http://talkingpointsmemo.com/edblog/a-long-road-ahead.

Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

Center for American Progress

1333 H STREET, NW, 10TH FLOOR, WASHINGTON, DC 20005 • TEL: 202-682-1611 • FAX: 202-682-1867 • WWW.AMERICANPROGRESS.ORG

17

Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity
Author(s): Karen Hawley Miles and Marguerite Roza
Source: *Peabody Journal of Education*, Vol. 81, No. 3 (2006), pp. 39-62
Published by: Taylor & Francis, Ltd.
Stable URL: http://www.jstor.org/stable/25594717
Accessed: 27-02-2018 20:04 UTC

PEABODY JOURNAL OF EDUCATION, *81*(3), 39–62

Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity

Karen Hawley Miles
Education Resource Strategies
Wayland, MA

Marguerite Roza
The Center on Reinventing Public Education
University of Washington

As attention shifts to how districts allocate resources to schools, student-weighted allocation has emerged as an alternative to traditional staff-based allocation policies. Student-weighted allocation uses student need, rather than staff placement, as the building block of school budgeting. This article examines how the shift to student-weighted allocation affected the pattern of resource distribution within 2 districts: the Houston Independent School District and Cincinnati Public Schools.

This study provides evidence that student-weighted allocation can be a means toward greater resource equity among schools within districts. Resource equity is defined here in per-pupil needs-weighted fiscal terms.

We wish to thank Avis Sharpe and Kathleen Ware, at the Cincinnati Public Schools, and Mark Smith and Robert Stockwell, at the Houston Independent School District, for their help in obtaining and understanding each district's budget detail. We also thank Claudine Swartz and Dan Goldhaber for their help in reworking drafts and three anonymous reviewers for their thoughtful suggestions.

Correspondence should be sent to Karen Hawley Miles, Education Resource Strategies, Executive Director, 8 Bennett Road, Wayland, MA 01778. E-mail: kmiles@educationresourcestrategies.org

However, we also conclude that moving to student-weighted allocation by itself does not guarantee equity gains and that, for a variety of reasons, the equity gains realized in these districts might not be replicated elsewhere. The analysis suggests that important details help determine financial equity gains: (a) the portion of total funds included in school budgets, (b) key elements of the allocation formula, and (c) prior district spending patterns. We caution readers on the inherent limits of attaining fiscal equity.

After 2 decades of research, legal activity, and policy changes surrounding resource distributions across school districts, increasing attention is now turning to resource distribution within districts (Berne, Moser, & Stiefel, 1997; Berne & Stiefel, 1994; Busch & Odden, 1997; Rubenstein, Schwartz, & Stiefel, 2004). Recent studies report significant resource disparities across schools in many urban districts (Berne, Rubenstein, & Stiefel, 1998; Roza & Hill, 2004). The move toward focusing accountability for performance at the school level has drawn attention to these disparities and raised questions about how districts distribute resources among schools.

Comparing resource levels across schools is complicated for two reasons. Until recently, district accounting practices rarely documented school-level expenditures (Picus, 1993). Even now that most districts do, schools receive other resources that are not reported in school-level budgets but instead are part of district department budgets (Miles & Frank, in press; Miles & Hornbeck, 2000). In addition, some students have needs that require additional resources (Quality Counts, 2004). However, as acknowledged by Little and Olszewski (2004) in an article on school spending disparities, in most urban districts, current budgeting and accounting practices provide no means to compare resources across schools with differing student populations.

An increasing number of practitioners, policymakers, and reformers suggest that changing the *method* of allocating resources to schools can promote greater resource equity within a district (Miles & Roza, 2002b; Miles, Ware, & Roza, 2003; Ouchi & Segal, 2003; Seattle Public Schools, 1997). The majority of urban districts use a staff-based allocation process that delivers resources to schools in the form of staff, based on increments of students (Odden & Picus, 2000). However, several urban districts such as those in Seattle, Houston, San Francisco, and Cincinnati recently have moved to student-weighted allocation, which uses student needs as the building block for school budgeting rather than staff allocation (Ouchi & Segal, 2003).

This analysis uses case studies of two urban districts: the Houston Independent School District (HISD) and the Cincinnati Public Schools

(CPS) to (a) compare implementation of student-weighted with staff-based allocation, identifying key fiscal details of the new allocation both in Year 1 and in Year 4 of the reform; (b) analyze the extent to which individual schools gain or lose funds with implementation of student-weighted allocation; and (c) examine fiscal equity gains across schools with the implementation of student-weighted allocation.

We find that the move to student-weighted allocation increased financial equity in HISD and CPS. However, we also conclude that moving to student-weighted allocation by itself does not guarantee equity gains and that, for a variety of reasons, the equity gains realized in these districts might not be replicated elsewhere. The analysis suggests that important details help determine financial equity gains: (a) the portion of total funds included in school budgets, (b) key elements of the allocation formula, and (c) prior district spending patterns. We also caution that measuring fiscal equity does not fully inform resource equity across schools, in part because it does not address human resource capacity, the concentration of high- and low-needs students, and school-level flexibility in the use of resources.

We begin this article by describing how staff-based and student-weighted allocation practices work and how they contribute to, or ameliorate, school-to-school resource inequities. In the methodology section, we introduce a newly developed tool for comparing school spending levels—one that converts dollar figures to an index to compare spending levels at schools with different student needs. The findings describe the details of each district's implementation of student-weighted allocation, the financial impact of the reform on individual schools, the fiscal inequities present before the change in allocation policy, and the fiscal equity gains with the adoption of weighted student allocation. We end with lessons and policy implications.

Background

Staff-Based Allocation

Most districts allocate resources to schools in three steps: (a) assigning school staff using an enrollment-based formula, (b) adding staff positions and resources on top of this formula, and (c) converting staff positions to dollars using district-wide average salaries. The staff-based formula allocates most school employees, such as teachers, principals, and guidance counselors, based on increments, or ranges, of overall student enrollment or enrollment of specific types of students (Sclafani, 2004). For example, a school might receive one teacher for every 24 students, a vice principal if it has more than 400 students, and a bilingual education teacher for every 10 to 50 English language learners. Schools either gain or lose resources when on the cusp of the range. Usually, staff members are allocated as full-time positions; occasionally districts allocate percentages of full-time staff positions. Additionally, there are nonformula line-item staff additions that either address the needs of specific students (e.g., special education or limited English proficiency) or serve special programs (e.g., an art teacher for an arts magnet school). The district then totals up the number of full-time equivalent (FTE) staff positions and converts them into dollars using district-wide average salaries for each type of staff.

Staff-based allocation often produces school budgets that report varying per-pupil expenditures. The process of allocation makes it difficult to evaluate the sources or reasons for different resource levels. Analysis of school budgets suggests differences in funding levels are generally caused by school size, nonformula magnet or other special program staff, resources for special student populations, and costs of physical plant differences (Miles & Roza, 2002c). Sometimes these variations in spending per pupil are justifiable as, for example, when differing allocations map to the varying needs of students or school building characteristics. Other times, inequities are simply the unplanned products of mathematical formulas, political influence, history, or the special interests of a district department head.

Despite per-pupil spending differences created by staff-based allocation, this practice continues in nearly all urban districts nationwide. Understanding the reasons for its prevalence provides clues about the conditions under which moving away from staff-based allocation might improve resource equity between schools and why some reformers and policymakers now call for new allocation practices. Staff-based allocation makes sense when there are strict requirements for specific staff positions and levels in schools that do not vary based on the number of students and when school leaders are not expected to adapt the organization to fit student or staff needs. For example, if contracts or state regulations require every school to have a principal and a clerk, then schools with fewer students will have higher per pupil administrative costs. In this case, giving schools a strict dollar amount per pupil would penalize small schools and force them to divert resources away from instruction. However, expectations about what schools look like and how they are organized are changing as charter schools are finding ways to use resources differently and high-performing schools are finding creative ways to rethink school resources (Miles, 1995, 2001; Miles & Darling-Hammond, 1998). In addition, many schools now receive additional staff positions to serve students with special needs or programs that are not reflected in staffing rules or contracts. (Miller, Roza, & Swartz, 2005). Moving away from strict allocations of positions is critical to realizing new models. However, as soon as schools begin to convert staff positions to dollars, they call to the forefront spending comparisons in terms of dollars per pupil. Comparing school spending requires development of a method that adjusts for student need. This article describes and utilizes one such tool.

Student-Weighted Allocation

Some policymakers have called for an end to staff-based allocations, favoring instead a system that distributes dollars, rather than staff, to schools using a student-centric formula (called student-weighted allocation or weighted student funding). The idea behind student-weighted allocation is to incorporate all baseline education and additional student resource needs into a formula that drives the distribution of dollars, not staff. This system weights pupils according to their different educational needs and the cost to serve them. In this study, we define the term *weight* to mean the formulaic spending increment allocated on the basis of a student-identified characteristic. Common categories for weighting include special education, poverty, limited English proficiency, vocational education, grade level, and gifted education. For instance, if district leaders make a strategic decision to invest more heavily in K–3 students and create smaller class sizes, the district could assign all students in a K–3 class an additional class size reduction funding weight of, say, 10%. This 10% funding weight would be added to all other weights in the existing school formula, ensuring that added resources for the K–3 class size reduction effort are distributed equitably among all K–3 students.

This new method of allocation can be a tool that increases equity in school budget spending because it makes funding levels transparent and requires deliberate adjustment of a formula to reduce or add resources to schools (Miles & Roza, 2002a). Districts or states also may consider use of student-weighted allocation because it is believed to promote flexibility and accountability for use of resources, simplify or depoliticize the budgeting process, provide for portability of funding (to facilitate funds transfers when students choose among different schools), and facilitate budgeting when district revenues increase or decrease. The larger education finance field has surfaced several key issues relevant to studying district-to-school allocations, namely (a) what funds are included in the school-based allocation, (b) how districts augment funding for specific student needs, and (c) to what extent funds are allocated for specific school or program characteristics (Berne & Stiefel, 1999; Odden, 1999). Each of these issues, and its impact on equity, is relevant to our investigation of student-weighted allocation.

First, student-weighted allocation typically is used to allocate only those resources that show up in school budgets. This means that whereas student-weighted allocation might decrease per pupil spending differences across schools, it has no impact on two other sources of spending differences not reflected in school-level budget analysis: those attributed to differences between real and average teacher salaries and those resulting from staff located in the school but reported on centrally managed budgets.

Districts commonly reflect average district salaries in school budgets rather than the actual salary earned by each employee, thereby masking potentially significant spending variation. Such differences occur because new teachers whose actual salaries are significantly lower may be concentrated disproportionately in some schools (The Education Trust–West, 2005; Roza & Hill, 2004). Research on this source of variation reveals fairly predictable spending disparities across urban districts; real salaries impact the average school's budget by some 4% to 7%, with coefficients of variation ranging from .06 to .08 (Roza & Hill, 2004). These patterns are consistent across both districts using staff-based allocations and those using student-weighted allocations, suggesting that spending differences associated with real salaries are driven by different factors.[1]

Centrally managed, or budgeted, programs create spending differences by distributing resources like professional development and special program staff across more than one school. Districts typically do not track or report which schools receive these resources. With little spending data on how these services impact schools, researchers have had difficulty to date assessing the impact of centrally managed spending. Recent analysis of Denver, Seattle, Baltimore, and Providence school districts suggest that these resources can add as much as 40% to a school budget and that the differences across schools may be even greater than either school-reported budget resources or the spending differences created by real salaries; coefficients of variation range from .32 to .37 (Miles & Frank, in press; Miller et al., 2005). The most complete analysis of equity across schools would maximize the tracking of instructional, administrative, and support resources to the school level. In different studies of resource use across districts, districts vary significantly in the

[1]Salary data from three districts that use student-weighted allocations (Cincinnati, Seattle, and San Francisco) reflect similar salary patterns as those documented in districts using staff-based allocations.

portion of resources they track to the school level and some portion of this spending is in the form of shared services. Although this study isolates the impact of changing from staff-based allocation to student-weighted allocation for school-level budgets only, HISD and CPS are good sites to study because they attempt to maximize resources tracked to the school level and clearly detail school-level services.[2] For this study, then, it is important to consider the resulting changes in spending patterns in the context of these other sources of spending differences that are not impacted directly by the change to student-weighted allocation.

Second, with regard to how districts account for student needs, there is now much discussion in the literature on what weights should be applied for each type of student to reflect the additional costs of serving students with special needs. Although some research proposes dramatic increases to existing weights for disadvantaged students, there is no consensus in this area (Baker, 2004; Duncombe & Yinger, in press). It is important to note that student-weighted allocation does not consider the spending variations that result from the marginal cost differences of serving each additional student. Because allocations are pupil based, schools receive a fixed allotment for each additional student regardless of the fact that there may be per-pupil cost savings associated with, say, having two non-English-speaking students versus one.

Third, many districts also allocate resources for specific school (e.g., magnet and small schools) or program characteristics (e.g., Montessori and Reading Recovery). These funds often are driven by the added curricular or instructional costs associated with the programs. For example, in 1999, CPS allocated an average of 40% more per pupil to schools implementing the Paidea Comprehensive Reform model. One option in the student-weighted allocation model is simply to include weights for students participating in these higher cost programs. Alternatively, districts can make nonformulaic allocations and, therefore, decrease the total funds included in the student-weighted formula. Because we aim to quantify the distribution of dollar resources across schools adjusted for student need regardless of the school model or organization, we do not adjust our student weights to reflect extra costs of students participating in these programs. We have—and it is critical to do so—included the extra cost of these programs in the school-level budgets. We describe this further in the Methodology section.

[2]Districts investigating the option of student-weighted allocation must clarify which services are decentralized and which are centralized (Odden, 1999).

Definitions of Equity

Defining *equity* in the context of schooling quickly becomes complex, even when the discussion is narrowed to include only resources. Many studies have acknowledged that investigations of resource distributions within districts must take into account both horizontal equity (equal treatment of equal students) and vertical equity (requiring higher spending for students with greater needs). This study builds these concepts into the analysis tools described later. However, some recent work suggests that investigations of resource equity should also consider two additional categories of questions: (a) teacher and leadership capacity, and (b) the composition or mix of the school's student population. Even with the same dollar resources, for various reasons schools might have different access to talented, high-performing teachers and principals. Second, schools with higher concentrations of high-needs students may face different challenges than schools with only a few such students. These differences in needs are not reflected in a scheme that weights purely by individual student needs.

In this article we ask a more preliminary question intended to provide a platform for asking the second level of questions just raised. We ask simply this: Do schools have the same dollar resources at the school level when adjusted for individual student need?

District Context

HISD and CPS implemented student-weighted allocation during the 1999–2000 academic year, in part, to facilitate more equitable spending across schools. We selected these districts for study because both implemented a well-debated student-weighted allocation formula and were committed to the difficult process of budget reform. Both districts provided information and participated in data collection and interviews that allowed resource allocation comparisons before and after the shift to student-weighted allocation. In this analysis, we examine the general and special revenue fund dollars that are reported in school budgets with the exception of utilities and custodial costs.[3]

HISD is a large urban district enrolling just over 200,000 students. The district provided data on school budget expenditures (using average salaries) and student demographics by school for the 1998–1999 (staff-based

[3]Districts have the power to allocate general and special revenue funds as they choose and adjust for any contractual and legal requirements. Utilities and custodial costs were not included in the analysis because they vary by the age and size of the building and cannot be controlled by the school.

allocation), 1999–2000 (Year 1 of student-weighted allocation), and 2002–2003 (Year 4) academic years. The district has more than over 250 schools, with a substantial high-poverty (66%) and English as a second language (ESL, 26%) student population. HISD's move to student-weighted allocation came as part of a larger system reform effort that featured decentralization of accountability and authority.

CPS is a midsized urban district enrolling 42,000 students. The district provided comparable data for the same years: 1998–1999 (staff-based allocation), 1999–2000 (Year 1 of student-weighted allocation), and 2002–2003 (Year 4). The district's 77 schools vary substantially by wealth and student population and include 57% high-poverty and 14% special education students. CPS's shift to student-weighted allocation was part of a larger school reform plan known as Students First, which required all students to meet the same academic standards, but allowed schools the flexibility to distribute resources toward this goal. School leadership teams were encouraged to review their use of resources and to "trade in" various staff positions. The union and district negotiated considerable flexibility regarding staff at each school.

Methodology

The following analytic methods are described in the context of the three research objectives outlined earlier.

Step 1: Compare Formula Details of Staff-Based and Student-Weighted Allocations

We begin our investigation by comparing staff-based allocation—including the need-based spending weights and value of other allocations—with student-weighted allocation in each district. Whereas student weights are explicit with student-weighted allocation, most districts using staff-based allocation do not compute needs-based spending weights (despite the fact that districts earmark some staff allocations to address specific student needs). We compare the dollar values of these categorical and noncategorical resources to yield comparable (implicit) spending weights for each student type.

Step 2: Investigate Funding Reallocation During the Implementation Year

We use absolute school budget spending data from each district to investigate the total amounts of money schools gained or lost in the transition from staff-based to student-weighted allocation. In examining spending changes, we report the average change as well as the maximum and minimum across all schools in each district.

Step 3: Assess Changes in Equity Among School Budget Spending Patterns

Next, we draw on measures used to evaluate funding equity across districts.[4] Applying these tools to measure intradistrict equity requires adjustment to reflect the educational needs of different types of students within a school. One approach is to separate out categorical funds (e.g., those distributed for identified student needs) and conduct separate analyses of noncategorical funding (Steifel, Rubenstein, & Berne, 1998). Because student-weighted allocation is intended to distribute funds equitably on the basis of per-pupil needs, we opted to analyze all school budget expenditures (including categorical expenditures) using a pupil-weighted index.

The weighted index converts each school's total allocation into a newly developed student-weighted index that takes into account each school's specific mix of students. The student-weighted index is the ratio between two dollar amounts: the actual expenditures at a given school and the expected expenditures, which are computed using district-weighted average expenditures for each type of student (see Figure 1).[5] The district-weighted average expenditure for a given school reflects district-wide expenditures for each category of students and the number within each category at a given school.[6]

Using the student-weighted index formula, a school receiving average district expenditures for its student mix would have a weighted index of 1.0. As a result, the index allows comparison across different schools with different student populations. Schools that receive more, or less, than the district average allocation for its particular mix of students will have a weighted index of greater than 1.0, and less than 1.0, respectively.[7]

One concern in using this pupil-weighted analysis is that it does not account for the higher marginal costs associated with serving small

[4]These include the federal range ratio, the McLoone index, the coefficient of variation, the Gini coefficient, and others, as described by Berne and Stiefel (1984).

[5]The special education category includes several subcategories, as different disabilities warrant different expenditures. In Houston, special education allocation classifications and formulas were still under construction, and as a result, all special education expenditures were excluded.

[6]Districts might add other student categories not reflected in Figure 1, including homeless or migrant education.

[7]The index measures only the extent to which schools receive the district average expenditures for each category of students, not whether the district is investing the right amount to serve students with different needs.

$$\text{Student-weighted index for School A} = \frac{\text{Actual School A dollar expenditure}}{\text{district-weighted average expenditure for School A}}$$

District-weighted- average expenditure for School A =

$(N_{total} \times PPE_{non\text{-}categorical}) + (N_{sped} \times PPE_{sped}) + (N_{voc} \times PPE_{voc}) + (N_{pov} \times PPE_{pov}) + (N_{ESL} \times PPE_{ESL}) + (N_{gift} \times PPE_{gift}) + (N_{gl} \times PPE_{gl})$

N_{total} = total number of students in a school

$PPE_{non\text{-}categorical}$ = district average per-pupil expenditure, less categorical expenditures (or those allocated for the categories listed below).

N_x = total number students in a school that fit into category x

PPE_x = district average additional per-pupil expenditures, for each category of ìx students

Categories:
sped = special education
voc = vocational education
pov = high poverty, or students receiving free and reduced price lunch
ESL = English as a second language
gift = gifted and talented
gl = grade level

Figure 1. Student-weighted index formula.

numbers of students with a specific need. More specifically, if a district's total costs for serving 20 English language learners in one school is equal to the costs to serve half that many in a second school, the weighted per-pupil analysis fails to capture this information and reflects the funding difference as inequity. To isolate spending differences associated with the differing marginal costs of special needs students, we run a separate per pupil analysis on noncategorical spending (this reflects the approach typically used in intradistrict analyses). In this analysis, we create a noncategorical index to compare each school's noncategorical per-pupil spending to the district-wide noncategorical per-pupil spending average.

Once school expenditures are converted to indexes, we assess the level of disparity both before and after implementation of the reform by examining the coefficient of variation. There is no universal agreement on the acceptable level of intradistrict inequity, but some researchers use a coefficient of variation threshold of no greater than .1 (Iatarola & Stiefel, 2003). However, the .1 benchmark originally was developed as a target for interdistrict equity as opposed to intradistrict inequity (Odden & Picus, 2000). Given that we would expect interdistrict differences to be greater than those across schools within the same district (because all schools within a district draw from the same revenue source and tax base), it is appropriate to rely on an even lower coefficient for acceptable variation. Using weighted indexes, a coefficient of zero would indicate that all students with the same characteristics receive the same resources regardless of their school.[8] For this study, we compare changes in the coefficient of variation against this new relative standard of zero.

In addition to the coefficient of variation, we use range data to show how widely resources differ among individual schools. By computing the percentage of schools within 5% and 10% of the district average we see how many schools are substantially affected by the budgeting patterns.

Finally, we attempt to examine spending differences in the context of those that remain hidden in the central budgets or the difference between real and average salaries. Because each district puts only a portion of operating funds in school budgets, we compute the portion of the *total* district operating budget distributed by a student-based formula to gain clarity about equity gains. We then compare the school budget spending patterns to the typical spending variation of the other two sources.

[8]For deviations from zero, one would expect them to be transparent and articulated in district strategy.

Findings

Relative Student Spending Varied by Allocation Method and District

Converting needs-driven resources to student weights in the staff-based allocation model yielded the spending weights displayed in Table 1. In each district, the implicit weights reflect the average increase on top of noncategorical average expenditures ($5,042 per pupil in CPS and $2,738 per pupil in HISD). Where no figures are displayed, the district did not explicitly designate staff-based allocations by student needs (as was the case for English language learners, poverty, and gifted students in CPS, and for poverty students in HISD). Per-pupil expenditures for each type of student in both districts varied dramatically with the largest ranges found for special education.[9] In HISD, the implicit weights for bilingual education and gifted education were very small, reflecting only 0.2% and 2% above the average noncategorical expenditure. Where schools received additional staff allocations for magnet programs or other services, these additions were not allocated separately from other noncategorical spending and thus are reflected in the noncategorical averages.

In the move to student-weighted allocation, both districts adopted a formula that explicitly stated the weights for bilingual, poverty, gifted, and vocational education and eliminated per-pupil spending variations for each student need. As Table 2 indicates, the actual weight values changed in the adoption of student-weighted allocation and varied across the two districts. HISD increased its weight for bilingual and gifted students and reduced that for vocational education. CPS also decreased its weight for vocational education students and made weights explicit for bilingual education, poverty, and gifted.

In comparing the weights in Table 2, we notice that the two districts selected have very different values for each student need. CPS weighted bilingual education students at 47%, as compared with only 10% in HISD. On the other hand, CPS weighted poverty students at 5%, as compared with 20% in HISD. CPS weighted gifted students at 29%, as compared to 2% at HISD. In CPS, the 60% vocational education weight was applied only to the portion of student time (measured in student FTEs) in vocational education classes, as compared with a weight of 37% for each HISD vocational education student.

[9]Large ranges are to be expected for special education where student needs dramatically vary.

Table 1
Staff-Based Allocation Details

	Cincinnati Public Schools		Hudson Independent School District	
	Average Per-Pupil (Range)	Implicit Weight	Average Per-Pupil (Range)	Implicit Weight
Noncategorical spending[a]	$5,042 ($5,395)		$2,738 ($6,311)	
Special education	$6,428 ($54,237)	1.27	$1,569 ($18,828)	.57
Vocational education	($5,659) $9,264	1.91	$7,822 ($8,760)	3.0
Poverty				
Bilingual			$6 ($384)	.002
Gifted			$63 ($2,016)	.02

[a]Spending from school budgets only.

Other school budget funds were distributed without the use of student weights.[10] As the lower portion of Table 2 indicates, in Year 1, both districts awarded funds to schools for magnet programs and allocated a basic foundation amount to smaller schools. CPS also allocated funds for music and suspension programs.

The allocation details show that the two districts made minor adjustments to their weights from Year 1 to Year 4. CPS leaders added weights for different grade levels and eliminated virtually all of its non-student-weighted allocations. HISD reduced its small school allocation and added an allocation for schools with high mobility.

Resources Redistributed With the Adoption of Student-Weighted Allocation

Policy initiatives that prompt resource redistribution raise intense political discussions about how individual schools win and lose. Table 3 reports the money gained or lost by individual schools during the first year of student-weighted allocation. In HISD, schools gained or lost an average of $250 per pupil, or an average of 9.1% of its original school budget allocation. Averaging the absolute value of school gains and losses, we find an average net change in resources of $174,406 per school. The largest overall loss in school resources, $991,480, represented 33.8% of the school's original budget.

[10]In cases where districts allocated funds based on student participation in a magnet program, we did not consider these allocations as weights because the allocation was based on participation in a program, not a student characteristic.

Table 2

Student–Weighted Allocation Details

	CPS Year 1	*CPS Year 4*	*HISD Year 1*	*HISD Year 4*
Student weights				
Grade level	All grades 1.0	Grades K–3 1.2 Grades 4–8 1.0 Grade 9 1.25 Grades 10–12 1.2	All grades 1.0	All grades 1.0
Special education	.2–.7	.2–.7	Under construction	.15 for mild types
Vocational education	.6[a]	.6[a]	.37	.37
Poverty	.05	.05	.2	.2
Bilingual	.47	.47	.1	.1
Gifted	.29	.29	.12	.12
Other allocations				
Magnet	Four levels based on cost: .13–.44 per student in program	None	Allocated by school	Allocated by school
Special program	Included in-school suspension, Suzuki programs, and others	None	None	Schools with student mobility over 40% received a per-pupil weight of .10
Foundation or fixed	Ranged from $200,000 to $540,000 depending on school size and level	None	Allocated by school level and size, up to $300,000	Small schools received up to $200,000

Note. CPS = Cincinnati Public Schools; HISD = Houston Independent School District.
[a]For the portion of student time spent in vocational education classes.

Table 3
Resource Reallocation: Year 1 Implementation of Student-Weighted Allocation

	Average Change	*Largest Resource Gain*	*Largest Resource Loss*
Houston Independent School District			
Per-pupil allocation	$250	$3,663	–$1,240
Total school allocation	$174,406	$507,154	–$991,480
% of original school allocation	9.1	16.8	–33.8
Cincinnati Public Schools			
Per-pupil allocation	$266	$1,131	–$1,546
Total school allocation	$120,170	$730,881	–$595,316
% of original school allocation	4.2	16.8	–16.4

CPS experienced similar per-pupil funding shifts; on average, schools gained or lost $266 per pupil or 4.2% of the original school budget allocation. The largest school gain was $730,881, or 16.8% of the school's original budget. The largest school loss was $595,316 or 16.4% of the school's original budget.

Spending Disparities Lessened With Student-Weighted Allocation

Both HISD and CPS showed inequity in school-level resources when using staff-based allocation (Table 4). Examining spending variation using the student-weighted index, we find a coefficient of variation for HISD of .11, as compared with .26 at CPS. Additionally, the pattern of inequities under staff-based allocation was much different in HISD than in CPS. HISD schools had less variation as indicated by the lower coefficient, and 77% of HISD schools were allocated funds within 10% of the district average, compared to only 42% in CPS. The extremes in funding, however, were much greater in HISD, where the lowest funded school received only 46% of the district average expenditures and the highest funded school received 291% of the district average expenditures.

In both districts, the distribution of school resources became more equitable after implementing student-weighted allocation. With the adoption of student-weighted allocation, the coefficient of variation for HISD decreased only modestly from .11 to .09 but the percentage of schools funded within 5% of the district's weighted average jumped from 49% to 72%.[11] Perhaps

[11]A coefficient greater than zero suggests there are spending variations that result not from different access to revenue streams or student needs but due to other factors.

Table 4

Spending Equity With Staff-Based Allocation and Student-Weighted Allocation

	N	*Coefficient of Variation*	*Maximum Weighted Index*	*Minimum Weighted Index*	*% of Schools Within 10% of District-Weighted Average Expenditures*	*% of Schools Within 5% of District-Weighted Average Expenditures*	*% of Total District Operating Budget Distributed via Student Weighting*[a]
Houston Independent School District							
Staff-based allocation 1998–1999	243	0.11	2.91	0.46	77%	49%	NA (65%)
Student-based allocation 1999–2000	245	0.09	1.62	0.96	82%	72%	47% (65%)
Student-based allocation 2002–2003	271	0.09	1.19	0.95	87%	81%	53% (60%)
Cincinnati Public Schools							
Staff-based allocation 1998–1999	77	0.26	1.70	0.60	42%	23%	NA (67%)
Student-based allocation 1999–2000	77	0.23	1.63	0.64	49%	23%	52% (67%)
Student-based allocation 2002–2003	77	0.00	1.00	1.00	100%	100%	62% (69%)

[a]Percentage of total in school budget.

most notable was the leveling up of schools historically funded at the lowest levels. HISD's lowest funded school rose from a weighted index of 0.46 to 0.96, or 96% of the district-weighted average allocation. By Year 4 of implementation, the maximum index had dropped to 1.19 and 81% of schools were within 5% of the district average expenditures for their mix of students.

CPS also made small equity gains in its 1st year of implementation as evidenced by a decrease in the coefficient of variation from .26 to .23. Although the percentage of schools funded within 5% of the district average remained unchanged at 23%, the percentage of schools funded within 10% of the district average increased slightly (from 42% to 49%). By Year 4 (after making the changes in the formula described earlier), the coefficient of variation decreased to .00, indicating that every school in the district then received exactly the school budget amount dictated by the weighted average for its mix of student needs. Analysis of noncategorical spending in both districts (not shown here) yielded very similar results, lending credence to the newer weighted index method.

The portion of each district's total operating budget placed in the school budgets remained constant as districts shifted in Year 1 from staff-based to student-weighted allocation (65% in HISD and 67% in CPS). By Year 4 of student-weighted allocation, CPS moved a greater portion of its spending to school budgets, with 69% of the total per-pupil spending represented in school budgets, whereas HISD decreased to 60%. However, more relevant to equity is the percentage of the district's total operating funds allocated by student-based formula. In Year 1, HISD allocated 47% by student-weighted formula and CPS allocated 52%. By Year 4, both districts had increased this amount, although the CPS increase was more significant (up to 53% in HISD and 62% in CPS).

Discussion

This study provides evidence that funding inequities exist among schools within districts and that student-weighted allocation can result in greater resource equity. Unlike CPS and HISD, most urban districts continue to use a staff-based allocation to distribute school resources. With staff-based allocation, both CPS and HISD operated with substantial spending disparities between schools, with some schools having as much as a 70% higher allocation than others after adjusting for student needs. In both districts, coefficients of variation indicate greater variation than the .1 target set for spending variation across districts, and significantly more variation than the target of zero suggested in this article for within-district spending. If the spending patterns found here with staff-based allocation are indicative of the inequities present in other districts, this finding alone warrants attention.[12]

The data here suggest that student-weighted allocation may serve as a viable policy option for districts interested in increasing funding equity among schools. In the two districts studied, student-weighted allocation resulted in more schools receiving allocations near the district's weighted average expenditure and increased equity as indicated by reduced coefficients of variation.

Equally important, this analysis shows the extent to which elements of the student-weighted allocation formula can, and do, vary. Despite the equity gains found in CPS and HISD, a shift to student-weighted allocation will not guarantee increases in equity. Evidence from HISD and CPS show how three key factors impact the extent to which districts can remedy funding inequities with student-weighted allocation.

The Percentage of District Dollars Allocated Via School Budgets Matters

The equity gains cited earlier must be put in the larger context of district spending, which includes spending not captured in school budgets. As we noted at the outset, because this study considers only school budget dollars, we address only a portion of the possible inequities in resources between schools. For example, a district might choose to manage funds for magnet programs centrally, in which case disparities caused by these allocations are not captured in an analysis of school budgets. Keeping large portions of spending out of school budgets limits the extent to which we can document equity gains, as the analysis applies only to the limited funding considered. CPS and HISD each put 65% to 69% of total general fund dollars in school budgets during the years considered. Equity gains via a formula that incorporates a smaller portion of the district's budget may be less meaningful. Similarly, equity gains via a formula that incorporates a greater share of district funds can be more credible.

The portion and magnitude of funds in the student-weighted allocation formula also impact the noncategorical base amount, which in turn impacts that amount of funds allocated with each of the weights. In CPS, the noncategorical base of $5,042 yields $504.20 when a 10% weight is established. In HISD where the base is $2,738, a 10% weight yields only $273.80. Furthermore, for districts that rely on salary averages for staff

[12]School funding distributions with staff-based budgeting will vary substantially from district to district. In fact, given the historic commitment to examine resource equity in HISD and, more recently in CPS, we hypothesize that the funding inequities in other districts may be more substantial.

costs (as both CPS and HISD do here), inequities created by the uneven distribution of teacher costs also are buried. Because inequities created by real salary differences typically yield coefficients of variation between .06 and .08 (Roza & Hill, 2004), they are less than the variation created by staff-based allocation here (.26 and .11, respectively, in CPS and HISD). The fact that real salary allocations are not included in school budgets becomes much more relevant when we move to Year 4 of student-weighted allocation when coefficients decreased to .00 and .09, respectively, in CPS and HISD.

Key Elements of the Formula Matter

The formulaic distribution of resources, as enabled by student-weighted allocation, allows for precise allocation of resources. Therefore, deviations from equal funding for each category of students can be expressed via weights that are built into the allocation formula. However, if a district decides to allocate funds on the basis of program or school type, these decisions will not be incorporated into the student-weighted index and funding disparities will result.

Details of each district's allocation revealed that both HISD and CPS made some nonweighted allocations for student characteristics in Year 1. It was these nonweighted allocations for school types or programs that created coefficients above .00 in Year 1 for both districts. The allocation detail shows that by Year 4, CPS eliminated virtually all nonweighted allocations and yielded greater equity gains (coefficient of .00). HISD, in contrast, maintained its nonweighted allocations and, as a result, no additional equity gains from Year 1 to Year 4 were realized. In sum, greater use of nonweighted allocations can decrease the equity gains that can be expected with student-weighted allocation.

In addition to decisions about nonweighted allocations, districts must also make decisions about *how much* to weight various student characteristics. This analysis does not directly address the question of what level of investment for each student need is appropriate. However, examination of both the implicit and intentional weights chosen by the district calls attention to this critical issue. First, the allocation detail shows that both districts selected very different weights than the implicit ones that existed with staff-based allocation. Second, the allocation detail reveals that each district chose weights that dramatically differed. Bilingual education, for instance, carried a 10% weight in HISD versus one of nearly five times that at CPS. Gifted students were weighted higher than bilingual education in HISD but lower in CPS.

Readers, like us, undoubtedly are left curious about district rationale for such choices. It may be the case that district leaders differed in their view of the amount of resources necessary to address various student needs. Or, perhaps in each district, political forces were instrumental in selecting the precise weights. More research may be able to isolate how these important choices about weights are made, whether they reflect decisions leaders make about the needs of their students and the costs necessary to serve them, or whether they are driven more by efforts to mitigate the reallocations that take place as districts adopt new allocation methods.

Prior Spending Patterns Matter

Clearly, the potential gains in equity for any district will depend on the level of inequity present before adopting the student-weighted allocation method. In addition, as evidenced here, each district is likely to uncover different patterns and degrees of inequity with staff-based allocation. Because gains are relative to a district's starting point, results will vary from district to district.

Furthermore, unless implemented in surplus economic conditions, redistribution will mean some schools receive fewer dollars than they did the previous year. As the findings demonstrate, schools gained or lost significant amounts of money in the adoption of student-weighted allocation. One HISD school lost nearly $1 million. As a result, we expect that districts will use prior spending patterns to determine key elements of the formula.

Conclusion

By uncovering significant disparities with staff-based allocation, this analysis reinforces the need to examine resource equity among schools within districts. Although the method of measuring per pupil spending adjusted for student needs does not capture everything that must be understood to assess the relative resources between schools, it provides an objective starting point for discussion. Most large districts do not adequately measure or report spending patterns in ways that would begin to identify disparities between schools. The federal No Child Left Behind Act, which pushes academic accountability down to the school level and thus holds schools equally responsible for results, makes it imperative to ensure that all schools have an equitable playing field. In light of this, this analysis is especially important.

The data examined here, although limited to analysis of two districts, provide insight into the key factors to consider when using student weighting to compare resources across schools and the potential next step of using a student-weighted funding allocation system to reduce inequity. This study also highlights the tough decisions districts face when implementing student-weighted allocation, noting that the equity gains found here are highly dependent on the formula choices made by districts.

As we noted at the outset, districts may consider student-weighted allocation for many reasons other than to increase equity in spending. For example, student-weighted allocation is often considered a tool to increase school-level control of resources. However student-weighted allocation and site-based control over spending are separate policies and, although compatible, do not automatically coincide. A district can change its way of allocating resources to schools while making no changes at all in the requirements for how resources are used. Certainly, granting schools greater control over spending decisions creates a host of implementation challenges not described here. Regardless of the justification, this study shows the need for sophisticated implementation of student-weighted allocation as well as its potential power for evaluating, and ultimately reducing, inequity among schools.

References

Baker, B. D. (2004). A closer look at the costs of serving children "living on the edges" of state school finance policy. *Educational Considerations, 32,* 42–54.

Berne, R., Moser, M., & Stiefel, L. (1997). The coming of age of school-level finance data. *Journal of Education Finance, 22,* 246–254.

Berne, R., Rubenstein, R., & Stiefel, L. (1998). Intra-district equity in four large cities: Data, methods, and results. *Journal of Education Finance, 23,* 447–467.

Berne, R., & Stiefel, L. (1984). *The measurement of equity in school finance: Conceptual, methodological, and empirical dimensions.* Baltimore: Johns Hopkins University Press.

Berne, R., & Stiefel, L. (1994). Measuring equity at the school-level: The finance perspective. *Educational Evaluation and Policy Analysis, 16,* 405–421.

Berne, R., & Stiefel, L. (1999). Issues in school site-based financing in large cities in the United States. In M. Goertz & A. Odden (Eds.), *School-based financing.* Thousand Oaks, CA: Corwin.

Busch, C., & Odden, A. (1997). Introduction to the special issue: Improving educational policy and results with school level data—A synthesis of multiple perspectives. *Journal of Education Finance, 22,* 225–245.

Duncombe, W. D., & Yinger, J. (in press). How much more does a disadvantaged student cost? *Economics of Education Review.*

The Education Trust–West. (2005). *California's hidden teacher spending gap: How state and district spending practices shortchange poor and minority students and their schools.* Retrieved June 5, 2005, from www.edtrustwest.org

Iatarola, P., & Stiefel, L. (2003). Intradistrict equity of public education resources and performance. *Economics of Education Review, 22,* 69–78.

Little, D., & Olszewski, L. (2004, March 2). School spending disparity revealed: But court ends desegregation order. *Chicago Tribune,* p. News 1.

Miles, K. H. (1995). Freeing resources for improving schools: A case study of teacher allocation in Boston public schools. *Education Evaluation and Policy Analysis,* 17, 476–494.

Miles, K. H. (2001, September). Putting money where it matters. *Education Leadership, 59,* 53–58.

Miles, K. H., & Darling-Hammond, L. (1998). Rethinking the allocation of teaching resources: Some lessons from high-performing schools. *Education Evaluation and Policy Analysis,* 20, 9–29.

Miles, K., & Frank, S. (in press). *Unpacking school district cost per pupil: Lessons from five urban districts.*

Miles, K. H., & Hornbeck, M. (2000). *Reinvesting in teachers: Aligning district professional development spending to support a comprehensive school reform strategy.* Arlington, VA: New American Schools.

Miles, K., & Roza, M. (2002a). Assessing inequities in school funding within districts: A tool to prepare for weighted student budgeting. In *Portfolio for district redesign.* New York: Annenberg Institute for School Reform at Brown University. Available from http://www.schoolcommunities.org/Archive/portfolio/index.html

Miles, K., & Roza, M. (2002b). First steps to a level playing field: An introduction to student-based budgeting. In *Portfolio for district redesign.* New York: Annenberg Institute for School Reform at Brown University. Available from http://www.schoolcommunities.org/Archive/portfolio/index.html

Miles, K., & Roza, M. (2002c). Moving toward equity in school funding within districts. In *Portfolio for district redesign.* New York: Annenberg Institute for School Reform at Brown University. Available from http://www.schoolcommunities.org/Archive/portfolio/index.html

Miles, K., Ware, K., & Roza, M. (2003). Leveling the playing field: Creating funding equity through weighted student budgeting. *Phi Delta Kappan, 85,* 114–119.

Miller, L., Roza, M., & Swartz, C. (2005). A cost allocation model for shared district resources: A means for comparing spending across schools. In *Developments in school finance 2004.* (NCES 2005–865). Washington, DC: National Center for Education Statistics.

Odden, A. (1999). School-based financing in North America. In M. Goertz & A. Odden (Eds.), *School-based financing.* Thousand Oaks, CA: Corwin.

Odden, A., & Picus, L. (2000). *School finance: A policy perspective.* Fairfield, PA: McGraw-Hill.

Ouchi, W., & Segal, L. (2003). *Making schools work: A revolutionary plan to get your children the education they need.* New York: Simon & Schuster.

Picus, L. O. (1993). *The allocation and use of educational resources: School-level evidence from the schools and staffing survey* (Working Paper No. 37). Los Angeles: University of Southern California, Center for Research in Education Finance.

Quality counts 2004, count me in: Special education in an era of standards. (2004). Retrieved January 18, 2005, from http://counts.edweek.org/sreports/qc04/

Roza, M., & Hill, P. (2004). How within district spending inequities help some schools to fail. In D. Ravitch (Ed.), *Brookings papers on education policy: 2004* (pp. 201–208). Washington, DC: Brookings Institute Press.

Rubenstein, R., Schwartz, A., & Stiefel, L. (2004, March). *From districts to schools: The distribution of resources across schools in big city school districts.* Paper presented at the annual meeting of the American Education Finance Association, Salt Lake City, UT.

Sclafani, S. (2004). Comment by Susan Sclafani on "How within district spending inequities help some schools to fail." In D. Ravitch (Ed.), *Brookings papers on education policy: 2004* (pp. 219–222). Washington, DC: Brookings Institution Press.

Seattle Public Schools. (1997, February). *Weighted student formula: Educators committee report.* Presentation given to district-wide administrators meeting, Seattle, WA.

Steifel, L., Rubenstein, R., & Berne, R. (1998). Intra-district equity in four large cities: Data, methods, and results. *Journal of Education Finance, 23,* 447–467.

18

RICE | HERC
Houston Education Research Consortium

Building Better Cities,
Building Better Lives

Rice University's Kinder Institute for Urban Research

HISD's Decentralization Reform
(Part 1: Policy Analysis)

By Jodi Moon, Ph.D.

Research Brief
for the Houston Independent School District

Volume No. 6, Issue No. 2. | February, 2018

RESEARCH BRIEF ABSTRACT

HISD's Decentralization Reform (Part I: Policy Analysis)

This research brief is Part I of a four-part series that studies the implementation and impact of the HISD decision to decentralize in the 1990s.

- Part I describes how decentralization was enacted in HISD.
- Part II describes input from HISD principals and their sense of self-efficacy and capacity under the current decentralized model.
- Part III examines the impact of decentralization on student outcomes.
- Part IV examines the impact of decentralization on funding equity.

Findings from Part I

In this first brief, we examine the implementation of decentralization at HISD. The process that HISD originally undertook was well documented and fairly well structured. Over time, many of the key components of a strong decentralization model were addressed. For example, decision-making was shifted to the campus level. Funding was re-structured to provide the principals more flexibility and to re-distribute monies to schools based on a base amount plus weights for student level characteristics. Key changes were phased in, and attention was given to minimizing negative impacts as campuses adjusted to funding redistribution. However, some components of decentralization have been only partially fulfilled. For instance, in the literature, school choice is important under this model because it fosters competition and innovation as campuses strive to protect their funding by doing the best job they can for students. HISD is an open choice school district in theory; yet in practice, most campuses are using transfer agreements and choice is somewhat constricted. Additionally, research emphasizes the need to review and update the weighting structure frequently; while the weights have been adjusted, there is an opportunity to revisit these based on Houston's specific demographics. Finally, there are key elements of decentralization that were not implemented. The shift from average to actual teacher salaries was never made, and Small School Subsidies and magnet programs serve to distort the impact of funding redistribution. These findings suggest that there are modifications that could improve the existing model.

Introduction

In the late 1980s, the Houston Independent School District (HISD) was a highly centralized bureaucracy like many other urban school districts. Drop-out rates were starting to increase, student outcomes on average were low (e.g. 46 percent of 8^{th} graders met or exceeded the minimum expectations on TAAS in 1999), and there were "perceived inequities" in funding (Haines, 1999, p.3). The HISD School Board adopted a decentralization plan to improve student achievement and increase equity in funding; both the board and the administration believed that this could be accomplished by shifting more decision-making to the local level (campus). This reform included a shift from a full-time equivalency funding model (FTE) to a weighted student funding model (WSF).

This brief provides the necessary context for a thoughtful discussion about HISD's current decentralized model; it is one part of a broader study that addresses four key topics related to the decentralization of HISD. Two of these questions address how the program was enacted, examining the policy and practice of decentralization; two of these questions will examine the impact of decentralization on student outcomes and funding equity. Here, we emphasize the implementation of the policy; specifically, we compare the specific components of a decentralization model to HISD's adoption to identify strengths and weaknesses in the implementation.

Research Question

The research questions for this brief are:

- What are the key components of decentralization?
- How does HISD's implementation compare to best practice from a theoretical perspective?
- Are there other policies in place that interact with the goals of decentralization?

Useful terms

Equity

There are multiple ways to conceptualize equity, one of the two main goals of the reform. Horizontal equity requires that equally situated groups are funded equally; in other words, it assumes that there is the same base amount of general education funding provided for all students. Vertical equity anticipates that unequal groups require different amounts of resources to achieve the same outcomes; vertical equity accounts for student characteristics that have been found to require additional funding. The goals articulated by the PEER Committee on Decentralization tasked with planning the decentralization process reflected an emphasis on vertical equity. There is consensus in the field that given finite resources, vertical equity is a logical priority; vertical equity exists when specific characteristics that merit additional funding, such as poverty or ELL, are positively and significantly associated with funding.

FTE

An FTE funding model is a staff-based allocation model that treats each school as a similar unit that varies only by enrollment level. An FTE model applies student-teacher ratios to projected enrollment levels to allocate campus funds. Other campus level costs are budgeted through central administration, which tends to ensure more consistency in non-instructional positions such as school nurses.

WSF

WSF allocates campus level funds based on school level enrollment (elementary, middle or high school) and average daily attendance, incorporating additional funding for student characteristics such as Bilingual/ELL, migrant, or Gifted/Talented. HISD calls the base amount a Per Unit Allocation (PUA) and adds weights, or increments, which are allocated based on individual student characteristics. Costs such as teacher aides and non-instructional positions are covered through this allocation, which allows for more innovation in staffing decisions.

What do we know about decentralization?

The decentralization reform movement originated from organizational theory/business management; site specific management is seen as the remedy to the high overhead costs and highly specialized positions associated with a large bureaucratic organization. In the context of school districts, proponents argue that the principal is in the best position both to identify their students' needs and decide how to meet those needs. School principals therefore need autonomy to develop the appropriate staffing plan, determine class schedules, and prescribe teaching methods. In a decentralized model, principal capacity is essential, as is an accountability system to exercise oversight and support. School-level control of the budget using a model such as WSF is described as a key component of a decentralization reform, because asking principals to make innovative staffing decisions without the ability to pay for them can be fruitless.

Today, WSF (or a similar model, such as Fair Student Funding) is still in use in several larger cities, such as Boston, and New York; other cities, like Seattle, have moved away from this model (see Figure 1). Seattle now uses a modified form of an FTE model called Weighted Staffing Standard; Seattle's notable modification to the traditional FTE model is that the district applies different staffing ratios to schools with high poverty levels than those with non-high poverty levels.

WSF is not just a local funding model; it is the most commonly used mechanism to distribute special funding at the state level. The federal Every Student Succeeds Act (ESSA) also advocates for weighted per pupil allocations. In an ESSA pilot program, districts that commit to a more equitable distribution based on actual per-pupil expenditures will be afforded more flexibility in how they allocate Title I and other federal funds. (In this case, however, the funds are not to follow the student, which is a key feature of WSF in general.)

However, there are researchers who criticize the lack of quantitative studies that validate the theory behind decentralization. Others suggest decentralization suffers from a lack of precision in definition and clarity in design. Critics of WSF specifically argue with justification that it has the propensity to incentivize large schools and penalize small ones.

Baltimore, MD
Clark County, NV
Douglas, CO
Poudre, CO
Boston, MA
Cleveland, OH
Indianapolis, IN
Norwalk, CT
Chicago, IL
Denver, CO
Hartford, CT
Jefferson County, CO
New York City, NY
San Francisco, CA

Figure 1: Partial list of urban districts using a version of WSF

Source: https://www.erstrategies.org/ and email communication from K. Miles, 2017.

The decentralization of HISD

Early adoption steps

HISD actually began its decentralization process in the 1990s. Early steps in this process included:

- Creation of Shared Decision-Making Committees (SDMCs) at the campus level;
- Development of the Resource Allocation Handbook (RAH), intended to improve equity in funding and flexibility in spending;
- Creation of Peer Examination, Evaluation and Redesign (PEER) Program to review operations and suggest improvements; and
- Establishment of Peer Committee on Decentralization in 1998.

The Peer Committee on Decentralization was tasked with ensuring that educational decisions were being made at the level that best supported the relationship between the teacher and the student. The mission statement of the committee included:

- Develop a fair, equitable, and effective decentralized approach to resource allocation;
- Recommend areas of management and operations which can be handled most effectively at the campus level; and
- Design a financial/management system to replace the current system for funding schools.

According to the 1999 Peer Committee on Decentralization, stronger academic success for HISD students and increased equity in funding were both guiding principles of their recommendations. Although there are debates in the scholarly literature about the relationship between spending and achievement, recent research does support the position that vertical equity can minimize the effect of student characteristics on achievement. Additionally, common sense does suggest that equity in funding is a worthy goal in and of itself. The companion briefs on the impacts of this reform will allow us to better understand the extent to which these two goals were or were not achieved.

The transition to WSF that was spelled out by the Peer Committee report represented the final and key step in the decade-long shift to a decentralized model of school finance and governance for HISD; WSF was phased in over two years from 1999-2001.

Key changes that were made in HISD policy based on decentralization

- WSF model (campus based budgeting using weights for student characteristics)
- Principal control over staffing/hiring/instructional decisions

Decentralization is referenced at least five times in the Houston ISD Board Policy Manual; three of these references provide broad guidance and a rationale for the current policies that is well rooted in the scholarly literature around decentralization. These policies make explicit HISD's commitment to facilitating a decentralized system of campuses wherein instructional decisions concerning students are made by the principals of those students. For example, the current HISD Educational Philosophy statement (LDU 2013.01) explicitly expresses the support of a decentralized school district that provides principals with autonomy; this commitment is reinforced by the HISD Legal Policy (LDU 2011.06) regarding the annual budget which states that "Schools are where the decisions should be made; accordingly, principals must be the leaders of that decision-making process."

HISD's policy places strong emphasis on the role of the principals, which is in line with theory. Administrative Regulations (LDU 2010.02) provide specific examples of how this should be done. These include mention of the principal-led shared decision-making committees (SDMC) at each school which ensure input from the faculty, staff, and community, management of the budgeting process for their student population, and principal control over school staffing and hiring.

Table 2. HISD PUA funding levels 2003-2017

Year	Per Unit Allocation		
	Elementary	Middle	High
2003–2004	$2,732		
2004–2005	$2,802		
2005–2006	$2,768		
2006–2007	$2,832	$2,842	$2,871
2007–2008	$3,071	$3,096	$3,085
2008–2009	$3,257	$3,282	$3,246
2009–2010	$3,368	$3,393	$3,357
2010–2011	$3,485	$3,510	$3,474
2011–2012	$3,257	$3,282	$3,246
2012–2013	$3,341	$3,366	$3,330
2013–2014	$3,378	$3,403	$3,367
2014–2015	$3,470	$3,495	$3,459
2015–2016	$3,589	$3,625	$3,589
2016–2017	$3,522	$3,558	$3,522

HISD funding today

School finance is a highly technical topic and generally beyond the scope of this brief.

However, it is helpful to know that the Texas Education Agency (TEA) essentially establishes a basic allotment per student then adjusts that amount based on several district specific features, such as cost of education in the region or the sparsity of population. The TEA also uses weights to deliver additional funding for students with specific characteristics. The TEA categories for special education funds are more detailed than the HISD weights and difficult to compare; however, the three HISD weights seen in Table 1 in bold are equivalent to the TEA weights for those specific categories.

At the local level, HISD determines its own PUA (see Table 2) and applies its own weights as seen in Table 1. To illustrate this in a simplistic way, in 2017, the base amount for a middle school student is $3,558; if a student is also ELL, this amount is increased to $3914 (base amount * 1+weight). The base amount for an elementary school student is $3,522; if that student is ELL, the amount is increased to $3,874. These amounts are the same at the high school level; however, high schools benefit from the High School State Allotment (a TEA add on) which contributes an additional $163 per student[1]. Therefore, an ELL HISD high school student would actually garner a campus $4,037.

Table 1. HISD 2016-2017 Weights

Category	Weights
SCE	0.15
Special Education	0.15
G/T	0.12
CTE	0.35
ELL	0.10
Homeless	0.05
Refugee	0.05

At the district level, 66% of the campus budget is managed at the campus level, while the remainder is still centrally managed, addressing a range of operating costs.

HISD in the literature

HISD's shift to a decentralized model was analyzed by researchers in its early years. Miles and Roza (2006) observed that in 2002-2003, HISD's lowest funded school prior to decentralization had increased from 46% to 96% of the district-weighted average allocation; other findings suggest modest increases in equitable allocation overall. Other researchers (Cooper et al., 2006) estimated that 31.2 % of HISD funds were redistributed under WSF; the ratio of the highest possible allocation for one student to the lowest possible allocation for one student was 7.5 (which essentially means that a student who fits every weighted category is allocated 7.5 times the amount of a baseline student.) Baker & Elmer (2009), however, found the relationship between spending and free and reduced lunch or at-risk designations was positive but modest at the school level in HISD.

So what should decentralization look like?

Table 3 provides the basic framework for a successful decentralization plan as presented in the scholarly literature.

1 The actual funding amount is $275 for each student in average daily attendance; a portion of these funds are applied to district-wide initiatives.

Table 3. Elements of a Decentralization Reform and the HISD Implementation

Element	Rationale	HISD Reality	Conclusion
Campus based budgeting.	Odden & Busch suggest that 75% of the potential school budget be managed by principals rather than central administration. Principals need control over resources to effectively make staffing and scheduling decisions.	Original goal set by PEER Committee was 80% of budget; first year was reported as 59%; currently 47% (43% if you exclude benefits and utilities)	PARTIAL
Weights applied.	Campus based funding should reflect student characteristics; weights established via public forum and re-evaluated frequently.	PEER Committee recommended a committee be established to recommend weights; weights have been established and revised—process not strongly documented	PARTIAL
Campus based decision making.	Instructional, staffing and scheduling decisions should be made at the campus level; the principals are in the best position to know their students' needs.	Principal survey should inform us further. NOTE: Some curricular decisions are made at District level.	PARTIAL
Actual teacher salaries.	This means that each actual teacher's salary is used in budgeting and funding rather than applying the district average salary to every teacher. Average teacher salaries can unfairly penalize schools with less experienced teachers—which tend to be low-income—because it appears that their expenditures are larger than they really are. Inequities in real salary differences can yield coefficients of variation between .06 and .08 (Roza & Hill, 2004). Note: ESSA includes this requirement in their pilot program at the federal level as well.	The district currently absorbs the difference between actual and average salary. Grant funds budget on actual salary and benefits. Excess salary funds are used to off-set deficits on a district wide level. The net impact in these variances is zero, according to the RAH; according to the budget office, this is not exactly the case but the overage is viewed as minimal. PEER Committee recommended use of actual salary.	NO
School choice is the norm.	This is a public version of privatization in a sense; the money follows the student so each school is theoretically motivated to innovate/improve to capture more students/funding.	This is in place in Houston, but it is not without constraints. There are principal transfer agreements, etc. There are also constraints on specific populations that make them less likely to actively participate in choice.	PARTIAL
Minimize add-ons.	There should be no un-weighted add-ons, such as subsidies for small schools, magnet programs, etc. These programs tend to distort the equitable redistribution of funds that WSF is tasked with.	Small Schools subsidies and magnet subsidies both exist; magnet weight is a recent change.	NO

Element	Rationale	HISD Reality	Conclusion
Comprehensive school-based information system.	Principals need up to date financial information, purchases should be easy, and budget analyst support should be provided.	Principal survey should inform us further.	YES
Standard and benchmarks.	There must be expectations and accountability in place, both should reflect focus on ambitious student learning.	STAAR; HISD Board Policy Manual, Educational Philosophy, AE Local, 3/15/2013.	YES
Teachers involved in decision making.	Teachers have most direct knowledge about student needs.	Not part of this study. However, according to Board policy, 2/3 of the professional staff who serve on the campus level planning and decision-making committees must be teachers. BQB2REGULATION LDU 2017.01 and *Education Code 11.251(e)*	YES
Principal capacity.	Principals must be able to plan strategically and develop a budget based on their students' academic needs. Training/ professional development programs should be established to develop principal capacity where support is needed.	Principal survey should inform us further. School Business Manager Training Program supports school budget management. (Houston ISD Board Policy Manual, DM1 REGULATION) Training and Information Courses SAP 4.6	YES
Accountability via rewards/sanctions.	There is a need for monitoring and support. The PEER Committee recommended a formal review committee to monitor and report internal customer satisfaction.	District accreditation: *Texas Education Code 39.051* Performance indicators: *Texas Education Code 39.053(a), (a-1), (b), (c)* Principal Performance Incentives offered: *Texas Education Code 21.357(c)* AYP, TEA State Accountability 1993-2006: district rating system School Leader Appraisal Scorecard ASPIRE Awards (2005-2016) No formal committee established.	PARTIAL/External PARTIAL/Internal
Adequacy of funding.		Not part of this study; Picus et al. conducted 2012 adequacy analysis of Texas which indicates it is not adequate.	NO

Sources: Cooper et al., 2006; HISD Board Policy Manual Online; HISD RAH 2016-2017, 2014-2015; Ouchi, 2004, 2006; Odden and Busch, 1998.

Discussion

Fulfilled/commendable steps

The process that HISD originally undertook to decentralize was well documented and fairly well structured. Key changes were phased in, and attention was given to minimizing negative impacts as campuses adjusted to the new funding distribution. Over time, many of the key components of a strong decentralization model were definitely addressed. A significant portion of the budget was shifted to the campus level, although the proportion is not as high as theorists suggest; budget analysts and system supports were put in place. Student learning standards and associated accountability mechanisms provide oversight and support.

Unfulfilled/problematic components

There were key elements of decentralization that were not implemented: the shift from average to actual teacher salaries is one example. Using average teacher salary limits an important source of variation in funding, and experienced teachers are more often found in low poverty schools. The Small School Subsidies and magnet funding (note: magnet process did change recently) are two other examples. These add-on budget items serve to distort the impact of the weighted funding approach; they also serve to minimize the competition that is intended to drive innovation at the campus level.[2]

2 The question of innovation and the actual potential for principals to be the change agent that reformers believe they can be will be addressed in a separate research brief, wherein principal surveys will help us understand whether the key players here believe they have the support they need to do this well.

Partially fulfilled components

Other components of decentralization have been only partially fulfilled. For instance, school choice is important because it fosters competition and innovation as campuses strive to protect their funding by doing the best job they can for students. HISD is an open choice school district in theory; yet in practice, most campuses are using transfer agreements and choice is somewhat constricted. Notably, choice as a mechanism also remains in question in the academic realm based on evidence that it tends to be more educated and involved parents who are active choice users. The adoption of weights has also been less structured than theorists suggest; it is important that weights are set appropriately. The PEER Committee did recommend establishing a committee that would revisit weights on a regular basis; weight adjustments have only occurred on an ad hoc informal basis.

Limitations

There are limitations to this study. First, the original move to decentralization occurred almost thirty years ago, and was implemented over a ten-year period, culminating in the adoption of WSF. A retrospective analysis is passive at best; however, HISD can learn from the consequences of this policy and apply the knowledge moving forward. Second, the theoretical arguments in support of decentralization rely on adequacy of funding, which is not the case according to the Picus et al. 2012 adequacy study of Texas. Finally, there are resources that are not captured that should be considered in a conversation about equity of both inputs and outcomes. These include but are not limited to peer effects, parent involvement, teacher quality, and curricular. If the ultimate goal is more equitable educational opportunities for all students, these variables must be factored into any dialogue about resource distribution.

Conclusion

Decentralization remains a viable approach to the equitable distribution and management of resources in school districts. It is a model that can appeal both to external reformers, due to the focus on school choice and a free market system, and internal reformers, who value local control. Of course, there are researchers who propose alternatives or modifications. Meyer (2009) notes that policy making should be centralized, while administration is decentralized. Examples of policy in this case might include curriculum planning and design and quality control standards. This distinction allows monitoring to occur more easily, because the end goal is centrally defined, but how it is achieved can be campus decision. Education Research Strategies (2014) also cautions that some resources might be better managed centrally for compliance or safety reasons, such as school nurses, special education staff, or security officers. Other researchers believe that there must be a strong blend of decentralization and performance based incentives for students to benefit (Hanushek, n.d.).

To recap, the decentralization reform had two main objectives: the redistribution of funding and improving student achievement. This initial portion of the study demonstrates that decentralization was well implemented, but there are components that should be revisited to improve the intended outcomes of decentralization and WSF. The remaining briefs will investigate how well these goals have been met over time in spite of the implementation issues addressed here.

Sources

Baker, Bruce D. "Within-District Resource Allocation and the Marginal Costs of Providing Equal Educational Opportunity: Evidence from Texas and Ohio." *Education Policy Analysis Archives/Archivos Analíticos de Políticas Educativas* 17 (2009).

Baker, B. D., & Elmer, D. R. (2009). The politics of off-the-shelf school finance reform. Educational Policy, 23(1), 66-105.

Calvo, N., & Miles, K. H. (2010). Beyond funding formulas: District transformation through weighted student funding and strategic decentralization. *Student-Based Budgeting*, 40.

Cooper, B. S., DeRoche, T. R., Ouchi, W. G., Segal, L. G., & Brown, C. (2006). Weighted Student Formula: Putting Funds Where They Count in Education Reform. *Education Working Paper Archive*. Retrieved from https://eric.ed.gov/?id=ED509021

Darden, E. C., & Cavendish, E. (2012). Achieving resource equity within a single school district: Erasing the opportunity gap by examining school board decisions. *Education and Urban Society*, *44*(1), 61–82.

Della Sala, Matthew R., Robert C. Knoeppel, and Russ Marion. "Modeling the Effects of Educational Resources on Student Achievement: Implications for Resource Allocation Policies." *Education and Urban Society* 49, no. 2 (2017): 180–202.

Dunn, William. *Public Policy Analysis*. 5th edition. Boston: Routledge, 2012.

Haines, Al. (1999). The Report of the PEER Committee on District Decentralization. HISD.

Hanushek, E. (n.d.) Weighted student funding: liberals and conservatives are equally naïve. [Blog post]. Retrieved on November 15, 2017 from http://hanushek.stanford.edu/publications/weighted-student-funding-liberals-and-conservatives-are-equally-na%C3%AFve

Hanushek, E. (2010). Misplaced optimism and weighted funding. Education Week (online). Retrieved from https://www.edweek.org/ew/articles/2012/03/28/26hanushek_ep.h31.html?qs=hanushek+misplaced+optimism

HISD. (2016). 2016-2017 Resource Allocation Handbook: Fiscal Year: July 1, 2016-June 2017. Houston, TX.

Houck, E. A. (2011). Intradistrict resource allocation: Key findings and policy implications. *Education and Urban Society*, *43*(3), 271–295.

Houston ISD Board Policy Manual. (2017). Planning and Decision Making Process. BQB@ (REGULATION). LDU 2017.01. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=BQB2(REGULATION).pdf

Houston ISD Board Policy Manual. (2013a). Educational Philosophy. AE(LOCAL). LDU 2013.01. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=AE(LOCAL).pdf

Houston ISD Board Policy Manual. (2013b). Curriculum Development. EGA(LOCAL). LDU 2013.05. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=EGA(LOCAL).pdf

Houston ISD Board Policy Manual. (2011). Annual Operating Budget. CE(LOCAL). LDU 2011.06. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=CE(LOCAL).pdf

Houston ISD Board Policy Manual. (2010). Administrative Regulations. BP(EXHIBIT). LDU 2010.02. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=BP(XHIBIT).pdf

Houston ISD Board Policy Manual. (2009). Annual Operating Budget. CE(EXHIBIT) LDU 2009.10. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=CE(XHIBIT).pdf

Houston ISD Board Policy Manual. (2009). DM(1) Regulation. DM1(REGULATION). LDU 2009.11. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=DM1(REGULATION).pdf

Howard, R. W., & Preisman, J. (2007). The Bankrupt "Revolution" Running Schools Like Businesses Fails the Test. *Education and Urban Society*, 39(2), 244–263.

Ladd, H. F. (2008). Reflections on equity, adequacy, and weighted student funding. Education, 3(4), 402-423.

Levin, Henry M. "Educational Vouchers: Effectiveness, Choice, and Costs." *Journal of Policy Analysis and Management* 17, no. 3 (1998): 373–392.

Meyer, Heinz-Dieter. "Saying What We Mean, and Meaning What We Say—Unpacking the Contingencies of Decentralization." *American Journal of Education* 115, no. 3 (2009): 457–474.

Miles, K. H., & Roza, M. (2006). Understanding student-weighted allocation as a means to greater school resource equity. Peabody Journal of Education, 81(3), 39-62.

Miller, Lawrence J., and Jane S. Lee. "Policy Barriers to School Improvement: What's Real and What's Imagined?" *Center on Reinventing Public Education*, 2014.

Odden, A., & Busch, C. *Financing Schools for High Performance: Strategies for Improving the Use of Educational Resources. The Jossey-Bass Education Series.* ERIC, 1998. https://eric.ed.gov/?id=ED418501.

Ouchi, W. G. (2004). Academic freedom. Education Next, 4(1).

Ouchi, W. G. (2006). Power to the principals: Decentralization in three large school districts. Organization Science, 17(2), 298–307.

Paul, Kelli M., Natalie A. Legan, and Kim K. Metcalf. (2007). "Differential entry into a voucher program: A longitudinal examination of families who apply to and enroll in the Cleveland Scholarship and Tutoring Program." *Education and Urban Society* 39, no. 2: 223–43.

Sabatier, Paul, and Daniel Mazmanian. "The Implementation of Public Policy: A Framework of Analysis." *Policy Studies Journal* 8, no. 4 (1980): 538–560.

Transforming school funding: A guide to implementing student-based budgeting (SBB). (2014). Education Research Strategies. Retrieved on December 5, 2017 from https://www.erstrategies.org/cms/files/2752-transforming-school-funding-student-based-budgeting-guide.pdf

Van Meter, Donald S., and Carl E. Van Horn. "The Policy Implementation Process: A Conceptual Framework." *Administration & Society* 6, no. 4 (1975): 445–488.

Verstegen, Deborah A. "On Doing an Analysis of Equity and Closing the Opportunity Gap." *Education Policy Analysis Archives/Archivos Analíticos de Políticas Educativas*, no. 23 (2015).

Verstegen, Deborah A. "Policy Perspectives on State Elementary and Secondary Public Education Finance Systems in the United States." *Educational Considerations* 43, no. 2 (2016): 4.

Verstegen, Deborah A. "State Finance Policies for English Language Learners: New Findings from a 50-State Survey." *Journal of Education Finance* 42, no. 3 (2017): 338–355.

Mission

The Kinder Institute for Urban Research builds better cities and improves people's lives by bringing together data, research, engagement, and action.

RICE | KINDER
INSTITUTE FOR URBAN RESEARCH

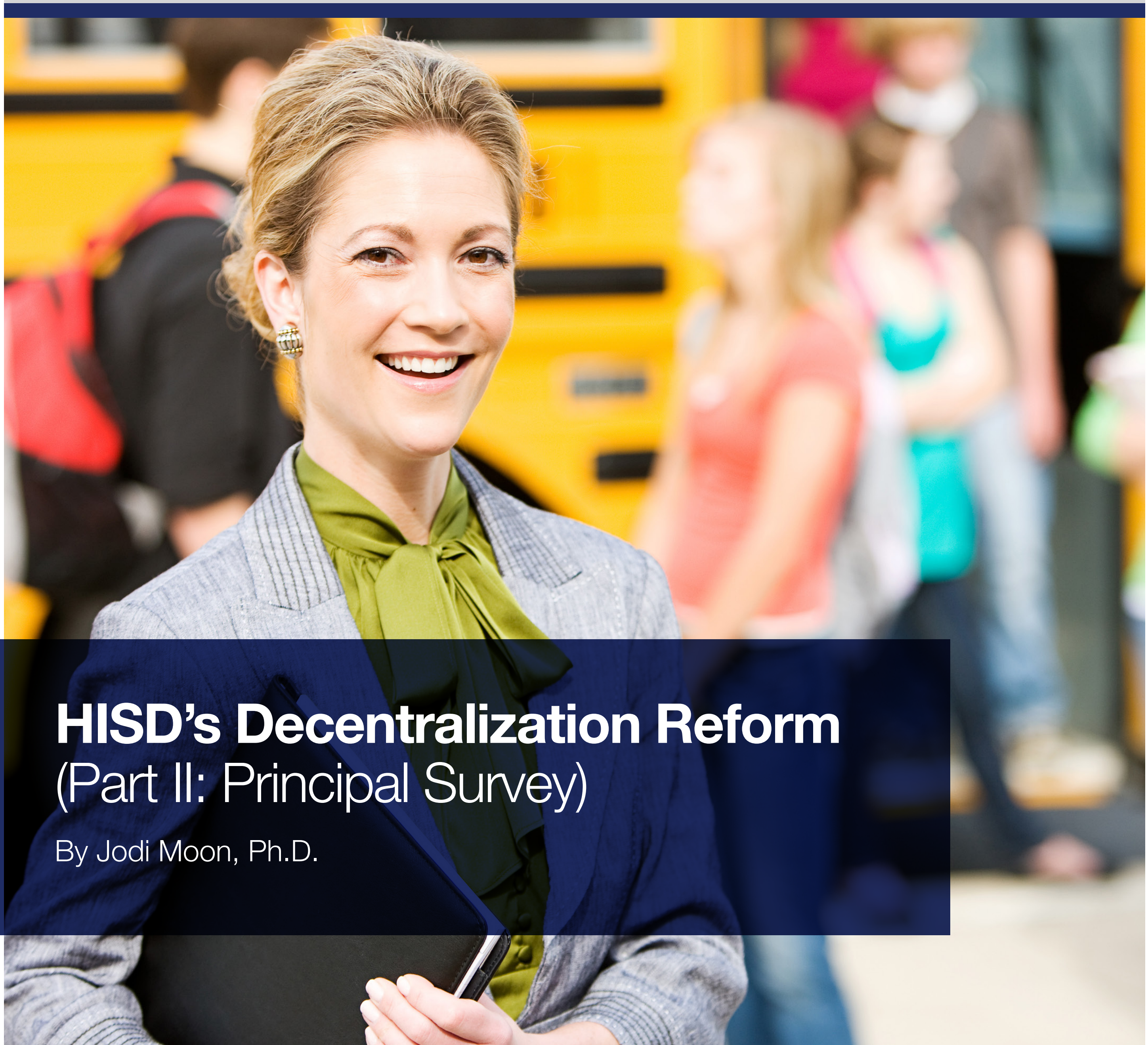
6100 Main Street MS-208 • Houston, TX 77005 • Phone 713-348-4132 • Email kinder@rice.edu

19

RICE | HERC
Houston Education Research Consortium

Building Better Cities,
Building Better Lives

Rice University's Kinder Institute for Urban Research



HISD's Decentralization Reform
(Part II: Principal Survey)

By Jodi Moon, Ph.D.

Research Brief
for the Houston Independent School District

Volume No. 6, Issue No. 3. | May, 2018

Research Brief Abstract

HISD's Decentralization Reform (Part II: Principal Survey)

This research brief is Part II of a four-part study of decentralization in HISD.

- Part I describes how decentralization was enacted in HISD.
- Part II reports HISD principal attitudes and satisfaction within the current decentralized model.
- Part III examines the impact of decentralization on student outcomes.
- Part IV examines the impact of decentralization on funding equity.

Findings from Part II

HISD principals who elected to participate in the survey on average expressed positive statements about their degree program training and current level of efficacy related to their ability to: use data to identify student needs; communicate with teachers to identify student needs; and make staffing decisions to support student needs. They reported having autonomy over making the scheduling, instructional, and staffing decisions that are best for their students. They further reported being supported by HISD central administration in the fundamental roles that principals are expected to fulfill in the current decentralized model: analyzing the data to best determine their students' needs; making staffing, instructional and scheduling decisions based on that analysis, and; preparing a budget that reflects those needs.

Findings do suggest possible opportunities including professional development for first year principals about how to make staffing decisions to support student needs and a review of the budget analyst protocols and/or an efficiency study of the support provided by budget analysts to each campus.

Introduction

In the late 1980s, the Houston Independent School District (HISD) was a centralized bureaucracy like many other urban school districts. Student performance was a concern: The drop-out rate for HISD was double the state average (10% in HISD versus 5% state average in 1990), and student outcomes on average were low (e.g., 32% of 9^{th} graders met or exceeded the minimum expectations on the Texas Assessment of Academic Skills TAAS in 1990 compared to the state average of 49%). Over the course of several years (1990–1999), the HISD School Board adopted a decentralization plan to improve student achievement and increase equity in funding; both the board and the administration believed that this could be accomplished by shifting more decision-making to the local level (campus). This reform culminated in a shift from a full-time equivalency funding model (FTE) to a weighted student funding model (WSF) in 1999; the district refers to this model as a per unit allocation (PUA).

This brief reports input from HISD principals that pertain to the current decentralized model; it is one part of a four-part study of decentralization in HISD. The first two questions relate to how the policy of decentralization was initially implemented, and how it is currently practiced in the district; the second two questions examine the impact of decentralization on student outcomes and funding equity. Here, we examine principal attitudes and satisfaction within this decentralized model.

What does the literature say about the role of the principal in a decentralized model and more broadly?

A guiding motivation of the decentralization model is that the school principal is in the best position to make many site-specific decisions to best support their students' learning needs. These decisions include, but are not limited to, scheduling, curricular, and staffing decisions. Importantly, in order for decentralization to work, principals must understand how to analyze their student data; have the ability to plan strategically based on student needs (e.g., hire additional staff in critical areas); and receive sufficient funding that allows academic needs to drive the budgeting process. This notion of budgetary discretion is linked directly with WSF as a funding mechanism in the literature (see e.g., Odden & Busch, 1998; Ouchi, 2004; 2006).

The fundamental roles of a principal as discussed above are not always specifically tied to a formal model of decentralization. For instance, researchers describe a systematic increase in the decentralization of *teacher hiring* over time in all types of districts from 1987 to 2012, especially in urban settings. Results from the 2015–16 National Teacher and Principal Survey (Taie & Goldring, 2017) indicate that 87% of principal respondents have major influence in the hiring process and Zigarelli (1996) found principal autonomy in teacher hiring/firing is a factor in identifying an effective school. Grissom and Loeb (2011) have also identified organizational management skills (including managing budgets and resources) as a key complement to instructional leadership for school success. These traits of personnel autonomy, managing resources, and managing budgets are therefore not necessarily unique to principals in a decentralized model, but they are the essential roles of principals in a decentralized model. Through our survey, we examine HISD principal attitudes and satisfaction in the current HISD decentralized model.

Research Questions

As indicated, this report is this second of a four-part series of briefs on decentralization in HISD. This study examines HISD's principals' self-reported perceptions of their ability to make campus decisions to benefit students based on their degree training, support and autonomy. These specific roles are articulated both in the academic literature and in HISD school board policy. Because funding goes hand in hand with governance, and WSF is seen as a key part of a decentralization reform, we specifically ask about WSF in our survey questions as well.

The research questions for this brief are:

- Do HISD principals believe they have the skills/training needed to make the best decisions for student learning?
- Do HISD principals believe they have the necessary support from HISD central administration to make the best decisions for student learning?
- How do HISD principals rate their autonomy?
- How do HISD principals rate their understanding and beliefs about the WSF process?

Methods/Data

Using a questionnaire, we analyze HISD principals' beliefs on their autonomy and capacity. The survey was announced via the HISD Academic Services newsletter on 11/27/2017 and 12/4/2017 and the survey was conducted using Qualtrix. The survey was accessed by 167 persons; there are 277 potential principal respondents. Three cases were dropped because the respondent was not a principal, and 11 cases opted out from participating and were dropped. The final sample consisted of 153 HISD principals, with an 88% completion rate (135/153).

For most of the opinion questions, a four-point Likert response scale was used with 1=strongly disagree and 4=strongly agree. All survey questions included an option for additional comments. Open–ended responses are included in Appendix; responses were analyzed for common themes where the responses exceeded ten percent of the sample.

Table 1 displays the distribution of characteristics in the sample and in the overall HISD principal population. Due to differences in the categories offered on the survey and the categories used to store information about school principals in the district, categories cannot be statistically compared. However, an inspection of the percentages suggests some similarity. For additional data on tenure and degree level, see Appendix.

Table 1. Respondent characteristics

	HISD	Survey
School Level		
Elementary School	58%	65%
Middle School	17%	13%
High School	17%	15%
Other school level	n/a*+	6%
Gender		
Male	32%	32%
Female	68%	54%
Prefer not to answer	n/a*	14%
Race/Ethnicity		
Asian	3%	2%
Black or African American	36%	21%
Hispanic or Latino	34%	30%
White	26%	26%
Two or more races	—	4%
Prefer not to answer	n/a*	17%

* n/a in this case indicates that this category used in the survey does not explicitly match a category used within HISD.
+ *Other* includes: PreK-12, PreK-8, K-8, and ECC.

Findings: How do HISD principals report their experience in the current decentralized model?

Do HISD principals believe they have the skills/ training needed to make the best decisions for student learning?

As seen in Table 2, the majority of respondents *agree* or *strongly agree* that the degree program they pursued to become a principal provided the necessary training to support their ability to do the following when they first became an HISD principal: use data to identify student needs (117, 81%); communicate with teachers to identify student needs (118, 82%); and make staffing decisions to support student needs (108, 75%).

Table 2. Degree program effectiveness (n=144)

To what extent do you agree or disagree that the degree program(s) you pursued to become a principal provided the necessary training to support your ability to do the following when you first became an HISD principal?	Agree/ Strongly Agree
Use data to identify student needs	81%
Communicate with teachers to identify student needs	82%
Make staffing decisions to support student needs	75%

Almost all respondents currently feel well prepared to do the following: use data to identify student needs; communicate with teachers to identify student needs; and make staffing decisions to support student needs (first year principals were excluded from this question). See Table 3.

Table 3. Perceptions of self-efficacy (n=122)

To what extent do you agree or disagree that you are well prepared to do the following today?	Agree/ Strongly Agree
Use data to identify student needs	97%
Communicate with teachers to identify student needs	96%
Make staffing decisions to support student needs	97%

Do HISD principals believe they have the necessary support from HISD central administration to make the best decisions for student learning?

Respondents feel supported by administration vis-a-vis data analysis needs (124, 87%) and leadership training (109, 77%) while fewer (84, 59%) *agree* or *strongly agree* they have the budget analyst support needed (see Table 4).

Table 4. Central administration support (n=142)

To what extent do you agree or disagree that HISD central administration provides the necessary support to you in the following areas?	Agree/ Strongly Agree
Data analysis to identify student needs	87%
Leadership training	77%
Budget analyst support	59%

How do HISD principals rate their autonomy?

Almost all respondents *agree* or *strongly agree* that they have autonomy over staffing (127, 92%), instructional (127, 92%) and scheduling (132, 96%) decisions that are best for their students, as seen in Table 5.

Table 5. Principal autonomy (n=138)

To what extent do you agree or disagree that you have the autonomy to do the following?	Agree/ Strongly Agree
Make staffing decisions that are best for my students	92%
Make instructional decisions that are best for my students	92%
Make scheduling decisions that are best for my students	96%

How do HISD principals rate their understanding and beliefs about the WSF process?

Most respondents *agree* or *agree strongly* that they understand how WSF funding is calculated (107, 76%) and the percentage of their budget allocated in this way (102, 72%) as seen in Table 6. Familiarity with the WSF model is related to the amount of experience respondents have: those with 0–1 year of experience were less likely to describe being familiar with WSF. [1]

Table 6. Understanding WSF (n=141)

To what extent do you agree or disagree with the following statements about the Weighted Student Funding (WSF) (per unit allocation) process?	Agree/ Strongly Agree
I understand how WSF allocations are calculated.	76%
I understand what percentage of my budget is WSF.	72%

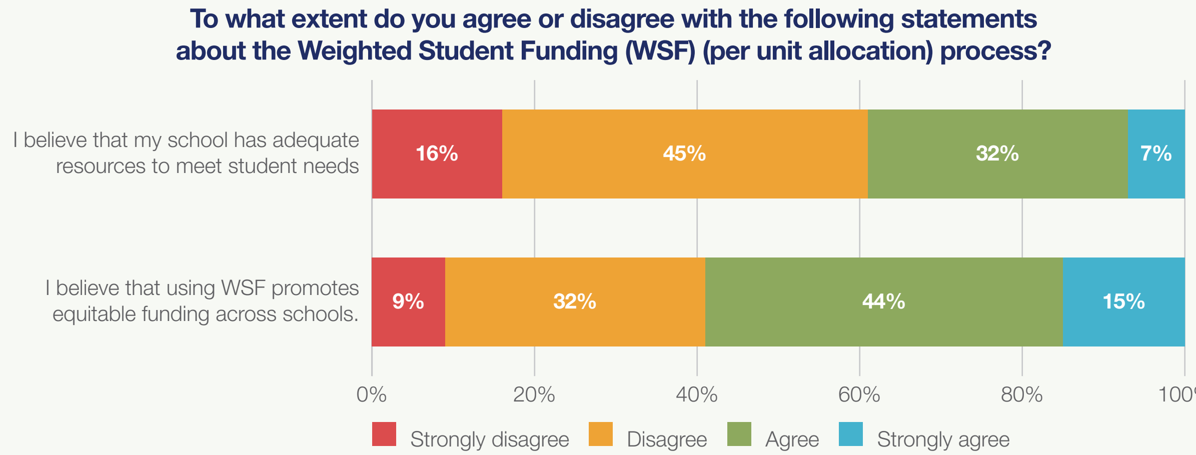
Participants were also asked about their beliefs about funding equity and adequacy in the district. Of the 138 HISD principals who responded, 84 (61%) *disagree* or *disagree strongly* with the statement that their school has adequate resources to meet student needs while 54 (39%) *agree* or *agree strongly* with this statement. Fifty-seven (41%) *disagree strongly or disagree* that using WSF promotes equitable funding across schools while 81 (59%) *agree or agree strongly* that using WSF promotes equitable funding across schools.

Other insights

Respondents were divided on their perceptions about the existence of district policies or practices that constrain their abilities to make the best decisions for their students (yes=70, 51%; no=66, 49%). There were statistically significant differences by school level for this question, with high school principals more likely to answer "yes" that there were policies or practices they felt constrained their autonomy than principals of middle or elementary schools.

Most participating HISD principals report being comfortable with the current distinction between campus and central funding functions. When asked if there are budget items currently handled by the district that would be better handled at the campus level, 70% responded "no". Similarly, when asked if there were budget items that the campuses currently handle that would be better handled at the district level, about 76% of principals responded "no". (Open-ended responses are provided in Appendix, see Figures 13 and 14.)

Figure 1. Beliefs about WSF (n=138)



1 The analysis tested for any statistically significant relationships between survey responses and years of experience and school level. All statistically significant relationships are reported.

Discussion

Those HISD principals who elected to participate in the survey on average expressed positive statements about their own capacity, their training, and their sense of autonomy. They described being supported by central administration in the fundamental roles that principals are expected to fulfill in the current decentralized model. HISD has policies and procedures in place aimed at supporting principals in their fundamental roles. For instance, HISD's current school board policy emphasizes the role of the principal. Administrative Regulations (LDU 2010.02) state that the principals are in charge of the budgeting process for their student population, school staffing and hiring specifically. The Educational Philosophy (LDU 2013.01) places decision-making at the principal level, and also holds the principals accountable for innovative instructional results. Attitudes of principals expressed in this survey reflect the supportive environment these policies aim to create.

Although responses were generally positive, some of the results suggest possible opportunities to improve or increase principal support. For instance, 59% of respondents *agree* or *strongly agree* that they are provided with the necessary budget analyst support. HISD practices are in place to support principals in the budget process. HISD currently has seven budget analysts and seven senior budget analysts who are assigned to support principals. Principals also have access to guidance through the "Understanding the Budget Process" manual, and through SAP 4.6 training programs (LDU 2009.10). However, there are no set procedures defining the use of budget analyst assistance; the analysts are available to support principals as needed. Possible next steps include a review of the budget analyst protocols and/or an efficiency study of the team support.

Additionally, while 75% of responding principals *agree* or *strongly* agree that their degree training prepared them to make staffing decisions to support student needs, this means that about one-quarter of principals *disagree* or *strongly disagree* that their degree training adequately prepared them to perform fundamental roles when they first became principals. In contrast, of principals with at least one year of experience, about 97% *agree* or *strongly agree* that they are currently prepared to make staffing decisions to support student needs. This pattern in the data suggests that a segment of principals are starting at HISD concerned about their ability to perform their fundamental roles, but very quickly grow their abilities to more confidently serve their students, staff, and the district. In part, this rapid uptake by principals may speak to the district's nine leadership development programs. These programs emphasize mentor relationships and a cohort experience to facilitate networking and collaboration, in addition to planned opportunities for skill development. These programs appear to be serving principals well in shaping and developing skills that enable principals to feel more confident in performing their fundamental roles. To address the lower confidence of beginning principals, the district could consider identifying strategies for improving the connection between principals' degree programs and the transition into HISD schools. This could include a future study utilizing HISD's current principals to identify which degree programs are particularly successful at preparing principals for taking on the fundamental roles in HISD. The district could also consider setting up partnerships with degree programs locally and across the State of Texas to discuss the district's specific training needs and working to ensure those needs are met by the training and education offered in the degree programs.

Limitations

The primary questions the survey data allow us to answer relate to principal perceptions of: their degree training; their current level of efficacy; central administrative support; understanding and beliefs about WSF; and sense of autonomy. In addition to responses to survey items, a selection of responding principals provided open-ended responses to particular items throughout the survey. These responses, de-identified to protect confidentiality, are available in Appendix and can be consulted for additional feedback provided by principals. Note, the open-ended response data were not collected systematically therefore the comments do not necessarily reflect general patterns of attitudes, beliefs, or practices of principals in the broader HISD population.

Although we collected data from a sample of principals that generally reflected the composition of principals in all of HISD, our results only reflect attitudes and opinions of principals working in a decentralized system; there is also the potential of self-reporting bias. Results of this brief provide no evidence of potential differences principals would experience in a more centralized model of central administration. Additionally, it is important to remember that although survey participants were fairly reflective of all HISD principals, there might be unmeasured but systematic differences between those who chose to respond and those who did not respond. Caution should be used when attempting to make any inferences from these data.

Conclusion

Decentralization in HISD had two main stated objectives: redistributing funding and improving student achievement. Principals play a major role in achieving these goals in a decentralized model. In this second part of the larger four-part study, we surveyed HISD principals and found that the majority of respondents describe feeling prepared and supported in the context of the duties they are asked to manage in the existing decentralized structure.

Addendum

This survey was conducted in December 2017. In January 2018, HISD formed the Principal Budget Advisory Committee, which consists of 36 principals: they represent schools from a variety of sizes (small, medium, large), board member districts (geographical), academic levels (elementary, middle, high, multilevel), and type (magnet, specialty, comprehensive, etc.). The purpose of the committee is to: gather input/feedback on the budget process and the current working recommendation to move the HISD budgeting process to an FTE funding model; to include the principal voice in the decision process; to allow principals to raise issues that might not have been addressed without their input; and to guide the district through this budgeting process to make sure that all schools have the resources to be successful. The group has already met three times.

References

Grissom, J. A., & Loeb, S. (2011). Triangulating principal effectiveness: How perspectives of parents, teachers, and assistant principals identify the central importance of managerial skills. *American Educational Research Journal*, *48*(5), 1091–1123.

Haines, Al. (1999). The Report of the PEER Committee on District Decentralization. HISD.

Houston ISD Board Policy Manual. (2013a). Educational Philosophy. AE(LOCAL). LDU 2013.01. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=AE(LOCAL).pdf

Houston ISD Board Policy Manual. (2010). Administrative Regulations. BP(EXHIBIT). LDU 2010.02. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=BP(XHIBIT).pdf

Houston ISD Board Policy Manual. (2009). Annual Operating Budget. CE(EXHIBIT) LDU 2009.10. Retrieved on November 9, 2017 at https://pol.tasb.org/Policy/Download/592?filename=CE(XHIBIT).pdf

Odden, A., & Busch, C. *Financing Schools for High Performance: Strategies for Improving the Use of Educational Resources. The Jossey-Bass Education Series.* ERIC, 1998. https://eric.ed.gov/?id=ED418501.

Ouchi, W. G. (2004). Academic freedom. Education Next, 4(1).

Ouchi, W. G. (2006). Power to the principals: Decentralization in three large school districts. Organization Science, 17(2), 298–307.

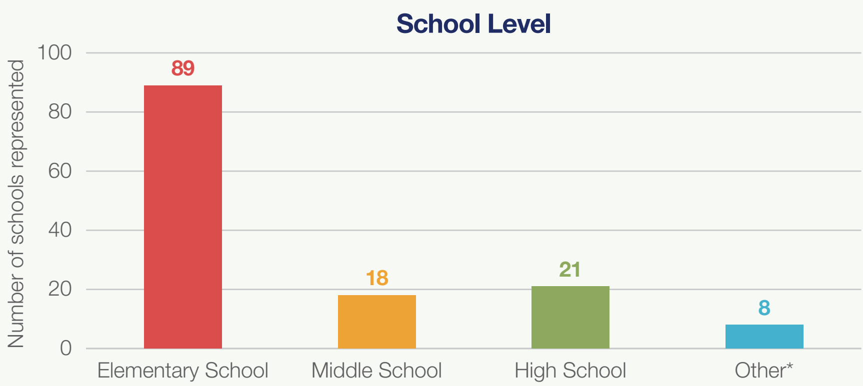
Taie, S., & Goldring, R. (2017). Characteristics of Public Elementary and Secondary School Principals in the United States: Results From the 2015–16 National Teacher and Principal Survey (NCES 2010-070) (No. National Center for Education Statistics). Washington, D.C.: U.S. Department of Education. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017070

Zigarelli, M. A. (1996). An empirical test of conclusions from effective schools research. *The Journal of Educational Research*, *90*(2), 103–110.

Appendix

Demographic Information

Figure 2: School level of survey respondents (n=136)



* Other includes: PreK-12 (1), PreK-8 (4), K-8 (2) and ECC (1)

Table 7: Years of experience as HISD principal* (n=152)

	N	Percent
0–1 years	31	20.4
2–5 years	57	37.5
6–10 years	29	19.1
More than 10 years	35	23.0

* Twenty respondents indicated having served as a principal outside HISD; 15 provided additional information on their years of experience outside HISD.

Figure 3: Gender identification of survey respondents (n=133)

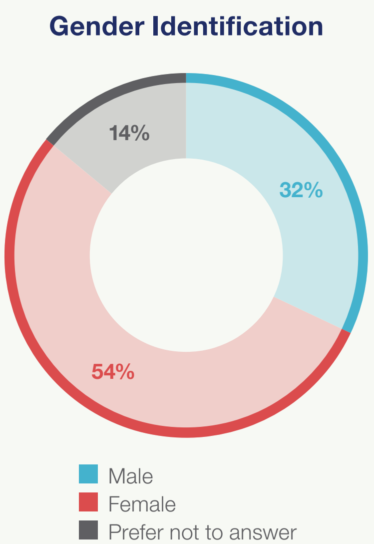


Figure 4: Race/Ethnicity of survey respondents (n=135)

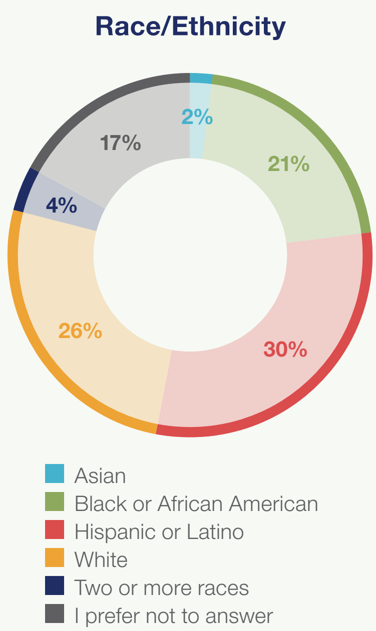
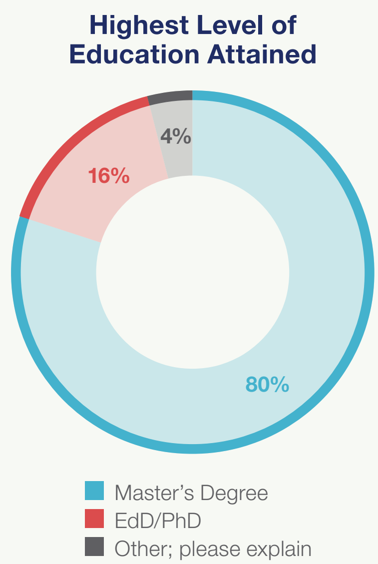


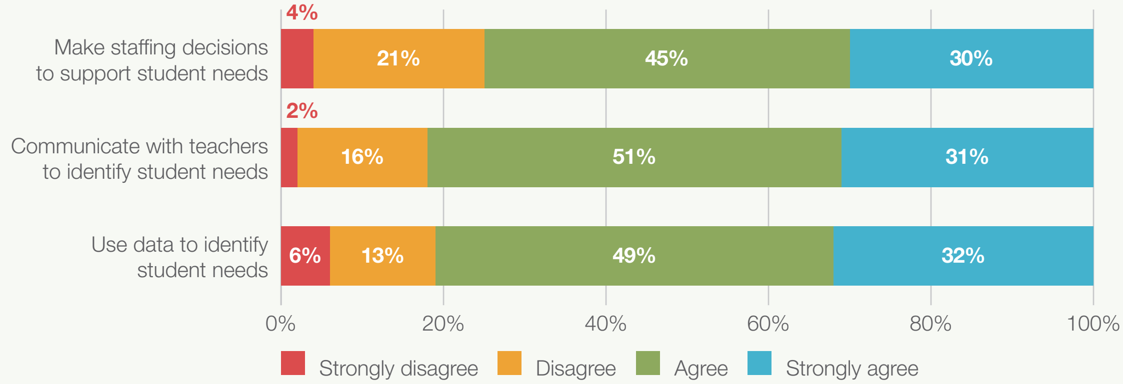
Figure 5: Highest level of education attained by survey respondents (n=136)



Do HISD principals believe they have the skills/training needed to make the best decisions for student learning?

Figure 6: Degree of program effectiveness (n=144)

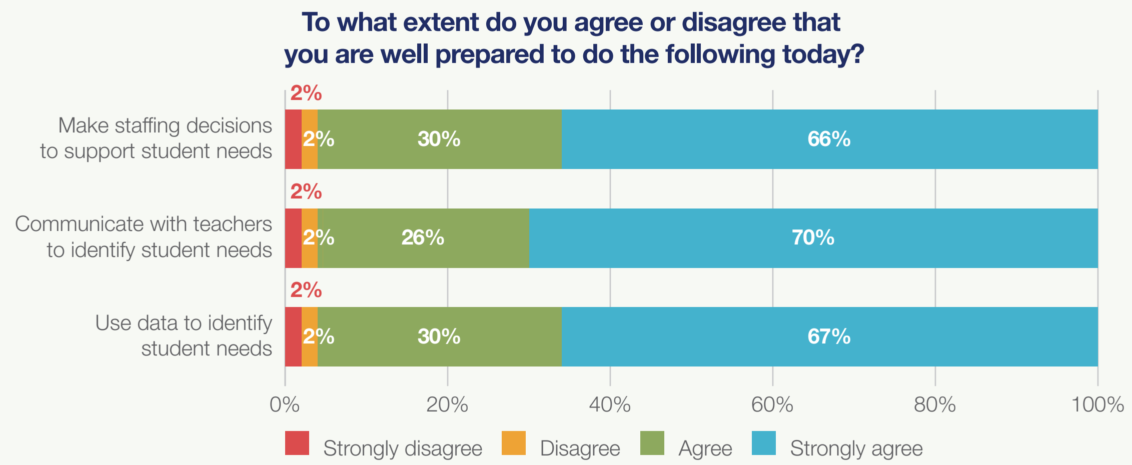
To what extent do you agree or disagree that the degree program(s) you pursued to become a principal provided the necessary training to support your ability to do the following when you first became an HISD principal?



Additional Comments (N=12)

To what extent do you agree or disagree that the degree program(s) you pursued to become a principal provided the necessary training to support your ability to do the following <u>when you first became an HISD principal</u>?
I feel my experiences through my internships (Masters and Ph.D.) along with my assistant and associate principal positions were crucial for these skills.
I received my Masters and Principal Certification through my admission to an innovative HISD Principal Cohort program. It's a shame the district discontinued this opportunity as the education and experience it provided were invaluable.
I spent three years as an assistant principal working for an excellent principal; I was well-trained.
I learned it as an assistant principal.
My degree program did go into these area, however constant changes in education and particularly changes in accountability system, I do not believe that my degree program prepared me. I would say 70% of my learning of how to do the above was learning from my principal as an assistant principal, attending work sessions on the topic, collaborating with principals or learning from opportunities provided by districts that I have worked for.
My school program focused on theory opposed to real life. HISD PD's gave me the additional training that I needed to target focus areas. The on the job training was essential to growth as a leader.
Dillard University and Texas Southern University had great programs that prepared my journey in becoming a principal.
My college work prepared me very well to perform these tasks effectively.
I would like more training in how to talk to staff members about reassignment to better meet needs. These are difficult conversations, and I have not role played them.
Researched-Based programs that fit the community needs.
We touched on student data, but it was a very small portion of the overall focus on leadership.

Figure 7: Perceptions of efficacy (n=122) (excludes first year principals)



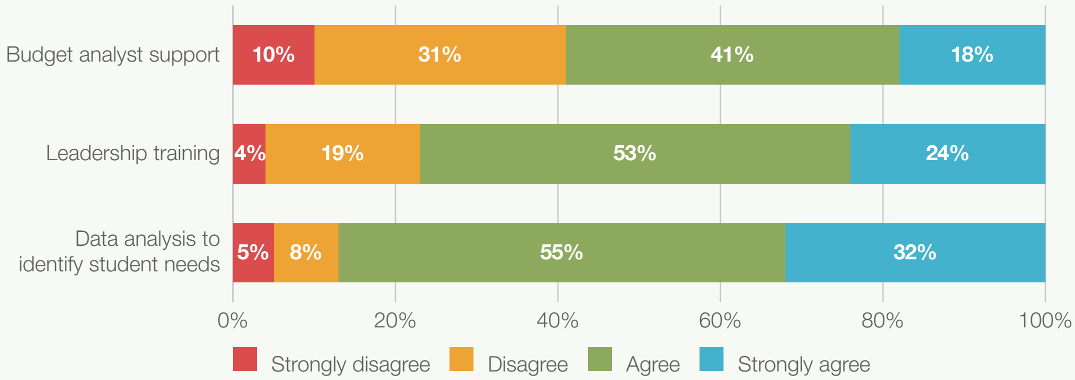
Additional comments (N=5)

To what extent do you agree or disagree that you are well prepared to do the following today?
I feel my experiences through my internships (Masters and Ph.D.) along with my assistant and associate principal positions were crucial for these skills.
I feel that my ability to do this came not only from district training, but the experience I had as an assistant principal.
HISD has a wealth of PD available to grow in the areas. Principals are the ones who need to look and seek to grow.
College work plus hands-on experience gave the skills necessary to perform these tasks effectively.
I believe my understanding of data is greater than most principals, but not nearly what I would like it to be. Principals have access to massive databases of data, and the time it takes to review these databases into usable fashion is extraordinary. Years ago, HISD principals had greater advisement and support from the district, now we just get massive reports and we are on our own to sift through it.

Do HISD principals believe they have the support needed from administration to make the best decisions for student learning?

Figure 8: Perceptions of support from central administration (n=142)

To what extent do you agree or disagree that HISD central administration provides the necessary support to you in the following areas?



Additional Comments (N=14)

To what extent do you agree or disagree that HISD central administration provides the necessary support to you in the following areas?

My first few years as principal I had a good budget analyst that really helped. Because of their training I think I manage my budget well, but I do not have a good analyst now. I believe there needs to be more consistency in this department.

Was better when we had just a few budget analysts working with school budgets as they knew all of the variables without having to ask others. Now the work is spread out and it seems that nobody is an expert at anything.

My budget analyst is incompetent.

I have gotten the most support and mentorship from more informal relationships with other principals. I have been very lucky to have had a few strong SSOs, which helped with more challenge situations.

As stated before it is available principals need to look for the training it does not fall on their laps or they are not forced to attend.

Do not feel as supported by budget analyst this year. Leadership training is too generic. Needs to be more specific.

For years the experienced principals in the district were called upon to support new principals with budget issues. It became clear that experienced principals were far more informed then most HMW personnel—especially those in the various school office iterations.

Our assigned budget analyst is very supportive but personally need more practice in all things relating to the budget.

Large audiences and webinars are ineffective. The budget analyst support is helpful when they come to the school to provide budget support. There is a lack of feeder pattern meetings to discuss patterns and demographic specific challenges. We do not meet to share best practices. This is greatly needed. Principals do not have support for learning. Expected to be experts and pressure is immense.

There are capable data experts at the district office, but they are spread very thin. The message is “call me if you have questions” instead of having a standard practice for looking at data and filtering some of the data for the campus. Leadership: There has been a mind-boggling rotating door of district leaders. I received incredible leadership and mentoring in 2009–10, but since then (budget cuts), a structured onboarding for new principals has been lost. The leadership development department was filled with people who have never served as a principal, so the activities were often “off point”. I’ve been a principal for 10 years and I often google HISD to find out who is at the helm of the department I am trying to reach. Often, the school offices have to “find out who is in charge” and get back to me.

Leadership training in HISD has been hit or miss. I think the district changes direction so often and reorganizes so often it is difficult to gain traction and to sustain the development of leaders. I arrived in HISD from other districts and I hang on more to the leadership training I received in other districts than to what I have received in HISD …

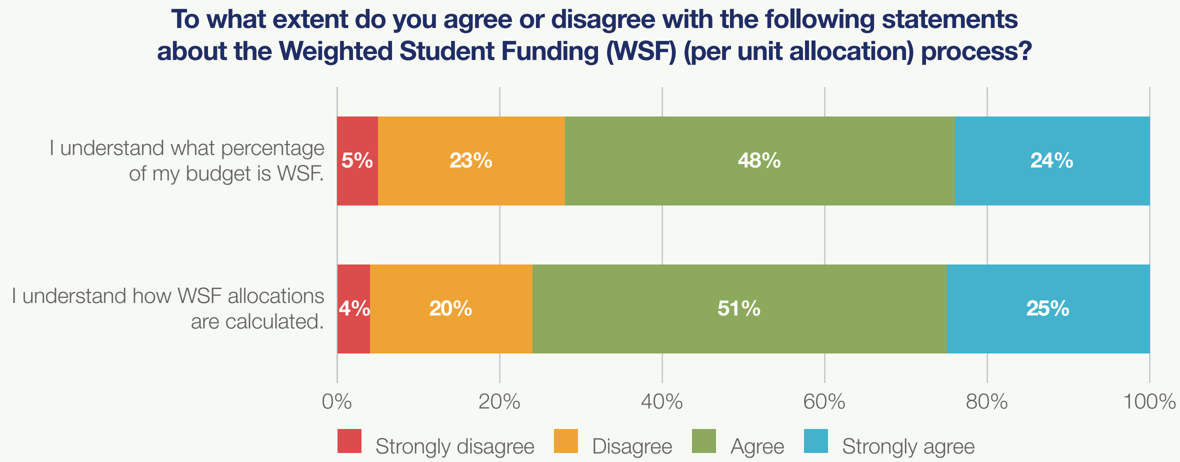
It’s between disagree and agree. I think many principals need hands on training.

Supervisors are all about compliance and not about nuts and bolts training.

We do not meet to share best practices. This is greatly needed.

How do HISD principals describe their understanding and beliefs about the WSF process?

Figure 9: WSF understanding (n=141)



Additional Comments (N=8)

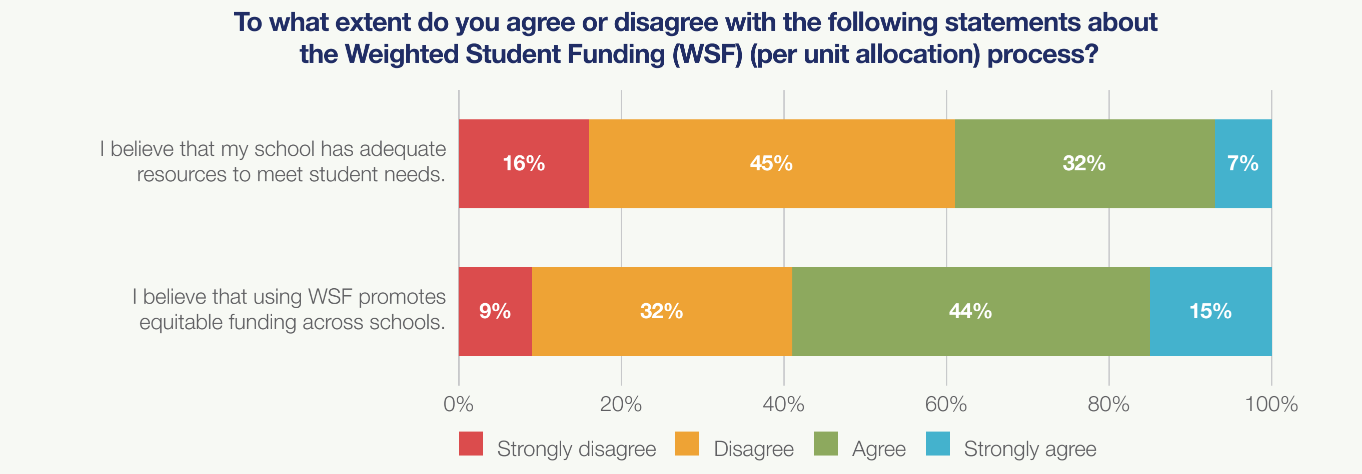
To what extent do you agree or disagree with the following statements about the Weighted Student Funding (WSF) (per unit allocation) process? Understanding process.
I learned this on my own in the role as principal.
I know this information because I asked, not because it was volunteered or required via training.
I served on a legislative committee in a previous district, and this is where my knowledge of WADA came from… I keep up with TEA and commissioner and stay informed.
Print out the Budget Allocation Handbook—on my shelf and understand how all factors (including attendance)
What I do not agree in this process is the adding of Magnet Monies because many of those take from at risk schools funding needed. those campuses already take the per unit allocation.
Since there is no final "other comments section" (not cool by the way), I will have to use this blank section to offer an overall critique. Moving away from decentralization for a district this size is understandable and easily digestible by those that haven't led an HISD campus. Trustees can use it as the villain for anything they find disappointing, and the highest levels of administration, with no experience in it, may be easily convinced. And for those in the private sector or business world, being decentralized seems ridiculous. However, a system dependent on 210K individuals cannot be compared to Hewlett Packard. HISD outperforms suburban districts across the city and country—other districts set up with a centralized model. To what are we now suddenly aspiring to be? There isn't success there that is transferrable to an urban district like Houston. Finally, many of the strong and high-flying principals that this district relies upon remain in Houston because of the decentralization model. The ability to lead your campus while remaining aligned with your school community is paramount to ensure that the families of Houston remain confident in our K–12 system.
I don't agree with the WSF allocations.
I learned this on my own in the role as principal.

Statistical test:

Years of experience correlated positively with *understanding how WSF funding is allocated* at $p<.01$; $r=.368$.

Years of experience correlated positively with *understanding what percentage of campus funding is WSF* at $p<.01$; $r=.409$.

Figure 10: WSF beliefs (n=138)

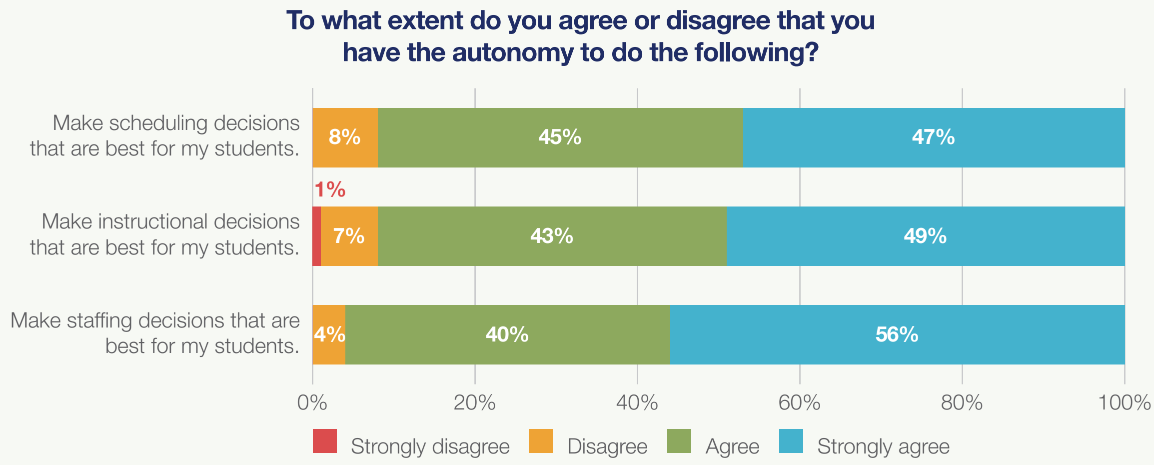


Additional Comments (N=10)

To what extent do you agree or disagree with the following statements about the Weighted Student Funding (WSF) (per unit allocation) process? Beliefs.
We have adequate b/c we receive magnet funds. If this is taken away b/c we are GT, then this will be a game changer and I would click disagree. Those funds make a huge difference as to the curriculum resources I can provide our students.
As long as magnet PUA doesn't change and is not differentiated.
As stated before the magnet programs cause it to not be equitable due to pulling resources from one campus and then to top it off they get extra funding.
The G/T weighted formula is excessive especially when you consider the additional magnet funding provided to Vanguard campuses. The regular allocation provides all the necessary staffing, as compared to an engineering magnet, aviation magnet, fine arts magnet, health science magnet in which highly specialized teachers are required and not provided for within the regular allocation.
Including cumulative At Risk factors in the WSF would make it more equitable.
Centralized funding would facilitate more equity in funding school programs in order to meet student needs.
My school receives the least amount of per student funding in the entire school district.
I don't fully understand this item so hard to share the equity therein
WSF alone does not achieve equity; my school does not receive enough funds to meet the needs of all students.
Due to the events of this year I was WAY below projection which has never occurred before. As a result, I am literally left without a budget to run the campus for the remainder of the year.

How do HISD principals describe their autonomy?

Figure 11: Perceptions of autonomy (n=138)

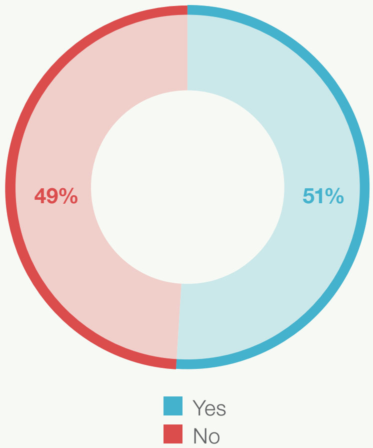


Additional Comments (N=12)

To what extent do you agree or disagree that you have the autonomy to do the following?
This is one of the best perks of working for HISD.
The decentralized funding system allows me the autonomy to make decisions that are best for my students.
These are core tenets in a decentralization model and would appear the most vulnerable as the district seemingly strives to centralize decision making.
As a leader I feel trusted and respected to make these decisions in the next interest of my campus and I hope this continues.
Although there are some limitations, in general, I have enough autonomy to make these decisions.
HISD strives to hire Haberman principals and teachers. If HISD becomes centralized decision-making, Haberman has no place in HISD.
This is what sets us apart from surrounding districts. We can truly utilize our talents and expertise about our school community to make decisions and realize our collective vision, not just carry out a mandate.
The instructional decisions autonomy is decreasing as frequently it seems that we have large district initiatives that collide with what campuses may already have in place as a best practice that is working. We've gone from I-stations that was a big monitoring and instructional tool when implemented and now to Ren 360 which is just monitoring. Both of these components have large implementation requirements and therefore impact some of the instructional decisions that I am able to make for my campus.
There is a disconnect from what actually needs to happen in a school and what central office perceives as what needs to happen. Unfortunately many times SSOs, TDSs, Chiefs, Program managers, and others who dream up initiatives for schools do not themselves know how to implement those programs. Too often those same people have never lead a school or have not led a school to success. We need to find or grow good principals and give them the autonomy and tools to do their job and hold them accountable when they don't.
District mandates determine my schedule more than I would like. I have an unusually strong school and I would like to be able to move to a student-driven model which requires a different type of schedule to do with fidelity.
Although I believe my scheduling decision are best it would be helpful to have master principal review and provide feedback.
I don't have enough funding to do so.

Figure 12: Policies or practices that constrain autonomy (n=136)

Are there any district level policies or practices that constrain your ability to make the best decisions for your students?



Additional Comments (N=56)

* Multiple themes were identified in comments thus percentage totals can exceed 100%.

Open-ended comments were analyzed using open coding to identify categories or themes that repeated in these data. Categories were defined to be responsive to the research questions. They were designed to be conceptually congruent but are not mutually exclusive because some comments included multiple themes.

There were several identifiable themes that emerged, including testing policies, administrative details, funding decisions, bureaucracy, time constraints, multiple initiatives, teacher related policies, ELL policies, curricular policies, and bell/schedule requirements. Testing policies (21%) and administrative policies (20%) were the most commonly identified themes. Administrative policies included paperwork that "bogged" principals down and timelines that made flexibility difficult.

Are there any district level policies or practices that constrain your ability to make the best decisions for your students?
Testing policies (21%)
The incessant insistence on testing including benchmarks, DLAs, and snapshots. The desire to move to a standardized bell schedule.
District mandated programs used for screeners, too many initiatives being rolled out at once, not having enough resources due to budget cuts (Recapture), district restrictions on released tests, etc.
Universal Screener—monthly progress monitoring with number of students provides little time for actual instruction. We are spending more time scheduling computers and the screening of students than teaching.
Currently we are engrossed with the district's IAT focus and focus on Ren 360. It is not that these two components are not highly important, however there seems to be an ongoing issue in our district of rush to implement and there is no differentiation for campuses that might already have great and working practices in place. At the campus level we feel constrained to abandon things or add and add to the plate when the plate just to be in compliance with what the district is asking. In addition, the support for most things implemented at the district is lacking.
Required testing usurps instructional time; the amount of time that was unilaterally mandated for IAT takes away from instructional time and does not differentiate by school needs.
IAT paperwork and the amount the time entering data.
district level testing timelines that are not developmentally appropriate for students, especially young students (K),
The testing/student assessment calendar can inhibit decisions made for students.
Mandatory district assessments.
Mandatory district level assessments.
Variety of testing with limited technology on campus to support the testing and interventions.
Principals are focused to adopt policies that do not meet the needs of students. We also are forced to participate in various unnecessary testing.
Administrative details (20%)
Within the last few years more of the principals' autonomy has been constrained with practices that are more common in a centralized budget system. A recent example is the requirement that an SSO/Chief approve any position changes for a campus. This slows the process and makes it more difficult to fill positions that are necessary to meet the needs of students. Another recent example is the decision to send a team to training to support one of our SIP goals. The travel requisitions required SSO approval. This is redundant and slows our ability to serve children.
The amount of paperwork required. Often the data requested exists in a district database (like Chancery) but we are asked to compile in a format determined by SSOs and/or Chiefs.
Lack of support/accountability for district level support personnel, lack of communication from campus staff who report to district managers.
I can't say this is a policy as it changes with each configuration. However, the back-n-forth nature of what types of positions require approval and which do not is confusing. And is not responsive to campus needs. Remaining agile is important for any system and if/when steps are created to slow that responsiveness then kids will lose out.

TADS system is extremely time consuming and does not allow for any flexibility. Teachers that are consistently highly effective should not have to have two formal observations/two walkthroughs a year. We would be able to provide more support to those teachers needing focused support.
Transportation Guidelines; Student Transfers.
The volume of memos, information, emails, action items, etc. that require attention or action is staggering. I'm not sure what the answer is for this.
procurement processes.
TAKS students cannot complete an IGC project to replace a failed EOC exam, we have an SEL department but not enough psychologists provided by the district to support campuses.
Use of specific progress monitoring tools, timelines for snapshot testing/formative assessments.
We have initiatives that must be implemented, but the paperwork boggles us down.

Other comments (20%)
TAKS students cannot complete an IGC project to replace a failed EOC exam, we have an SEL department but not enough psychologists provided by the district to support campuses
Principals are focused to adopt policies that do not meet the needs of students. We also are forced to participate in various unnecessary testing.
We are told at the beginning of the year to register anyone who shows up. Then in October, we are told to reduce our waivers by using gimmicks like having classes of 22 and 26 instead of two classes of 24.
I like that we are making certain things centralized like the curriculum and expectations.
Having a decentralized budget is one of the reasons I continue to work for HISD. The needs of our schools are so different across the district.
We seem to direct actions toward the lowest common denominator. In high-performing schools, many of the trainings and requirements are not appropriate. We passed that threshold years ago.
Achieve 180 policy to remove IR or FIR schools from their feeder patterns.
Decentralization to campuses.
I would like more facilities funding directly. I believe that department does not respond fast enough or do a good enough job with repairs.
Special education referral policies—45 calendar days until parental consent is too long.
Discipline Policies.

Funding decisions (14%)
Funding.
Funding based on enrollment and ADA.
Yes, there are a few but the main one is how funds are not distributed equally.
Cannot get nurse position, police position or buy certain products.
Our campus needs a social worker or counselor. However, there is not enough funding to support either on our campus.
Funding for program, i.e., Magnet, Special Ed.
Magnet process.
District mandated programs used for screeners, too many initiatives being rolled out at once, not having enough resources due to budget cuts (Recapture), district restrictions on released tests, etc.

Bureaucracy (11%)
The Chiefs and SSO's continuing their practices of micromanaging. These positions are truly not necessary to begin with.
Budget and use of title I—district implements stricter code for use than other school districts—example not allowing Teacher Asst salary to be from Title I.
Timeliness of final budgets (happening late this year) and Human Resources Business Partner is inefficient.
Constant District need for data points. Too much time taken away from instruction. Lack of support closely situated to the campus level (regional offices had specialists available for campus-based support).
Within the last few years more of the principals' autonomy has been constrained with practices that are more common in a centralized budget system. A recent example is the requirement that an SSO/Chief approve any position changes for a campus. This slows the process and makes it more difficult to fill positions that are necessary to meet the needs of students. Another recent example is the decision to send a team to training to support one of our SIP goals. The travel requisitions required SSO approval. This is redundant and slows our ability to serve children.
The amount of paperwork required. Often the data requested exists in a district database (like Chancery) but we are asked to compile in a format determined by SSOs and/or Chiefs.

Time constraints (8%)
Use of specific progress monitoring tools, timelines for snapshot testing/formative assessments.
Timeliness of final budgets (happening late this year) and Human Resources Business Partner is inefficient.
Constant District need for data points. Too much time taken away from instruction. Lack of support closely situated to the campus level (regional offices had specialists available for campus-based support).
Meetings- being pulled off campus; several new initiatives all at once hat require meetings.
I can technically spend at least two hours or more reading emails from the many departments in the district who want to promote what they do, this needs to be recentralized.

Multiple initiatives (7%)
We have initiatives that must be implemented, but the paperwork boggles us down.
Continued roll out of new programs.
Meetings- being pulled off campus; several new initiatives all at once that require meetings.
District mandated programs used for screeners, too many initiatives being rolled out at once, not having enough resources due to budget cuts (Recapture), district restrictions on released tests, etc.

Teacher related policies (7%)
There are a few teachers who sabotage the school culture. School culture greatly impacts student learning. District office does not support principals when disciplining teachers in the form of MEMOS. Politics should not interfere with student learning.
Last hired first to be let go because they were my hire, new and fresh. I had to let the better teacher go, which is not the best decision for my students.
1. When I hire a teacher in March, April, or May, they should receive all network credentials by August 1. It is crucial to provide teachers (especially first year) access to curriculum and planning documents so they can participate fully in August PD and PLC processes. 2. Currently, the district does not allow a CIT to appraise teachers. The CIT is directly involved with instructional practices. I had to change my CIT's role so that I could allow her to appraise teachers.
The practice of assigning teachers that have been financially riffed from other campuses.

ELL Needs (5%)
Designation of campus programs such as Dual Language.
Not enough hours in the day to grow my ELL students.
Dual language program.

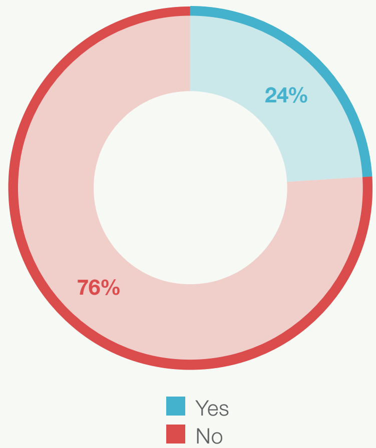
Curricular decisions (4%)
Ability to purchase specific curriculum and items for our students.
One-size-fits all curriculum and instruction expectations that don't fit my population. If I can demonstrate a better fit, my learning community should be able to at least pilot it and demonstrate effectiveness.

Bell/schedule requirements (4%)
Scheduling and ability to have early dismissals for parent involvement and staff development.
The incessant insistence on testing including benchmarks, DLAs, and snapshots. The desire to move to a standardized bell schedule.

Statistical test: school level correlates with response to this question at $p<.01$; $r= - .245$.

Figure 13: Budget functions that should be centralized (n=136)

Are there any budget items that you currently control that you believe would be better handled at the district level?



Additional Comments (N=33)

Open-ended comments were analyzed using open coding to identify categories or themes that repeated in these data. Categories were defined to be responsive to the research questions. They were designed to be conceptually congruent but are not mutually exclusive because some comments included multiple themes.

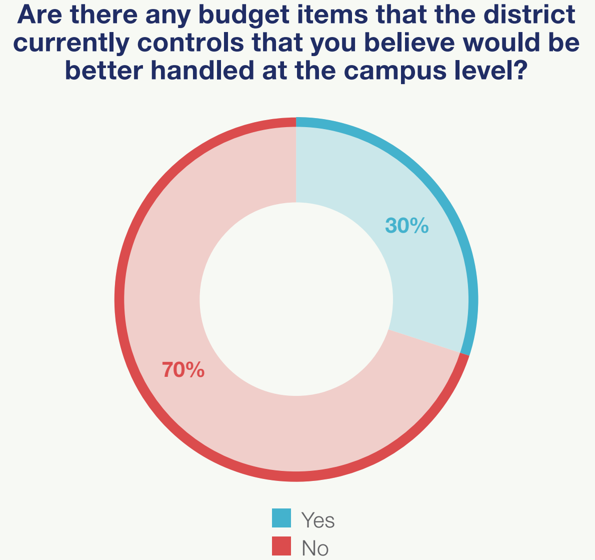
Major themes identified here include the belief that nursing, librarians, counselors and ancillary staff might be better managed by central administration.[2] Other themes related to a decentralized model or a centralized model.

Are there any budget items that you currently control that you believe would be better handled at the district level?
Specific budget items that should be centralized (51%)
Staffing (35%)
Nurse (35%)
Ancillary Teachers (29%)
Librarian (29%)
Counseling (24%)
Substitutes (12%)
Fine Arts (6%)
Athletics (6%)
Instructional Resources (6%)
Transportation (6%)
Contract Fees (6%)
Statements in support of decentralized funding (18%)
Goodness no. The district currently manages one large budget area, Special Education, and it is a mess. Examine the staffing models for SpED and then try and make the case for utilizing that plan moving forward. There is no ability to quickly respond to changes in pedagogy, student needs, changes in setting. Centralizing more components of a school will only make them less powerful.
No, if anything, I would like to have more control over the budget
I believe budget control and school autonomy keep principals working in HISD. I personally have no interest in working in a centralized district. I have done that before and found it incredibly stifling to know what needs to be done with your campus, but to have your hands tied in the implementation. I think HISD would lose principals to the suburbs to where the work is easier. If those same budgetary and implementation constraints happen in HISD, what would the incentive be to stay? I have heard this comment made by several other principals since it seems that some of the powers that be are looking to centralize the district.
I certainly do not believe it would be better to centralize funding. I am far better able to efficiently use funding to meet the needs of students at my campus. Principals have to understand how to impact their funding income with correct PEIMS data. That incentive for principals will be taken away if funding is centralized and the entire district will suffer. The same applies to my ability to efficiently staff my school using part time employees where possible. I am strongly against any move to centralize funding.
I think the principal should allocate budget always. He or she knows what is needed for their budget and campus.
This would be disastrous. HISD has been innovative and has promoted excellence because we must be entrepreneurs and not dictated to by policies that do not fit unique schools.
Other comments (27%)
All salaries be taken out of budget before the school sees the budget (including hourly personnel).
I feel that it would be helpful if the budget analysts assisted with OPM creating and delimiting positions. I feel that it would be beneficial to have conversations with them about what we need and they complete them in the system.

2 The category "staffing" was included multiple times but is ambiguous.

I believe the district should restructure by cutting top heavy positions funded by title I and place those $ in the schools to assure that every school has the minimum staff—nurse, librarian/literacy resource, counselor, administrator, Parent support.
I have not been adequately trained to understand my budget to answer this question.
In the previous district I worked for, all salary items were controlled at the district level and were equally provided to campuses based on a formula. Principals were left to handle any other funds and expenses.
There are some budget items that could be controlled by the district, but I would want control over who was hired into a particular position. If I would lose autonomy in that regard, then my answer would be no.
I haven't received adequate training specific to HISD budget processes, so my opinion is based on previous experience with budgets in other settings. It seems to me that there are some very big budget lines that allow for a great deal of discretion without guidance as a new principal. Also, the system may offer greater freedom than is wise, particularly given limited training in this area.
I think deciding the projections and number of teachers to hire is always problematic. You are always in danger of over or under projecting and then being stuck with paying back money or having to hire in September. Also, there are some positions that each campus should be given based on size for example: full time AP, instructional coordinator, dyslexia specialist, full or part time librarian, counselor, and nurse.
Technology Equipment Update carefully monitored and funded by the district including infrastructure.
Statements in support of centralized funding (9%)
All, except activity funds and general/ title 1 supply funds.
All; the budgets are challenging to read let alone be strategic with. I consider myself a smart person and still do not have a clear vision of how to be strategic with my budget. It prints on 15 pages and the system to utilize it is quite tedious.
General Funds allocations.

Figure 14: Budget functions that should be decentralized (n=135)



Additional Comments (N=32)

* Multiple themes were identified in comments thus percentage totals can exceed 100%.

Open-ended comments were analyzed using open coding to identify categories or themes that repeated in these data. Categories were defined to be responsive to the research questions. They were designed to be conceptually congruent but are not mutually exclusive because some comments included multiple themes.

Major themes identified here include the belief that the following programs should be managed at the campus level: Title I and II funds, custodians, facilities, activity funds, and special education.

Are there any budget items that the district currently controls that you believe would be better handled at the campus level?
Specific budget items that should be decentralized (66%)
Title I (19%)
Title II (19%)
Custodians (10%)
Facilities (10%)
Activity Funds (10%)
Special Education (10%)
Curriculum (5%)
Summer school (5%)
Grants (5%)

Payroll (5%)
Fine Arts (5%)
Other comments (44%)
Previously we used to be able to handle Title II funds for professional development. Those were completely taken away and used for Teacher Specialists at the District Level. However, not all schools get support yet all of our money was removed. Not equitable!
Literacy By (3/middle) should have been guided by individual campus needs (resources such as classroom libraries and implementation support).
I need the ability to make decisions that can be acted on quickly. When extra layers of approval are required for personnel changes, professional development, etc. we make the work cumbersome. Each of these decisions is approved through other mechanisms, such as PD plan submitted in late spring, SIP submitted in August.
I can't think of anything right now, I guess I have gotten used to the way it is.
I don't know what I control and what the district controls.
Too many levels of administration at District levels; Area Supt, SSO, TDS, Directors, managers-all with different expectations.
All budget concerns. We should contain our current PUA process.
Give us our Title II funding back. Leadership Development department is unnecessary given that we all have mentors (SSOs) assigned to us.
Bring back Title II funds. We used to receive these each year with the intent of being used for campus-specific professional development. Feeder patterns had the ability to combine funds so as to impact a greater number of students. The Title II funds were taken from us to pay for TDS with the promise that we would all have access to TDS. I've led two different large HS campuses and enjoyed the experience and expertise of TDS for 5 weeks over 7 years. Meanwhile my Title II funds were never again seen, and thus any PD I wanted to support had to be funded elsewhere (which then took "stuff" from teachers and kids).
Special Education is an area that needs to be reviewed. Staffing formulas right now only take into consideration the number of SPED students on caseload. However, as the district continues with inclusion services for students who are AU and ID, many of these students have services in excess of two hours a day. A single teacher can have a low caseload by numbers, but have many hours of support needed by those students and scheduling becomes very difficult to meet all the needs while still providing planning and lunch. Hours on caseload makes more sense that just number of students. Schools have a better handle on the actual needs than the formula implies, and two schools can have identical caseloads, but VERY different hours of service.
Custodial services. We used to have this on our staffing table. When it was removed, all that happened was that personnel for my campus were cut and cleaning quality suffered. Custodial personnel should be put back into the campus budget and principals should hire with input from central.
Campus Diagnosticians at every campus.
The schoolwires fee and the copy machine fee I know are a necessity but from a small campus with a small budget it can be pretty large expense.
Midlevel management (CSO, SSO), and the explosion of "wrap around service, IAT etc. positions that are expensive but NOT impacting campuses.
Transference Ability (9%)
Being able to move funds.
The ability to transfer funds from any budget line to another.
Transference between budgets, summer school, grants.

Mission

The Kinder Institute for Urban Research builds better cities and improves people's lives by bringing together data, research, engagement, and action.

RICE | KINDER
INSTITUTE FOR URBAN RESEARCH

6100 Main Street MS-208 • Houston, TX 77005 • Phone 713-348-4132 • Email kinder@rice.edu

20

RICE | HERC
Houston Education Research Consortium

Building Better Cities
Building Better Lives

Rice University's Kinder Institute for Urban Research

Converse College

HISD's Decentralization Reform
(Part 3: Decentralization and Student Achievement)

By Kori Stroub, Ph.D.

Research Brief
for the Houston Independent School District

Volume No. 7, Issue No. 5. | March 2019

Acknowledgements
I would like to gratefully acknowledge the intellectual contributions of the following staff from the Houston Independent School District: Rene Barajas (Chief Financial Officer), Glen Reed (Officer, Budgeting and Financial Planning), Carla Stevens (Assistant Superintendent of Research and Accountability). I would also like to thank my colleagues Jay Ayer, Holly Heard, Ruth Lopez Turley, Jodi Moon, Dan Potter, Meredith Richards, and Jessica Vasan for their helpful feedback during the development of this project.

About HERC
The Houston Education Research Consortium (HERC) is a partnership between Rice University and several Houston-area school districts. Through this partnership, HERC aims to improve the connection between education researchers and decision makers for the purpose of closing the socioeconomic gaps in educational achievement and attainment for students.

Suggested Citation
APA Style:
Stroub, K. (2018). Decentralization reform in HISD, part III: Evidence on the relationship between decentralization and achievement. Houston, TX: Houston Education Research Consortium, 2018.

Chicago:
Stroub, Kori. *Decentralization reform in HISD, part III: Evidence on the relationship between decentralization and achievement*. Houston, TX: Houston Education Research Consortium, 2018.

Summary

This brief provides evidence on the relationship between HISD's decentralization reforms, which were fully implemented by the 1999–00 school year, and trends in student achievement. The effects of decentralization on pass rates on the Texas Assessment for Academic Skills (TAAS) were estimated by comparing trends in campus pass rates in HISD to pass rates in a matched set of schools across the state that did not experience decentralization over the same period.

Schools in HISD generally experienced modest gains in TAAS pass rates between 1996–97 and 2001–02. There is no evidence, however, that the gains over this period were attributable to the district's decentralization efforts in the late 1990s and early 2000s. Specifically, decentralization was unrelated to TAAS pass rates in elementary, middle, or high schools, or in schools meeting HISD's small school criteria. Decentralization was also not related to the TAAS pass rates of economically disadvantaged students, black students, or Hispanic students.

Key Findings

- ***Decentralization was not associated with increases in TAAS pass rates three years after the reforms were fully implemented.*** Although TAAS pass rates in HISD increased between 1999–2000 and 2001–2002, there is no evidence that the increases were because of decentralization. When compared to other schools with similar levels of achievement from 1996–97 to 1998–99, decentralization was not associated with any statistically significant increases in achievement between 1999–2000 and 2001–2002, beyond what would be expected if decentralization had not occurred.
- ***Decentralization was not associated with increases in TAAS pass rates for black students, Hispanic students, or economically disadvantaged students.*** There is no evidence that the TAAS pass rates of black students, Hispanic students, and economically disadvantaged students were affected by decentralization reform.
- ***Decentralization was not associated with increases in achievement among students in elementary schools, middle schools, or high schools.*** Analyses of the impact of decentralization by school characteristics do not reveal any significant differences by school level.
- ***Decentralization was not associated with changes in achievement for small schools.*** There is no evidence that TAAS pass rates in small schools were impacted by decentralization reform.

Figures

Tables

Research Brief Abstract

HISD's Decentralization Reform (Part 3: Decentralization and Student Achievement)

This research brief is Part III of a four-part study of decentralization in HISD.

- Part I describes how decentralization was enacted in HISD.
- Part II reports HISD principal attitudes and satisfaction within the current decentralized model.
- **Part III examines the impact of decentralization on student outcomes.**
- Part IV examines the impact of decentralization on funding equity.

Introduction

In hopes of improving student performance, Houston ISD implemented decentralization throughout the 1990s (see Part I of this project for a detailed discussion of the reforms). In addition to giving principals more autonomy to develop staffing plans, class schedules, and teaching practices to cater to their students' unique needs, the reforms culminated with a change to the district's funding model from a full-time equivalency (FTE) model to a per unit allocation (PUA) model in the 1999–2000 school year. The PUA model placed more control of a school's budget in the hands of its principal. The goal of this study is to determine if the decentralization reforms, particularly the changeover to a PUA model, improved student achievement.

What this Study Examines

The primary objective of this brief is to provide evidence on the link between HISD's decentralization reforms and student achievement. Towards that end, TAAS pass rates were computed for all campuses in the state of Texas between 1996–97 and 2001–02—three years prior to and three years after HISD adopted the PUA-based funding model. To estimate the effect of decentralization, this study compared the change in pass rates (across all grades and all subjects) in HISD schools before and after decentralization was fully implemented in the district to a matched set of schools from across the state that did not experience decentralization over the same time period.

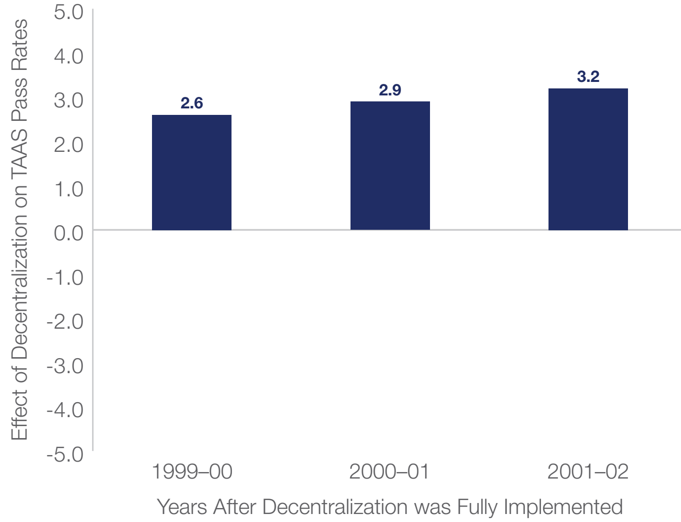
In addition to examining the overall relationship between decentralization and achievement, this study also attends to differences in the effect of decentralization by student-subgroup (black, Hispanic, and economically disadvantaged students), school level (elementary vs. middle vs. high) and school size (small schools).

What this Study Found

Key Finding #1: Decentralization was not associated with increases in TAAS pass rates three years after the reforms were fully implemented.

Figure 1 provides estimates of the impact of decentralization on HISD campus TAAS pass rates in the three years after decentralization was fully implemented (1999–2000, 2000–01, and 2001–02) by comparing pass rates in HISD to a set of campuses across the state that had nearly identical trends in TAAS pass rates in the three years before decentralization was fully implemented (1996–97, 1997–98, and 1998–99). The blue bars represent the difference in pass rates in HISD and non-HISD campuses in 1999–2000, 2000–01, and 2001–02. Positive values indicate that HISD had higher pass rates than similar non-HISD campuses, while negative values indicate that HISD had lower pass rates than similar non-HISD campuses. For example, Figure 1 demonstrates that in 1999–2000 HISD campuses had TAAS pass rates that were 2.6 percentage points higher than similar non-HISD campuses. Indeed, between 1999–2000 and 2001–02, pass rates in HISD were slightly higher than the TAAS pass rates in similar non-HISD campuses. Despite having slightly higher pass rates, however, these differences were not statistically significant (see Table 1). This suggests that decentralization did not have an effect on overall school performance in the three years after the implementation of the PUA-based funding model.

Figure 1. Overall Effect of Decentralization on TAAS Pass Rates in HISD, 1999–2000 through 2001–02.



Note. The bars represent the difference in the change in TAAS pass rates in HISD and non-HISD campuses in 1999–2000, 2000–01, and 2001–02. For example, one year after decentralization was fully implemented (1999–2000), overall TAAS pass rates in HISD were 2.6 percentage points higher than TAAS pass rates in the matched sample of non-HISD campuses. None of these differences are statistically significant (see Table 1), meaning there is no evidence that decentralization is responsible for the pass rate difference between HISD and non-HISD campuses.

Table 1. Effects of Decentralization on Overall Campus TAAS Pass Rates in HISD

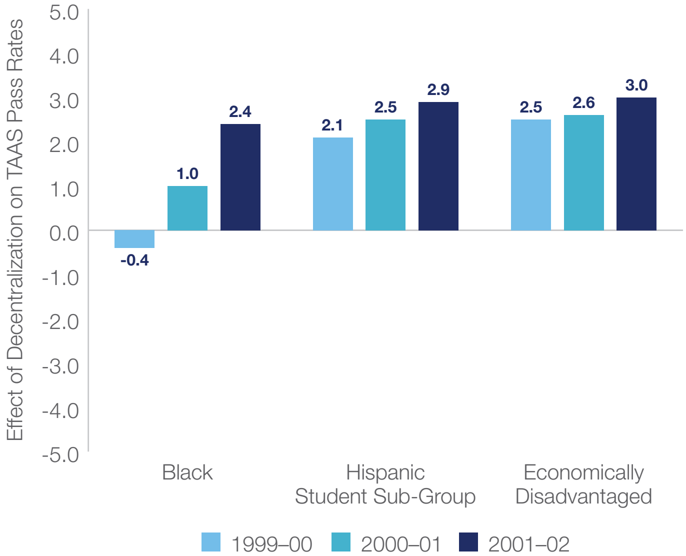
	Coef.	SE	Sig.
1999–00	2.63	2.11	0.21
2000–01	2.87	2.11	0.17
2001–02	3.22	2.11	0.13
# of schools	4,656		

Note. Since the analysis was limited to campuses that existed for the entire 6-year study period, the number of campuses in 1999–00, 2000–01, and 2001–02 are identical. As such, the standard errors for each year are identical.

Key Finding #2: Decentralization was not associated with increases in TAAS pass rates for black students, Hispanic students, or economically disadvantaged students.

Similar to the prior findings for all students, decentralization was not associated with the TAAS pass rates of students of color or economically disadvantaged students. For instance, Figure 2 demonstrates that black students in HISD had nearly identical TAAS pass rates to black students in similar campuses across the state in the three years after HISD fully implemented decentralization reform. The effects of decentralization on Hispanic students and economically disadvantaged students exhibit a similar pattern. While Hispanic students and economically disadvantaged students in HISD had consistently higher scores than their peers in non-HISD campuses after decentralization was fully implemented, these differences were not statistically significant. See Table 2 for the regression estimates.

Figure 2. Effect of Decentralization on TAAS Pass Rates in HISD for Black, Hispanic, and Economically Disadvantaged Students, 1999–2000 through 2001–02.



Note. The bars represent the difference in the change in TAAS pass rates in HISD and non-HISD campuses in 1999–2000, 2000–01, and 2001–02 for black, Hispanic, and economically disadvantaged students. For example, one year after decentralization was fully implemented (1999–2000), the TAAS pass rates of black students in HISD were 0.4 percentage points lower than the TAAS pass rates of black students in the matched sample of non-HISD campuses. None of these differences are statistically significant (see Table 2), meaning there is no evidence that decentralization is responsible for the pass rate difference between HISD and non-HISD campuses for these sub-groups of students.

Table 2. Effects of Decentralization on Campus TAAS Pass Rates in HISD by Student Subgroup

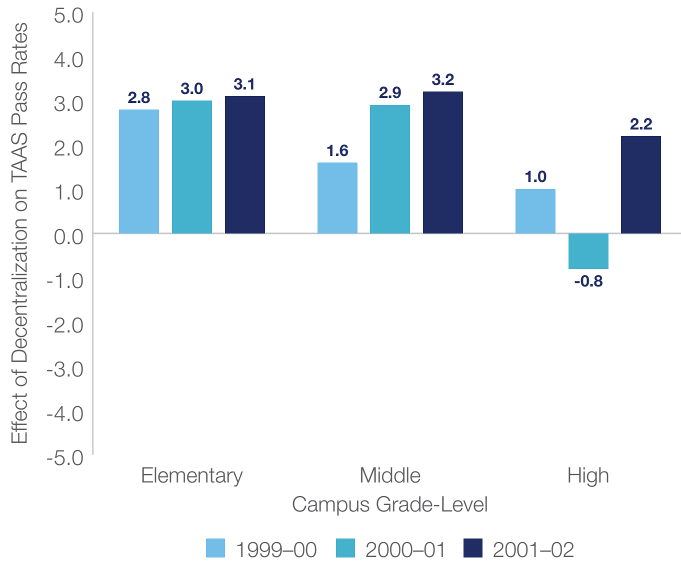
	Black			Hispanic			Economically Disadvantaged		
	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.
1999–00	–0.44	3.61	0.90	2.14	2.63	0.42	2.53	2.24	0.26
2000–01	1.04	3.61	0.77	2.50	2.63	0.34	2.63	2.24	0.24
2001–02	2.45	3.61	0.50	2.92	2.63	0.27	3.01	2.24	0.18
# of schools	3,011			4,489			4,571		

Note. Since the analysis was limited to campuses that existed for the entire 6-year study period, the number of campuses in 1999–00, 2000–01, and 2001–02 are identical. As such, the standard errors for each year are identical. Sample sizes for analyses of black student pass rates, Hispanic student pass rates, and economically disadvantaged student pass rates differ because not all schools met Texas Education Agency (TEA) reporting standards in terms of minimum number of students of a particular subgroup present in a school for an estimate to be calculated.

Key Finding #3: Decentralization was not associated with increases in achievement for elementary schools, middle schools, or high schools.

Figures 3 provides estimates of the impact of decentralization in HISD for elementary schools, middle schools, and high schools. Consistent with other findings in this report, when HISD schools are compared to similar schools of the same level, there is no significant effect of decentralization on achievement. Although Figure 3 shows that, in some cases, schools in HISD had slightly higher or lower pass rates than similar schools across the state, the differences were never statistically significant (see Table 3).

Figure 3. Effect of Decentralization on TAAS Pass Rates in HISD by Campus Level, 1999–2000 through 2001–02.



Note. The bars represent the difference in the change in TAAS pass rates in HISD and matched non-HISD campuses in 1999–2000, 2000–01, and 2001–02 for elementary, middle, and high schools. For example, one year after decentralization was fully implemented (1999–2000), the TAAS pass rates of elementary schools in HISD were 2.8 percentage points higher than the TAAS pass rates of elementary schools in the matched sample of non-HISD campuses. None of these differences are statistically significant (see Table 3), meaning there is no evidence that decentralization is responsible for the pass rate difference between HISD and non-HISD campuses.

Table 3. Effects of Decentralization on Campus TAAS Pass Rates in HISD by Campus Grade-Level

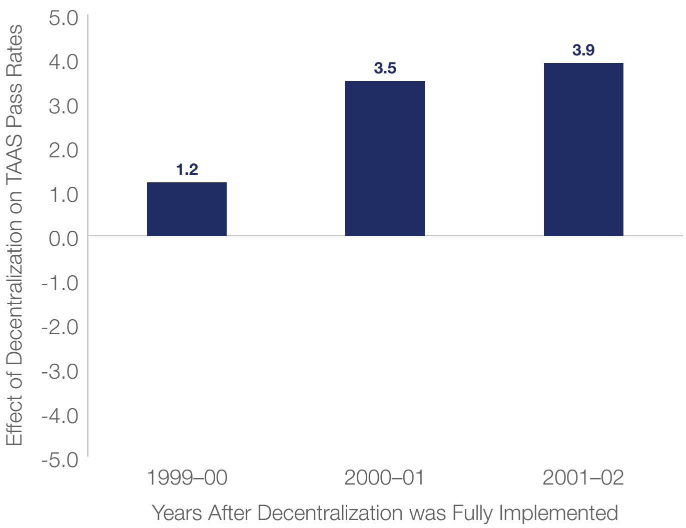
	Elementary			Middle			High		
	Coef.	SE	Sig.	Coef.	SE	Sig.	Coef.	SE	Sig.
1999–00	2.80	3.90	0.47	1.63	4.42	0.71	1.00	4.91	0.84
2000–01	3.02	3.90	0.44	2.90	4.42	0.51	–0.84	4.91	0.87
2001–02	3.14	3.90	0.42	3.22	4.42	0.47	2.21	4.91	0.65
# of schools	2,627			1,104			925		

Note. Since the analysis was limited to campuses that existed for the entire 6-year study period, the number of campuses in 1999–00, 2000–01, and 2001–02 are identical. As such, the standard errors for each year are identical.

Key Finding #4: Decentralization was not associated with changes in achievement for small schools.

Figure 4 provides estimates of the impact of decentralization on small schools' achievement in HISD. This analysis is identical to the analysis presented in Figure 1 above, except that it was conducted on the subset of Texas schools that met HISD's current small-school criteria (see Appendix A). Table A1 of the appendix presents the number of schools that met HISD's small school criteria.

Figure 4. Effect of Decentralization on the TAAS Pass Rates of Small Schools in HISD, 1999–2000 through 2001–02.



Note. The bars represent the difference in the change in TAAS pass rates of small schools in HISD and matched non-HISD campuses in 1999–2000, 2000–01, and 2001–02. For example, one year after decentralization was fully implemented (1999–2000), the overall TAAS pass rates of small schools in HISD were 1.2 percentage points higher than the TAAS pass rates of small schools in the matched sample of non-HISD campuses. None of these differences are statistically significant (see Table 4), meaning there is no evidence that decentralization is responsible for the pass rate difference between HISD's small schools and non-HISD small schools.

Table 4. Effects of Decentralization on TAAS Pass Rates of Small Campuses in HISD

	Coef.	SE	Sig.
1999–00	1.22	4.11	0.76
2000–01	3.50	4.11	0.40
2001–02	3.92	4.11	0.34
# of schools	1,713		

Note. Since the analysis was limited to campuses that existed for the entire 6-year study period, the number of campuses in 1999–00, 2000–01, and 2001–02 are identical. As such, the standard errors for each year are identical.

Again, consistent with other findings from this study, there is no significant effect of decentralization on achievement in small schools. While small schools in HISD had slightly higher TAAS pass rates than comparison schools, these differences were not statistically significant (see Table 4). This suggests that decentralization did not have an effect on the performance of small schools in the three years after decentralization was fully implemented.

It is important to note that beginning in the 2001–02 school year, HISD provided a small school subsidy to all campuses enrolling fewer than 400 students. It is possible that this subsidy influenced the effect of decentralization on small schools in 2001–02. It is difficult to draw any conclusions regarding the effect of the small school subsidy in 2001–02, however, because only 2 middle schools and 3 high schools were identified as small schools in 2001–02.

Conclusion

Taken together, these findings suggest that decentralization did not have an impact on campus achievement, measured by TAAS pass rates, in the three years after decentralization was fully implemented. While HISD did experience moderate gains in campus achievement between 1999–2000 and 2001–02, these gains do not appear to be explained by decentralization reform. Moreover, analyses reveal that the link between decentralization and campus achievement did not vary by school level, student sub-groups, or campus size.

While the findings presented in this brief suggest that decentralization had minimal impact on student performance in the years after the reform was fully implemented in HISD, it is important to acknowledge that the analyses were limited to a single academic outcome, notably campus-level pass rates on the state accountability test. It is possible that decentralization reform had more nuanced impacts on students and schools. For instance, if decentralization had small, but significant positive effects on student test scores, particularly among lower achieving students, overall campus-level pass rates may not be sensitive to these modest academic improvements.

Moreover, because Texas switched accountability tests in 2002–03, this study was only able to track campus pass rates for three years after the PUA-based funding model was implemented in HISD. As such, if the positive effects of decentralization emerged over the longer term, this study would not be able to identify such gains.

Appendix—Data and Methodology

Data

This study uses campus-level data from Texas' Academic Excellence Indicator System (AEIS), which served as the state's online education data portal until 2013. Specifically, this study used campus characteristics and TAAS pass rates for the 1996–97 through 2001–02 school years, which provided three years of data prior to decentralization being fully implemented and three years of data after decentralization was fully implemented.

Sample

Prior to conducting any analyses, two filters were applied to the population of Texas public schools. First, because the analyses used in this paper rely on campuses having testing data for the entire 6-year study period, all schools that did not exist for the entire period were excluded from the analytic sample. As a result of this exclusion criteria, 1,923 of the 8,303 campuses that existed over the study period were removed from the sample. Second, because they are so few in number, multi-level campuses (e.g., K–8 and 8–12 campuses) were also excluded from the sample. As such, only elementary, middle, and high schools were retained for analysis. As a result of this exclusion criteria, 484 of the remaining 6,380 campuses were removed from the sample. Table A1 presents the number of campuses in the sample before and after these two exclusion criteria were applied.

Key Variables

School Level: Indicator of whether a campus is an elementary, middle, or high school. A fourth category, combined schools, identifies campuses with grade-spans that encompass multiple levels (e.g., elementary-middle, or middle-high schools). Because there are relatively few combined campuses across the state, and there is significant variability in the grades these schools serve, combined campuses were removed from the analysis.

Small-School Indicator: Small schools were identified by applying HISD's current small school definition to all schools in the analytic sample. Currently, elementary, middle, and high schools are considered small if they have fewer than 500, 750, and 1,000 students, respectively. While HISD's definition of small schools has changed over time, for the sake of consistency this study uses the district's current definition, as described above. Moreover, the purpose of the small-school analysis is not to evaluate any particular definition of small schools, but rather

Table A1. Number of Schools, HISD vs. Rest of State, 1996–97 through 2001–02

	All Schools		Pre-Match Sample—Full		Pre-Match Sample—Small	
	HISD	State-Wide	HISD	State-Wide	HISD	State-Wide
Elementary Schools	218	4,049	186	3,327	56	1,563
Middle Schools	62	1,681	40	1,221	11	725
High Schools	62	2,082	31	1,157	11	798
Total	342	7,812	257	5,705	78	3,086

Note. To be included in the pre-match sample, schools had to meet the following two criteria: 1) Must exist for the entire 6-year study period (1997–2002), and 2) Must be identified as elementary, middle, or high Schools (i.e., multi-level campuses were excluded from the analysis). Small Schools were identified by applying HISD's current small school indicator to all schools in the analytic sample. Elementary, middle, and high schools are considered small if they have fewer than 500, 750, and 1,000 students, respectively.

to merely identify schools that are smaller than typical schools of a given grade level.

Percent Passing TAAS, All Tests: Overall campus-level accountability indicator identifying the proportion of all tests taken at a campus that met or exceeded the minimum accountability requirement. This measure combines test taken across the subject areas (math, reading, and writing), and grades (3–8 and 10) included in the accountability subset. In addition to pass rates for all students, pass rates for black students, Hispanic students, and economically disadvantaged students were all examined in this study.

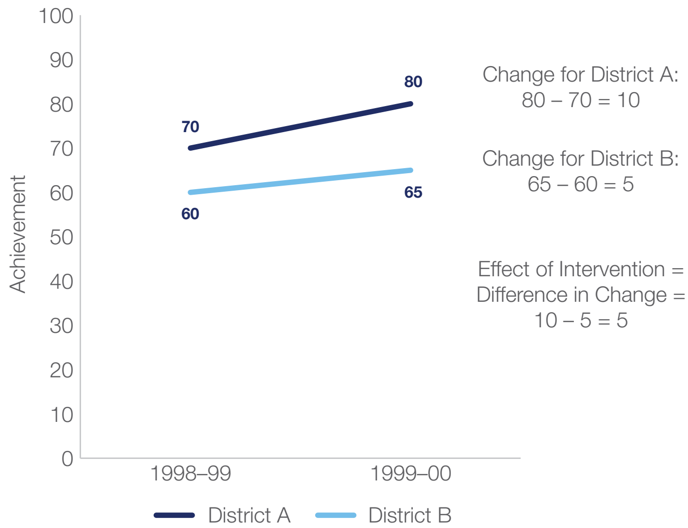
Analytic Strategy

Estimating the impact of decentralization on achievement in HISD is difficult because 1) changes in achievement after 1999–2000 may be due to factors other than the full implementation of decentralization (e.g., demographic changes or other policy changes), and 2) HISD schools differ from schools in the rest of the state in important ways (e.g., high proportions of ELL, Hispanic, and economically disadvantaged students). To address these issues and provide a more accurate estimate of the impact of decentralization on student achievement, this study uses an analytic approach that incorporates the following two techniques:

Difference-in-Difference Estimation

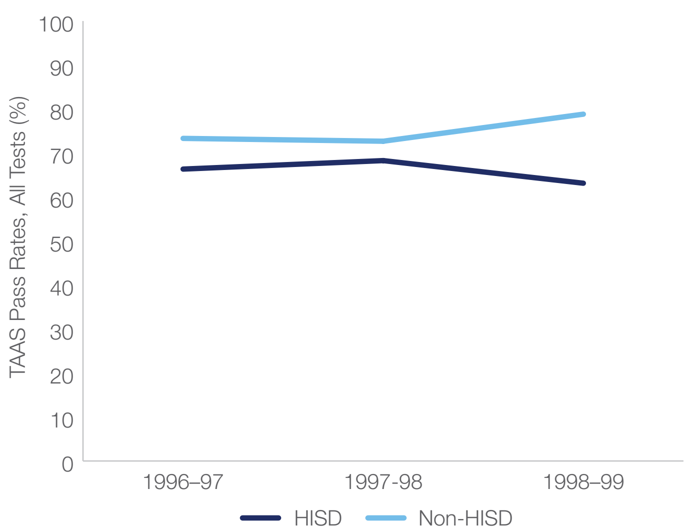
This study employs Difference-in-Difference (DID) techniques to estimate the impact of decentralization on campus-level TAAS pass rates. To illustrate how this technique works, consider the example illustrated in Figure A1. In this example, there are two hypothetical districts, District A and District B. Suppose that District A implemented some policy change between the 1998–99 and 1999–2000 schools years, while District B did not. Of interest is the extent to which the policy change resulted in an increase in student achievement in District A. To compute the effect of the policy change on achievement in District A, the change in achievement in District A between 1998–99 and 1999–2000 is compared to the change in achievement in District B over the same period. Between 1998–99 and 1999–2000, achievement in District A increased by 10 points. At the same time, District B experienced a 5 point increase in achievement. Taking the difference in the change in achievement in District A and District B between 1998–99 and 1999–2000 reveals that the policy was associated with a 5 point increase in achievement in District A in 1999–2000. This "difference in the differences" is the primary quantity of interest in this study and can be interpreted as the effect of decentralization on campus TAAS pass rates in HISD. These DID estimates are presented in Figures 1 through 4 of this brief.

Figure A1. Illustration of Difference-in-Difference Estimation.



A key assumption of the DID approach is that pre-treatment trends in the outcome for the treatment and control groups are parallel. In the context of this study, this assumption means that trends in the TAAS pass rates of schools in HISD prior to 1999–2000 must be parallel to the trends in TAAS pass rates in non-HISD schools over the same period. As Figure A2 reveals, however, this assumption is not met. Indeed, pass rates in HISD and non-HISD campuses exhibit diverging trends in the two years prior to the implementation of the PUA-based funding model in Houston.

Figure A2. TAAS Pass Rates for HISD and non-HISD Prior to Matching, 1996–97 through 1998–99.



Note. The difference in TAAS Pass rates between HISD and non-HISD campuses is statistically significant ($p < 0.05$) in 1996–97, 1997–98, and 1998–99.

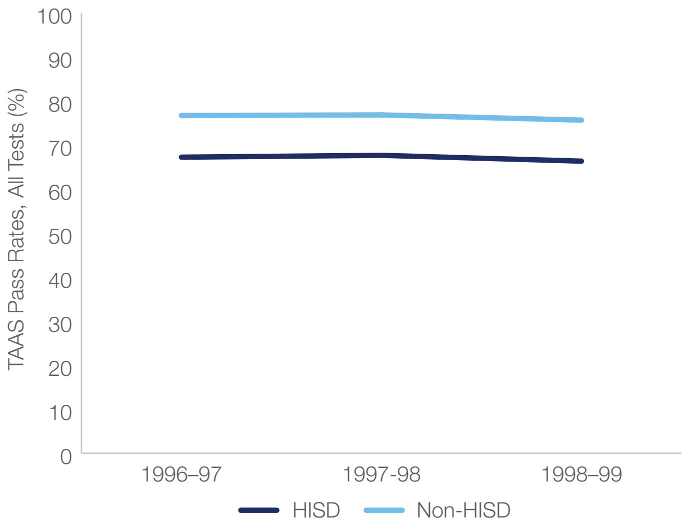
Coarsened Exact Matching

To address this violation of a key assumption of DID, rather than comparing schools in HISD to all other public schools in the state, schools in HISD were matched to public schools in Texas with similar achievement trends in the years prior to decentralization. Specifically, this study employs a technique known as coarsened exact matching (CEM) to match schools in HISD to campuses across the state of the same level (i.e., elementary, middle, or high school) with similar student achievement. Schools were matched based on the change in their annual TAAS pass rates between 1996–97 and 1997–98, and 1997–98 and 1998–99. Separate matches were conducted for each pass rate outcome examined in this study: overall TAAS pass rates, the TAAS pass rates of black students, the TAAS pass rates of Hispanic students, the TAAS pass rates of economically disadvantaged students, and the TAAS pass rates of small schools.

The CEM procedure involves two primary steps. First, the annual change in campus TAAS pass rates were coarsened into categorical variables. Each variable was split into 50 categories using Sturges' rule for histogram bin size (Sturges, 1926). Next, each campus in HISD was matched to all non-HISD campuses whose change in pass rates between 1996-97 and 1997–98, and 1997–98 and 1998–99 fell within the exact same categories.

This matching procedure was performed five times, once for overall pass rates in all schools in Texas, once for black pass rates in all schools in Texas, once for Hispanic pass rates in all schools in Texas, once for economically disadvantaged pass rates in all schools in Texas, and once for overall pass rates in only the subset of campuses in the state that met HISD's small-school criteria. Table A2 presents the pre-matched and matched samples for all schools in Texas and for the small-school subset. Finally, Figure A3 presents the overall pass rate trends for the matched sample of HISD and non-HISD campuses. Compared to the unmatched pass rate trends presented in Figure A2, Figure A3 demonstrates that the matching procedure resulted in parallel pass rates for HISD and non-HISD campuses. This indicates that the "parallel paths" assumption of DID is met in the matched sample.

Figure A3. TAAS Pass Rates for HISD and non-HISD After Matching, 1996–97 through 1998–99.



Note. The change in TAAS Pass rates between HISD and non-HISD campuses is not statistically significant ($p > 0.05$) in 1996–97, 1997–98, and 1998–99. This indicates that the lines are parallel, and the parallel paths assumption of DID is met in the matched sample.

Table A2. Number of Schools in the Matched Sample after Matching on Prior Achievement, All schools and Small-School Sub-Sample

	Before Matching				After Matching			
	All Schools		Small Schools		All Schools		Small Schools	
	HISD	State-Wide	HISD	State-Wide	HISD	State-Wide	HISD	State-Wide
Elementary Schools	186	3,327	56	1,563	173	2,454	40	721
Middle Schools	40	1,221	11	725	37	1,067	8	412
High Schools	31	1,157	11	798	27	898	9	523
Total	257	5,705	78	3,086	237	4,419	57	1,656

Regression Models

As mentioned above, the effects of decentralization on TAAS pass rates in HISD are estimated within a DID framework. The DID models are estimated as follows:

$$Y_{it}=\alpha+\beta(HISD_i)+\gamma_t+\gamma_i+\delta(HISD_i{}^*\gamma_t)+\varepsilon_{it}$$

where, α is the mean TAAS pass rates of non-HISD campuses in 1998–99, β is the difference in the mean TAAS pass rates in HISD and non-HISD campuses in 1998–99, $HISD_i$ is an indicator equal to 1 if a campus is in HISD, and 0 if a campus is not in HISD, γ_t is a set of school year fixed effects (1998–99 is the reference category), γ_i is a set of campus fixed effects, δ is the effects of interest, representing the effect of decentralization on campuses in HISD in each of the 6 years included in this analysis, and ε_{it} is a campus by school year error term.

Mission

The Kinder Institute for Urban Research builds better cities and improves people's lives by bringing together data, research, engagement, and action.

RICE | KINDER
INSTITUTE FOR URBAN RESEARCH

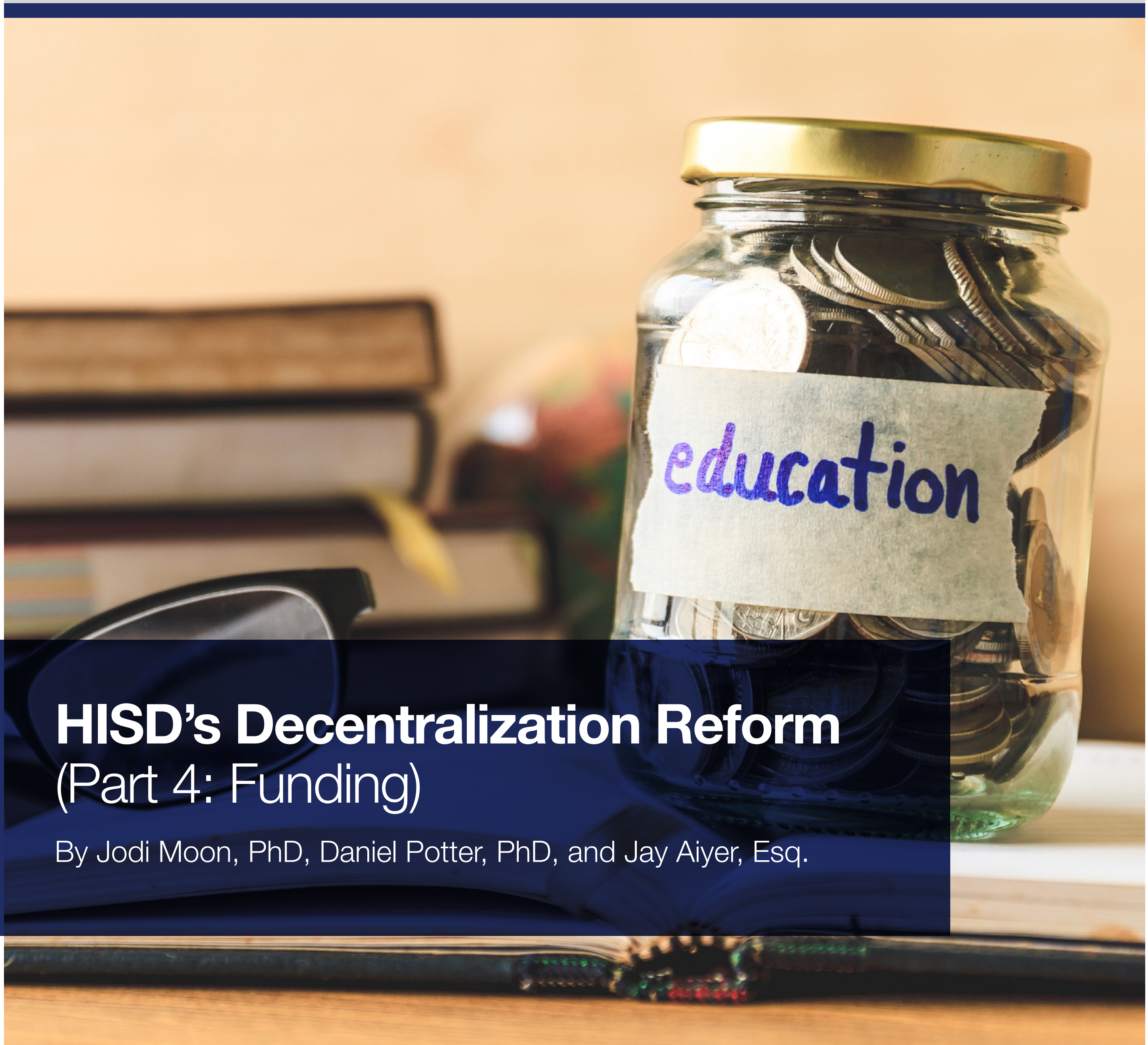
6100 Main Street MS-208 • Houston, TX 77005 • Phone 713-348-4132 • Email kinder@rice.edu

21

RICE | HERC
Houston Education Research Consortium

Building Better Cities
Building Better Lives

Rice University's Kinder Institute for Urban Research



HISD's Decentralization Reform
(Part 4: Funding)

By Jodi Moon, PhD, Daniel Potter, PhD, and Jay Aiyer, Esq.

Research Brief
for the Houston Independent School District

Volume No. 7, Issue No. 6. | March, 2019

Research Brief Abstract

HISD's Decentralization Reform (Part 4: Funding)

This research brief is Part 4 of a four-part study of decentralization in Houston Independent School District (ISD).

- Part 1 describes how decentralization was enacted in HISD.
- Part 2 reports HISD principal attitudes and satisfaction within the current decentralized model.
- Part 3 examines the impact of decentralization on student outcomes.
- Part 4 examines the impact of decentralization on funding equity.

Findings from Part 4

In this fourth and final brief, we look at the general fund budgeting strategy in Houston ISD from 1999–2000 through 2015–16 to see how much money schools got and use human resource data from 2013–14 through 2015–16 to see how they were using it. We found that:

- Middle schools and high schools had larger total general fund budgets and more per student spending than elementary schools;
- Small schools[1] had higher per student spending than non-small schools, even though their total general fund budgets were not different;
- Schools with a higher proportion of economically disadvantaged students had larger total general fund budgets, while having slightly lower per student spending; and
- Enrollment size was the best predictor of key personnel at a school, with larger schools being more likely to have assistant principals, counselors, nurses, and librarians.

1 The definition of "small school" changed in Houston ISD during the years of the study. For years prior to and including the 2001–02 school year, small school was defined as an enrollment of 400 students or less. During the 2002–03 school year, small school was defined as an enrollment of 500 students or less. Beginning in 2003–04, a separate definition of small school was given to elementary-, middle-, and high-schools. Beginning in 2003–04, a small school elementary school was defined as an enrollment of 500 students or less; a small school middle school was defined as an enrollment of 750 students or less; and, a small school high school was defined as an enrollment of 1,000 students or less.

Introduction

In the late 1980s, the Houston Independent School District (HISD) was a centralized bureaucracy like many other urban school districts. Student performance was a concern: the drop-out rate for HISD was double the state average (10% in HISD versus 5% state average in 1990), and student outcomes on average were low (e.g., 32% of 9^{th} graders met or exceeded the minimum expectations on the Texas Assessment of Academic Skills TAAS in 1990 compared to the state average of 49%). Over the course of several years (1990–1999), the Houston ISD School Board adopted a decentralization plan to improve student achievement and increase equity in funding; both the board and the administration believed that this could be accomplished by shifting more decision-making to the local level (campus). This reform culminated in a shift from a full-time equivalency funding model (FTE) to a weighted student funding model (WSF) in the 1999–2000 school year; the district refers to this as a per unit allocation (PUA) model.

This brief is the final part of a larger study that addressed four topics related to decentralization in Houston ISD. Here, we look at Houston ISD's Resource Allocation Formula for its general funds from school years 1999–2000 through 2015–16 to see how much money schools are getting and how it is being spent. This study examines the current general fund budgeting strategy overall, and by grade level served (i.e., elementary, middle, and high school). Additionally, special attention was given to small schools, as well as the percent of students at a school who were economically disadvantaged, black, Hispanic, or white.

Research Questions

The research questions guiding this brief are:

How is Houston ISD's current Resource Allocation Formula funding schools, and how are those funds being used by schools in the district:

1. Across different types of schools (e.g., grade level and size)?
2. According to characteristics built into the current strategy (e.g., economically disadvantaged, career and technical education)?
3. For characteristics not directly targeted by the strategy (e.g., number of black students, bilingual students)?

Data and methods

Appendix D has details on the data and methods used for this study. In brief, we compared general fund budgets and presence of key personnel across a range of school characteristics, focusing on grade levels served and small school status. In addition, we looked at how the current general fund budgeting strategy was working in schools based on their proportion of economically disadvantaged students, black students, Hispanic, and white students served. For each of these student body characteristics, schools were grouped into high, medium, and low categories based on the percentage of their students classified as the focal characteristic (see Exhibit A, for definition).

Exhibit A. Definition of high-, medium-, and low-percent schools based on student body characteristics

Student body characteristics	Group	Meaning
▪ Economically disadvantaged ▪ Black students ▪ White students ▪ Hispanic students	High	Percent of students at a school with the specified student body characteristic is higher than the 80th percentile (i.e., higher than 80 percent of other schools). For example, a “high-percent” economically disadvantaged school has a higher percent of economically disadvantaged students than 80 percent of other schools in the district.
	Medium	Percent of students at a school with the specified student body characteristic is between the 20th and 80th percentile of all schools.
	Low	Percent of students at a school with the specified student body characteristic is below the 20th percentile (i.e., lower than 80 percent of other schools)

Results

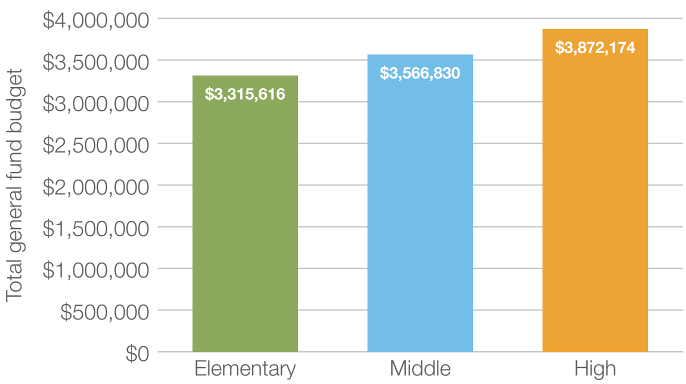
During the 2015–16 school year, the average total general fund budget of a school in Houston ISD was $3.96 million with a standard deviation of $2.45 million[2]. Houston ISD schools' total general fund budgets ranged from $487,000 to $16.97 million. For the same school year, the average per student spending of total general fund budgets was $5,158 with a standard deviation of $1,034. Finally, the average percent of a school's budget spent on instruction was 79.5 percent with a standard deviation of 5.8 percent.

Selected results from the regression analyses are reported below. Full results are shown in Table 2.

Findings for schools' total general fund budget

Middle schools and high schools had larger general fund budgets than elementary schools. From the 1999–2000 school year to the 2015–16 school year, in the baseline analysis, middle schools' general fund budgets were, on average, more than $610,000 higher than elementary schools' general fund budgets. From the same baseline analysis, the budgets for high schools were $2.6 million dollars higher than elementary schools. Elementary school budgets were less than middle and high school budgets largely because of the enrollment sizes of these schools. From the 1999–2000 school year to the 2015–16 school year, the average enrollment in elementary schools was 660 students, in middle schools was 930 students, and in high schools was 1,340 students. Schools were not the same sizes, so the analyses were run again with enrollment size (along with other student body characteristics) included in order to see which part of a school's general fund budget was due to its size, and which part of a school's general fund budget was because of the grade levels it served. In the full analysis considering enrollment size and other student body characteristics, the general fund budgets of middle schools were about $250,000 higher than elementary schools, and the general fund budgets of high schools were about $560,000 higher than elementary schools (see Figure 1).

Figure 1. Predicted total general fund budgets of elementary schools, middle schools, and high schools, 1999–2000 through 2015–16



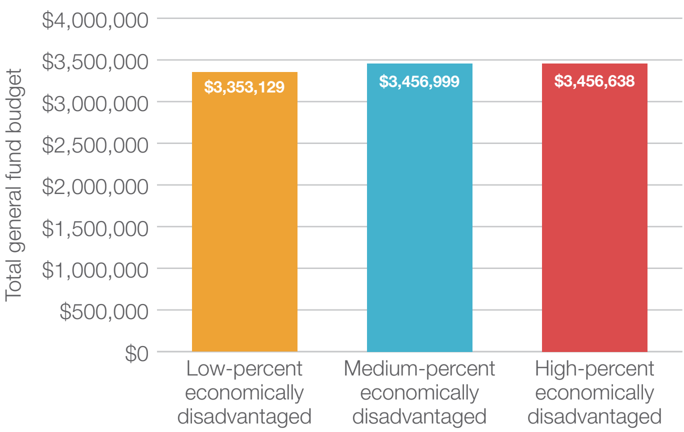
Note: Bars reflect predicted average total general fund budgets of elementary schools, middle schools, and high schools controlling for school year, enrollment size, and other relevant variables. Differences are statistically significant ($p < 0.05$).

Small schools had smaller budgets because of their size and who they serve. Comparing the general fund budgets of small schools to non-small schools, the total general fund budgets of small schools are about $530,000 less than the general fund budgets of non-small schools. Once enrollment size and student body characteristics were considered, the total general fund budgets of small schools were about $1,000 less than the total general fund budgets of non-small schools, which is neither a statistically nor substantively significant difference.

2 Standard deviation is the average difference between any given value in the sample, and the sample mean. In the case of total general fund budget, standard deviation is the average difference between the total general fund budget of any school in Houston ISD and the mean total general fund budget of Houston ISD.

Schools serving more economically disadvantaged students had larger total general fund budgets than schools serving fewer economically disadvantaged students. High-percent economically disadvantaged schools had total general fund budgets that were about $100,000 higher than low-percent economically disadvantaged schools.[3] Medium-percent economically disadvantaged schools also had larger total general fund budgets than low-percent economically disadvantaged schools (see Figure 2).[4]

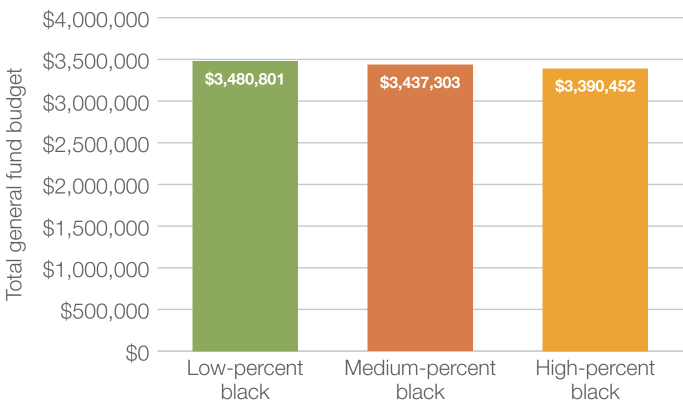
Figure 2. Predicted total general fund budget for low-, medium-, and high-percent economically disadvantaged schools, 1999–2000 through 2015–16



NOTE: Bars reflect predicted total general fund budget for schools serving low-percent, medium-percent, and high-percent economically disadvantaged students compared to schools serving low-percent economically disadvantaged students. Medium-percent and high-percent economically disadvantaged were statistically significantly different from low-percent economically disadvantaged ($p < 0.05$). Medium-percent was not statistically significantly different from high-percent economically disadvantaged ($p = 0.986$).

Schools serving more black students had smaller total general fund budgets than schools serving fewer black students, but this was explained by differences in the presence of professional personnel at the school. In addition to looking at differences in total general fund budgets by percent of economic disadvantaged students in a school, analyses were also run to look at the total general fund budgets of schools serving higher- and lower-percent black and Hispanic students. These analyses controlled for school's enrollment size, which is an important factor in total general fund budget of a school. High-percent black schools had total general fund budgets about $180,000 less than the total general fund budgets of low-percent black schools even after controlling for schools' enrollment sizes; however, this difference was explained by high-percent black schools having fewer professional staff. Once differences in the number of professional staff was considered the difference in schools' budgets was no longer statistically significant (see Figure 3).[5] Additional analyses revealed the difference in total general fund budgets of high-percent black and low-percent black schools may primarily reflect differences in spending at the elementary school level (see Appendix E for more details). No difference in total general fund budget was identified between high-percent Hispanic and low-percent Hispanic schools (see Table 2).

Figure 3. Predicted total general fund budget for low-, medium-, and high-percent black schools, 1999–2000 through 2015–16



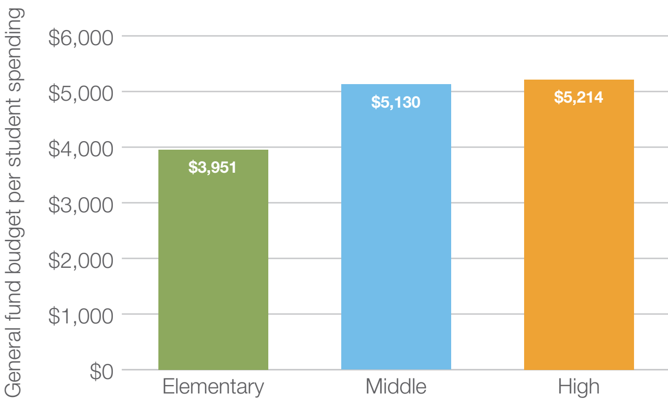
NOTE: Bars reflect predicted total general fund budget for schools serving low-percent, medium-percent, and high-percent black students. Differences are not statistically significant ($p > 0.05$).

Findings for schools' general fund per student spending

Middle schools and high schools had higher per student spending than elementary schools. The larger total budgets of middle schools and high schools were reflected in these schools' per student spending, even after considering enrollment size and student body characteristics. Middle schools' general fund per student spending was about $1,180 more than the general fund per student spending of elementary schools. High schools' general fund per student spending was about $1,260 higher than the general fund per student spending of elementary schools (see Figure 4).

3 See Exhibit A for definition of "high-percent" and "low-percent".
4 See Exhibit A for definition of "medium-percent" and "low-percent".
5 See Exhibit A for definition of "high-percent" and "low-percent".

Figure 4. General fund per student spending for elementary, middle, and high schools, 1999–2000 through 2015–16



NOTE: Predicted general fund per student spending for elementary, middle, and high schools. Middle and high school are statistically significantly higher than elementary schools ($p < 0.05$). Predicted general fund per student spending differences between middle and high schools was not statistically significant ($p = 0.55$).

Small schools had higher per student spending than non-small schools. Small schools' general fund per student spending is about $330 higher than the general fund per student spending of non-small schools.

Schools serving more economically disadvantaged students had lower general fund per student spending than schools serving fewer economically disadvantaged students. High-percent economically disadvantaged schools had lower general fund spending of about $120 less per student than low-percent economically disadvantaged schools.[6] Medium-percent economically disadvantaged schools had lower general fund spending of about $100 less per student than low-percent economically disadvantaged schools.[7]

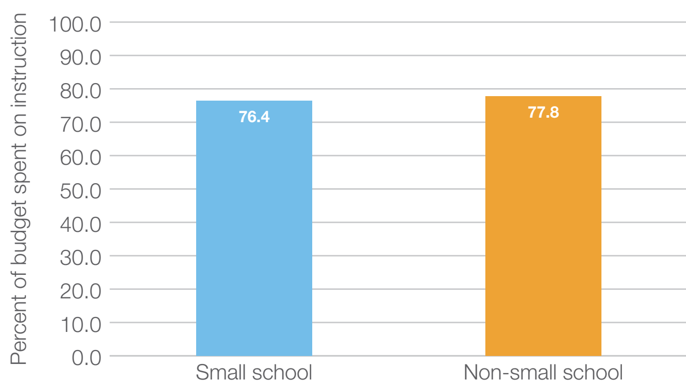
In order to answer questions about how schools are using their general fund budgets, we examined the percent of schools' general fund budget being spent on instruction (see Table 2), as well as whether or not key personnel were present in a school (see Table 3 through Table 6). Selected results focused on grade levels served, small school status, and student body characteristics are discussed in the main text. Full results are in Table 2 through Table 6.

Findings for percent of general fund budget spent on instruction

Middle schools and high schools spent a lower percentage of their total general fund budgets on instruction than did elementary schools. Middle schools and high schools spent a lower percentage of their general fund budgets on instruction (i.e., category 11 expenses) than did elementary schools. Enrollment size and student body characteristics do not appear to explain much of this difference.

Small schools spent a lower percentage of their total general fund budgets on instruction than did non-small schools. Small schools, on average, spent about 1.4 percent less of their general fund budget on instruction (i.e., category 11 expenses) than did non-small schools (see Figure 5).

Figure 5. Percent of a school's general fund budget spent on instruction, 1999–2000 through 2015–16



NOTE: Predicted percent of general fund budget spent on instruction for small and non-small schools estimated controlling for full set of variables. Difference is statistically significant ($p < 0.05$).

Schools serving more black students spent a lower percentage of their total general fund budget on instruction, while schools serving more Hispanic students spent a higher percentage of their total general fund budget on instruction. High-percent black schools spent about 1% less of their total general fund budget on instruction (i.e., category 11 expenses), than low-percent black schools.[8] In contrast, high-percent Hispanic schools spent about 1% more of their total general fund budget on instruction than low-percent Hispanic schools.[9]

6 See Exhibit A for definition of "high-percent" and "low-percent".
7 See Exhibit A for definition of "medium-percent" and "low-percent".
8 See Exhibit A for definition of "high-percent" and "low percent".
9 See Exhibit A for definition of "high-percent" and "low-percent".

Findings for the presence of key personnel

High schools are more likely to have a counselor and less likely to have a nurse than elementary schools. High schools are more likely to have a counselor on staff than elementary schools, net of enrollment size. In contrast, high schools are less likely to have a nurse on staff than elementary schools.

For small schools, differences in the presence of key personnel were almost entirely the result of differences in enrollment size. Small schools appear to be less likely than non-small schools to have assistant principals, librarians, and nurses, which is more reflective of enrollment size and not something unique about being a small school.[10]

Schools serving more economically disadvantaged students were less likely to have librarians than schools serving fewer economically disadvantaged students. High-percent economically disadvantaged schools were less likely to have a librarian than low-percent economically disadvantaged schools.[11]

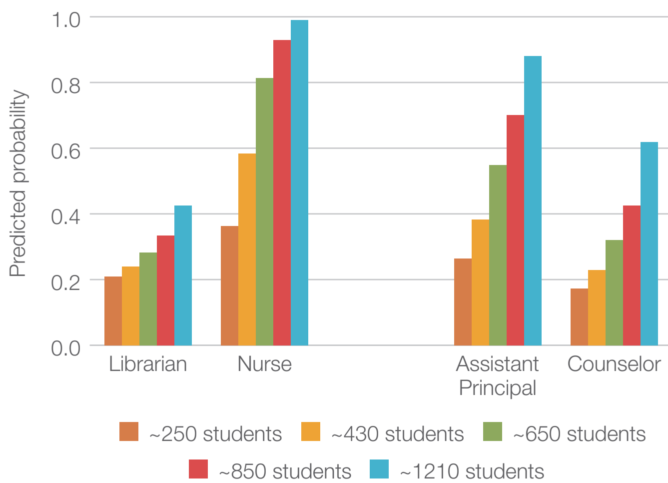
Schools serving more Hispanic students were less likely to have counselors than schools serving fewer Hispanic students. High-percent Hispanic schools were less likely to have a counselor on staff than low-percent Hispanic schools.[12]

Schools serving more black students were less likely to have librarians than schools serving fewer black students. High-percent black schools were less likely to have a librarian on staff than low-percent black schools.[13]

Schools serving more white students were more likely to have nurses than schools serving fewer white students. High-percent white schools were more likely to have a nurse on staff than low-percent white schools.[14]

Enrollment size was a very important driver for determining the likelihood of key personnel being present in a school. For each of the key personnel positions considered for this analysis, enrollment size positively and significantly predicted the likelihood of a school having someone on staff in that role. The larger a school, the more likely it was to have an assistant principal, counselor, librarian, or nurse on staff (see Figure 6).

Figure 6. Predicted probability key personnel present, by number of students in school



NOTE: Predicted probability that a key personnel will be present at a school, based on a school's size.

10 To test this assertion, supplemental analyses were performed that limited the analysis to schools with a restricted range of enrollment size (e.g., small school value +/−100 students). See Appendix F, Table F-1 for an explanation and models showing these results.
11 See Exhibit A for definition of "high-percent" and "low-percent".
12 See Exhibit A for definition of "high-percent" and "low-percent".
13 See Exhibit A for definition of "high-percent" and "low-percent".
14 See Exhibit A for definition of "high-percent" and "low-percent".

Discussion

In general, Houston ISD's current Resource Allocation Formula appears to be operating as intended. Middle schools and high schools, which tend to have larger enrollments, receive larger total general fund budgets. Additionally, there is evidence the general fund budgeting strategy is fulfilling the intended goal of a more equitable distribution of the general fund to schools in the district, as schools serving a higher proportion of economically disadvantaged students had larger total general fund budgets. This evidence suggests Houston ISD's current Resource Allocation Formula is operating as intended. What's unclear is if what was intended is currently what's wanted.

While there is evidence that schools are, in general, funded equitably, there is also evidence of inequality, particularly as it relates to the presence of professional staff and key personnel. Schools with higher percentage black students have fewer professional staff, which appears to account for the lower total general fund budgets of those schools. This pattern of fewer professional staff is reflected in the models predicting the presence of key personnel[15] as well. The presence of key personnel is directly tied to enrollment size. Larger schools are more likely to have assistant principals, counselors, librarians, and nurses. Several schools in the district are large enough to almost ensure their students have access to key personnel, but the same cannot be said for lower enrollment schools. The issue of enrollment is further complicated by the types of students served by lower enrollment schools. Higher proportion black schools have, on average, lower enrollments. Higher proportion Hispanic schools have, on average, lower enrollments. Higher proportion economically disadvantaged schools have, on average, lower enrollment. Despite a majority of Houston ISD students being Hispanic and about 75 percent of Houston ISD students being economically disadvantaged, these students are disproportionately concentrated in smaller schools. The district's small school subsidy appears to somewhat compensate smaller schools from a dollars and cents perspective, but smaller enrollment sizes continue to be linked to lower likelihoods of key personnel being present in schools. Houston ISD may have an equitable funding formula, but there is some evidence that this equity is not providing sufficiently for the least advantaged schools and students.

15 We define key personnel as non-instructional staff that are commonly described as providing essential services that are conducive to a successful learning environment, such as a school nurse; this definition is based on conversations with HISD staff and review of the principal survey responses (see Decentralization Study Brief 2 for more detail).

Recommendations

Centrally maintained personnel

To ensure every campus, regardless of enrollment size, has access to a district-determined baseline of services and key personnel, the district could hire and maintain individuals who are tasked with serving at multiple, lower-enrollment campuses throughout the district. Examples of services or personnel that are sometimes maintained centrally include security, nurses, and special education services. Houston ISD could develop its own designated list of baseline services and personnel it believes all schools should have, centrally maintain these staff, determine a set of qualifications that automatically provide lower-enrollment campuses access to the centrally maintained staff and services, and design a process for schools that did not automatically qualify to apply to have access. Campuses with larger enrollments could therefore opt to utilize centrally-maintained staff and services or choose to provide key personnel and services by hiring with their own budget funds.

Minimum and maximum school sizes

Given the importance of enrollment size in each of the analyses, with larger schools typically having larger budgets and being more likely to have key personnel on staff, the district could consider establishing minimum and maximum school sizes to narrow the disparities in budgets and personnel under the current system. Along these lines, Houston ISD could research the operational cost of running a school in order to determine feasible cut-points for maximum and minimum sizes. Such a study would need to consider the grade levels served by a school, if it is a separate and unique school or comprehensive, as well as a geographic proximity between schools. Additionally, Houston ISD may find it useful to conduct a root cause analysis of declining enrollment at certain schools around the district, in order to either stem the outflow of students or develop early warning indicators of a school's decline.

Weights

While there is some evidence Houston ISD's current Resource Allocation Formula is working to put more money in schools serving more economically disadvantaged students, whether this equity is enough and whether there are other characteristics the district would like to consider is something that could be addressed by reviewing and revising the current funding formula weights. Of specific interest, the current state compensatory education (economic disadvantage) funding weight is added to only 50% of students identified as economically disadvantaged at a school. Houston ISD might consider applying the funding weight to all economically disadvantaged students at a school. While this recommendation would add strain to the district's already stretched budget, it may be possible that in holistically reviewing all the formula weights, other weights could be revised lower to help offset some of the increase in more fully funding economically disadvantaged students.[16]

16 Notably, the Houston ISD Resource Allocation Advisory Committee (RAAC) is currently reviewing the PUA weights used by the district.

Limitations

Key personnel positions identified from the HR data were not listed by funding source; hence, some positions might be funded by non-PUA funding.[17] This analysis does not include external private or non-profit funding sources, nor does it factor in non-fiscal resources such as teacher/principal experience level, or parental involvement.

17 Any position tagged in the personnel as Title II or Apollo funded were identified by their title and removed from the analysis. This was primarily limited to tutors and teachers, which were positions not reported in the final set of analyses.

Sources

Augenblick, J. G., Myers, J. L., & Anderson, A. B. (1997). Equity and adequacy in school funding. *The Future of Children*, 63-78.

Education Resource Strategies (ERC) (2014). Transforming school funding: A guide to implementing student-based budgeting. Retrieved from https://www.erstrategies.org/cms/files/2752-transforming-school-funding-student-based-budgeting-guide.pdf

Hanushek, E. (2010). Misplaced optimism and weighted funding. Education Week (online). Retrieved from https://www.edweek.org/ew/articles/2012/03/28/26hanushek_ep.h31.html?qs=hanushek+misplaced+optimism

OECD (2012). Equity and Quality in Education: Supporting Disadvantaged Students and Schools, OECD Publishing. http://dx.doi.org/10.1787/9789264130852-en

Verstegen, Deborah A. "Policy Perspectives on State Elementary and Secondary Public Education Finance Systems in the United States." *Educational Considerations* 43, no. 2 (2016): 4.

Table 1. Mean, standard deviation, and other estimates of variables in analysis, Houston ISD overall: School year 2015–2016

	N	Mean	SD	Median	50th percentile	75th percentile	Min	Max
Dependent variables								
Total general fund (in $100K)	252	39.60	24.47	33.87	26.43	44.21	4.87	169.71
General fund per student	252	5157.79	1034.03	4916.18	4620.98	5307.53	3531.96	13179.09
Percent on instruction	252	79.45	5.83	80.36	75.92	82.92	61.11	100.00
Presence of key personnel								
Assistant principal	248	0.66	0.48	1	0	1	0	1
Counselor	248	0.41	0.49	0	0	1	0	1
Librarian	248	0.28	0.45	0	0	1	0	1
Nurse	248	0.81	0.39	1	1	1	0	1
School characteristics								
Small school	252	0.31	0.46	0	0	1	0	1
Separate and unique	252	0.41	0.49	0	0	1	0	1
Achieve 180	252	0.16	0.37	0	0	0	0	1
Resource allocation components								
Percent economic disadvantaged	252	79.34	21.04	87.70	74.05	93.15	1.40	99.60
Percent special education	252	7.17	3.90	6.40	5.00	8.80	0.00	21.70
Percent English language learners	252	32.35	21.79	27.65	13.30	49.50	0.00	100.00
Percent gifted/talented	252	14.51	15.58	9.20	5.05	18.00	0.00	100.00
Percent career and technical education	252	12.25	26.81	0.00	0.00	3.30	0.00	100.00
Student body characteristics								
Percent bilingual	252	31.91	22.92	29.55	12.05	49.85	0.00	100.00
Percent black	252	26.92	25.96	17.85	6.30	40.75	0.40	98.00
Percent Hispanic	252	62.30	27.92	68.70	38.20	88.00	2.00	98.80
Percent white	252	6.57	11.76	1.50	0.80	4.65	0.00	63.70
Enrollment size	252	778.20	473.73	698.00	519.00	874.50	99.00	3572.00

Table 2. Regression models predicting school's total general fund budget (in $100K), general fund per student spending, and percent of budget spent on instruction, 1999–2000 through 2015–16 school years

	Total general fund budget ($100K)			General fund per student spending			Percent budget spent on instruction		
	Model 1 b	Model 2 b	Model 3 b	Model 1 b	Model 2 b	Model 3 b	Model 1 b	Model 2 b	Model 3 b
Fiscal year	0.794***	0.790***	0.805***	91.231***	91.395***	92.660***	0.068***	0.069***	0.068***
Enrollment size	0.031***	0.032***	0.009***	-1.550***	-1.536***	-3.638***	0.003***	0.003***	0.005***
Grade levels served (*reference group—elementary*)									
Middle	7.449***	5.667***	2.512***	1510.330***	1449.022***	1178.944***	-3.197***	-3.294***	-3.098***
High	11.179***	9.590***	5.566***	1531.930***	1584.361***	1263.722***	-6.682***	-6.402***	-6.091***
Achieve180 status (*reference group—no*)									
Yes	1.936*	1.400	0.364	130.094	138.320	55.044	-2.698**	-1.835*	-1.742*
Separate and unique schools (*reference group—no*)									
Yes	2.199**	2.478***	1.390***	219.095*	204.681	123.762	-1.593*	-1.656*	-1.552*
Small school status (*reference group—no*)									
Yes	-0.572*	-0.454	-0.011	298.451***	307.860***	333.910***	-1.503***	-1.416***	-1.441***
Percent economically disadvantaged (*reference group—low percent*)									
Medium		1.642***	1.039**		-59.392	-102.378*		-0.536	-0.482
High		1.581***	1.035*		-79.936	-117.825*		-0.717*	-0.669
Percent career and technical education (*reference group—low and medium percent*)									
High		-0.095	-0.384		-173.197***	-203.258***		-0.562	-0.533
Percent special education (*reference group—low percent*)									
Medium		1.348***	1.241***		90.390**	75.201*		-0.002	0.022
High		3.429***	2.941***		182.607***	127.755**		-0.159	-0.084
Percent English language learner (*reference group—low percent*)									
Medium		-2.984***	-2.635***		-300.225***	-280.951***		-0.032	-0.052
High		-2.555***	-2.198***		-250.749**	-232.115**		-0.023	-0.042
Percent gifted/talented (*reference group—low percent*)									
Medium		0.114	-0.030		76.221*	64.296*		0.145	0.155
High		-0.788	-0.666		7.896	9.026		0.104	0.094
Percent bilingual (*reference group—low percent*)									
Medium		0.341	0.394		110.962*	108.500*		0.065	0.071
High		0.034	0.074		119.626	121.405		-0.050	-0.049
Percent black (*reference group—low percent*)									
Medium		-0.853*	-0.435		-99.244	-67.197		0.151	0.118
High		-1.783**	-0.904		-64.738	1.969		-1.111*	-1.182*
Percent Hispanic (*reference group—low percent*)									
Medium		0.277	0.089		81.047	67.175		1.250***	1.264***
High		1.046	0.732		34.550	24.509		1.412**	1.424**
Percent white (*reference group—low percent*)									
Medium		-0.527*	-0.416		-19.252	-8.819		-0.273	-0.285
High		0.352	0.809		87.759	121.114		0.128	0.080
Count of professional staff			0.462***			40.880***			-0.046***
Intercept	4.963***	4.853***	0.796	4855.491***	4948.653***	4655.392***	77.899***	77.536***	77.821***

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include random intercept to adjust for nesting of data within schools. Standard errors reported in separate table in appendix.

SOURCE: Houston Independent School District General Fund Budget Data, 1999–2000 through 2015–16

Table 3. Odds ratios from logistic regression models predicting presence of assistant principal, 2013–14 through 2015–16

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR
Fiscal year	1.26**	1.26**	1.26**	1.29**
Enrollment size	1.00**	1.00	1.00*	1.00*
Grade levels served (*reference group—elementary*)				
Middle		2.06	5.17*	6.01*
High		1.21	1.93	2.33
Achieve180 status (*reference group—no*)				
Yes		0.76	0.82	0.87
Separate and unique schools (*reference group—no*)				
Yes		0.90	0.88	0.96
Small school status (*reference group—no*)				
Yes		0.74	0.72	0.63
Percent economically disadvantaged (*reference group—low percent*)				
Medium			0.93	1.04
High			0.70	0.73
Percent career and technical education (*reference group—low percent*)				
Medium			0.32	0.33
High			0.98	1.14
Percent special education (*reference group—low percent*)				
Medium			0.64	0.62
High			0.97	1.01
Percent English language learner (*reference group—low percent*)				
Medium			1.21	2.09
High			1.14	0.69
Percent gifted/talented (*reference group—low percent*)				
Medium			0.96	1.08
High			0.94	1.08
Percent bilingual (*reference group—low percent*)				
Medium				0.64
High				2.18
Percent black (*reference group—low percent*)				
Medium				1.47
High				0.55
Percent Hispanic (*reference group—low percent*)				
Medium				0.37
High				0.32
Percent white (*reference group—low percent*)				
Medium				0.96
High				0.58

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.

SOURCE: Houston Independent School District, Human Reource data, 2013–14 through 2015–16

Table 4. Odds ratios from logistic regression models predicting presence of counselor, 2013–14 through 2015–16

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR
Fiscal year	1.16*	1.18*	1.19*	1.19*
Enrollment size	1.00***	1.00***	1.00***	1.00***
Grade levels served (*reference group—elementary*)				
Middle		1.50	3.14*	3.55*
High		5.26***	11.52***	12.46***
Achieve180 status (*reference group—no*)				
Yes		0.89	0.60	0.48
Separate and unique schools (*reference group—no*)				
Yes		1.44	1.54	1.59
Small school status (*reference group—no*)				
Yes		1.12	1.05	0.96
Percent economically disadvantaged (*reference group—low percent*)				
Medium			0.83	0.48
High			0.78	0.51
Percent career and technical education (*reference group—low percent*)				
Medium			0.73	0.44
High			1.91	1.30
Percent special education (*reference group—low percent*)				
Medium			1.33	1.29
High			1.31	1.16
Percent English language learner (*reference group—low percent*)				
Medium			1.26	1.11
High			0.97	0.92
Percent gifted/talented (*reference group—low percent*)				
Medium			0.34**	0.46*
High			0.26**	0.41
Percent bilingual (*reference group—low percent*)				
Medium				2.27*
High				2.39
Percent black (*reference group—low percent*)				
Medium				0.36
High				0.59
Percent Hispanic (*reference group—low percent*)				
Medium				0.56
High				0.15*
Percent white (*reference group—low percent*)				
Medium				1.14
High				0.51

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.

SOURCE: Houston Independent School District, Human Reource data, 2013–14 through 2015–16

Table 5. Odds ratios from logistic regression models predicting presence of librarian, 2013–14 through 2015–16

	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR
Fiscal year	0.81**	0.80**	0.78**	0.77***
Enrollment size	1.00**	1.00	1.00	1.00
Grade levels served (*reference group—elementary*)				
Middle		0.50	0.40	0.38
High		0.94	0.79	0.82
Achieve180 status (*reference group—no*)				
Yes		1.03	1.50	1.88
Separate and unique schools (*reference group—no*)				
Yes		2.30**	1.89*	2.15*
Small school status (*reference group—no*)				
Yes		0.59	0.61	0.59
Percent economically disadvantaged (*reference group—low percent*)				
Medium			0.30***	0.48
High			0.20***	0.32*
Percent career and technical education (*reference group—low percent*)				
Medium			0.75	1.03
High			0.52	0.67
Percent special education (*reference group—low percent*)				
Medium			0.93	1.02
High			0.78	0.86
Percent English language learner (*reference group—low percent*)				
Medium			0.86	0.94
High			1.29	1.35
Percent gifted/talented (*reference group—low percent*)				
Medium			1.02	0.87
High			1.18	0.73
Percent bilingual (*reference group—low percent*)				
Medium				0.91
High				0.87
Percent black (*reference group—low percent*)				
Medium				0.48
High				0.18*
Percent Hispanic (*reference group—low percent*)				
Medium				0.43
High				0.30
Percent white (*reference group—low percent*)				
Medium				1.85
High				2.79

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.

SOURCE: Houston Independent School District, Human Reource data, 2013–14 through 2015–16

Table 6. Odds ratios from logistic regression models predicting presence of nurse, 2013–14 through 2015–16

	Model 1	Model 2	Model 3	Model 4
	OR	OR	OR	OR
Fiscal year	0.93	0.94	0.93	0.94
Enrollment size	1.01***	1.01***	1.01***	1.01***
Grade levels served (*reference group—elementary*)				
Middle		0.19***	0.63	0.59
High		0.20**	0.68	0.67
Achieve180 status (*reference group—no*)				
Yes		0.71	0.80	0.79
Separate and unique schools (*reference group—no*)				
Yes		1.44	1.37	1.32
Small school status (*reference group—no*)				
Yes		1.08	1.11	1.00
Percent economically disadvantaged (*reference group—low percent*)				
Medium			0.31*	1.43
High			0.25*	1.27
Percent career and technical education (*reference group—low percent*)				
Medium			1.18	1.61
High			5.60	7.63*
Percent special education (*reference group—low percent*)				
Medium			1.36	1.40
High			1.37	1.25
Percent English language learner (*reference group—low percent*)				
Medium			1.11	1.55
High			1.04	2.91
Percent gifted/talented (*reference group—low percent*)				
Medium			1.31	1.46
High			0.46	0.31
Percent bilingual (*reference group—low percent*)				
Medium				0.81
High				0.41
Percent black (*reference group—low percent*)				
Medium				0.41
High				0.75
Percent Hispanic (*reference group—low percent*)				
Medium				0.94
High				0.59
Percent white (*reference group—low percent*)				
Medium				1.44
High				18.74**

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.

SOURCE: Houston Independent School District, Human Reource data, 2013–14 through 2015–16

Appendix A: Useful Terms

Equity

Equity is different from equality. Equality is when everyone gets the same thing. Equity is when everyone gets what they need to succeed. The Organization for Economic Cooperation and Development (OECD) defines equity as:

> Equity as inclusion means ensuring that all students reach at least a basic minimum level of skills. Equitable education systems are fair and inclusive and support their students to reach their learning potential without either formally or informally pre-setting barriers or lowering expectations. Equity as fairness implies that personal or socio-economic circumstances, such as gender, ethnic origin or family background are not obstacles to educational success (2012, p. 15):

Funding Equity

One of the stated goals of Houston ISD is to promote positive student outcomes through funding equity. According to the district, funding equity is when specific characteristics that merit additional funding, such as poverty or historically under-served race/ethnic groups, are positively and significantly associated with funding.

Weighted Student Funding (WSF)

WSF allocates campus level funds based on school level enrollment (elementary, middle or high school) and average daily attendance, incorporating additional funding for student characteristics such as English language learner or gifted/talented. Houston ISD calls the base amount a Per Unit Allocation (PUA) and adds extra funds for certain student characteristics (i.e., adds weights).

Improvement Required (IR)

IR is a designation placed on a school by the Texas Education Agency (TEA) indicating that a specific number of students at that school did not meet current accountability standards. Those standards are derived largely by performance on the statewide assessment exam, State of Texas Assessment of Academic Readiness (STAAR). Multiple years of a school in IR status could trigger closure by the district or by the TEA.

State Compensatory Education Unit (SCE)

SCE is a state designated funding category based on the number of students who are economically and academically disadvantaged. Houston ISD determines economically disadvantaged students using the free/reduced lunch applications and the economic survey form for non-Community Eligibility Provision and Community Eligibility Provision schools, respectively.

Appendix B

Table B-1. Houston ISD base amount PUA funding, by level of school: School years 2003–04 to 2016–17

Year	Per Unit Allocation		
	Elementary	Middle	High
2003–2004	$2,732		
2004–2005	$2,802		
2005–2006	$2,768		
2006– 2007	$2,832	$2,842	$2,871
2007–2008	$3,071	$3,096	$3,085
2008–2009	$3,257	$3,282	$3,246
2009–2010	$3,368	$3,393	$3,357
2010–2011	$3,485	$3,510	$3,474
2011– 2012	$3,257	$3,282	$3,246
2012–2013	$3,341	$3,366	$3,330
2013–2014	$3,378	$3,403	$3,367
2014–2015	$3,470	$3,495	$3,459
2015–2016	$3,589	$3,625	$3,589
2016–2017	$3,522	$3,558	$3,522

Appendix C: Brief overview of state and Houston ISD funding

Texas funds public schools through a multi-tiered funding structure utilizing a combination of state and local taxes. While local revenues account for more than half of all education spending, all money is allocated through the state funding formula system, and is state controlled. The amount a specific district can retain from local property taxes is capped, with all additional dollars sent to the state to be distributed to 'property poor' school districts through a system known as *recapture*. Reductions in state funding and an increased reliance on local tax dollars have impacted overall funding levels. It is also important to note that while equity within a district may exist as it relates to available resources, it should not be viewed that those resources are "adequate" as that term is legally used in school funding.

The state funding formula utilizes a weighted student funding (WSF) approach, which is a common mechanism at the state level (Hanushek, 2012; Verstegen, 2016). This funding includes the basic allotment per student, adjusted based on several district specific features such as the cost of education in a region or the sparsity of population; weights are then added to deliver additional funding for students with specific characteristics. The cost of education index[18], or CEI, was last updated in 1991. Many of the weights and allocations have not been updated since 1989.

Over the last 15 years, the share of funding provided by the State has consistently been less than half of all education spending. The foundation schools program, the primary mechanism to fund Texas schools has seen increases in overall spending, climbing from over $22 billion in 2000 to over $48 billion in 2018. While the increase in spending over this period may appear dramatic, adjusted for inflation and student population growth, the spending level has largely been flat. During that period the average percentage of state taxes contributing to public education has averaged less than 44% of overall spending. In real terms, the contribution of local taxes to the overall spending in public education has more than doubled over this period, climbing from over $11 billion in 2000, to over $28 billion in 2018. Much of this increase has been a result of an increase in property values that serve as the basis of local property taxes. This increase has seen more school districts designated as property rich, placing them into recapture and triggering a distribution of those local revenues, Houston ISD has been in recapture since the 2016–2017 fiscal year.

Houston ISD's decentralized funding system mirrors the state WSF system, apportioning per unit allocations (PUAs) for students at the elementary, middle, and high school levels. (See Appendix B, Table B-1 for table of historical PUA amounts.) Like the state system, the district's weights have not been updated recently[19]. Currently, the PUA accounts for approximately 46% of a school's budget. The number of students is calculated based upon attendance, plus the presence of special population units.

18 The current CEI attempts to adjust for varying economic conditions across the state, based mainly on the size of the district, the teacher salaries of neighboring districts, and the percentage of low-income students in the district in 1989–1990. The index has not been updated since that time (TEC, §42.102).

19 As one exception, the mobility weight of .1 was split into the two categories of homeless (.05) and refugee (.05) in 2013.

Table C-1. Houston ISD special population weight values: 2016–17

Special population	Weights
State compensatory education (SCE)	.15
Special Education	.15
Gifted/talented (GT)	.12*
English language learner (ELL)	.10*
Homeless	.05
Refugee	.05
Career and Technical Education (CTE)	.35*

NOTE: Asterisk indicates Houston ISD weights that are equivalent to the TEA weights for those specific categories. Weights reflect values from 2016–17, which have gone largely unchanged compared to the years of data included in the analyses.

As seen in Table 1, there are six special population groups receiving extra funding through a student population weight system, as well as the career and technical education (CTE) programming. From an equity perspective, the state compensatory education (SCE) weight is particularly relevant. An SCE weight of 15% is applied to half of the economically disadvantaged and at-risk students at a school. That is the equivalent of every economically disadvantaged and at-risk student at a school receiving a weight of 7.5%.

For the career and technical education (CTE) weight, Houston ISD uses a full-time equivalent (FTE)-based weighting system of 35% that generates full-time equivalents based upon the number of CTE students in a school.

Houston ISD has also shifted its magnet funding system to a hybrid FTE-WSF model that provides full time-equivalents based upon program participation. Schools receive a "capital allocation" that in 2016–17 amounted to $10 per pupil.

Finally, schools designated as "small schools" receive an additional subsidy to defray the higher marginal cost of running a small operation.

For all schools in Houston ISD, the only staffing requirements specified by policy are a principal and a secretary.

Notably, during the 2016–17 school year, 262 of the 284 HISD campuses receive Title I funds from the federal government, which are designed to provide supplemental funds for at-risk and low-income students, thereby playing a significant role in promoting funding equity. Houston ISD applies a progressive distribution with Title I funds, so that schools with more than 35% economically disadvantaged students receive an additional $424–$482 per student, depending on the population of economically disadvantaged. This progressive weight is a result of equity expert recommendations based on the impact of high concentrations of poverty at specific schools. Of note, the analyses described in this report do not include Title I or any federal source of funding.

Appendix D: Description of Data, Sample Preparation, Variables, and Methods

For this study, we used general fund budget data from the 1999–2000 through 2015–16 school years, as well as human resource data from the 2013–14 through 2015–16 school years. Table 1 in the main body of the text provides description of the data used in analyses from the 2015–16 school year, and of data for each school year included in the study, overall for the district and separately for elementary, middle, and high schools is available from the authors upon request.

General fund budget data were used to look at schools' total general fund budget, per student spending of general funds, and percentage of general fund budget spent on instruction. Funds spent on instruction were identified as any funds spent on a category 11 expense in the line-item generalized fund data. This study does not look at schools' total budgets, only the parts of schools' budgets resulting from the district's current Resource Allocation Formula (i.e., funds determined through the PUA model).

Human resource data were used to determine the presence of key personnel at Houston ISD schools, focusing specifically on the presence of assistant principals, counselors, nurses, and librarians. These roles were identified for consideration as part of this analysis because they were frequently the roles identified by Houston ISD staff and Board members as essential personnel for a school. The three years of HR data used as part of this study (2013–14 through 2015–16) were the three most recently available years of data at the time of the analyses.

Budget data were stored in campus-year format, where each row of the data file represented a single year from a campus (e.g., row 1 contained data from Campus A, Year 2000; row 2 contained data from Campus A, Year 2001; row 3 contained data from Campus A, Year 2002). The general fund budget data included only public funds sent from the district to its schools as part of the current funding strategy of Houston ISD. None of the analyses include external, private, or non-profit funding sources, such as money from grants, school-specific organizations, or federal sources. The original data file contained 4,843 campus-year records. In order to arrive at the final sample of schools included in the analyses, several filters were applied.

First, we limited the sample to include data from schools that were open as of the 2017–18 school year, which resulted in dropping 694 campus-year records. Next, we dropped data related to campus-years reporting the grade level served as "Both", which resulted in dropping 74 campus-year records. Finally, we calculated a "per student spending adjusted for inflation" measure (to account for changes in the value of the dollar over the duration of the available data) and identified extremely high values (i.e., schools receiving inflation-adjusted general fund amounts of more than $15,000 per student) and extremely low values (i.e., schools receiving inflation-adjusted general fund amounts of less than $2,000 per student). There were 35 campus-years dropped because of extremely high values, and 149 campus-years dropped because of extremely low values. The final analytic sample for the Houston ISD general fund budget data was 3,891 campus-years belonging to 171 elementary school campuses, 40 middle school campuses, and 41 high school campuses that were open at the start of the 2017–18 school year.

Total general fund budget in $100K

Total general fund budget was calculated by summing together the total amount of funds associated with a school within a given school year in the funding records. Multiple categories of expenses were included in the total general fund budget: community services, curriculum development, data processing, debt services, extracurricular activities, facilities maintenance operation, facilities acquisition construction, food services, general administration, guidance counseling, health services, instruction, instructional leadership, inter-governmental charges, juvenile justice alternative education placement (JJAEP), media services, school leadership, security, social work services, staff development, tax increment reinvestment zone (TIRZ), transfers out, and transportation. Total general fund budgets was divided by 100,000 to create the variable used in the study.

General fund budget amount per student

For each campus-year, a school's total general fund budget was divided by the school's enrollment to calculate the general fund budget amount per student at a school.

Percentage of total general fund budget spent on instruction

For each campus-year, to calculate the percentage of total general fund budget spent on instruction, the dollar amount reported for the category "instruction" was divided by the total general fund budget and then multiplied by 100.

Presence of key personnel at a school

Using the human resource data from the 2013–14 school year, 2014–15 school year, and 2015–16 school year, presence of key personnel was determined for each school year based on whether or not a school reported a person working in the school in that position. The original data contained 784 campus-year records in the human resource file. Applying the filters described above, the final analytic sample was made up of 730 campus-year belonging to 170 elementary schools, 39 middle schools, and 39 high schools that were open at the start of the 2017–18 school year.

Four key personnel roles were identified: assistant principal, counselor, librarian, and nurse. The position could be full-time or part-time. Presence of the key personnel was coded a 1, and absence was coded a 0 for each campus-year of data available for a school.

Grade levels served

Grade levels served was based on the classification of the school as elementary school, middle school, or high school during the 2017–18 school year by Houston ISD. Elementary school, middle school, and high school status were coded as 1 to indicate the school belonged to that classification and 0 to indicate the school did not belong to that classification. Middle school and high school indicators were included in the analyses, with the elementary school indicator left out as the reference group. As a result, all comparisons are made to elementary schools.

Small Schools

The definition of small school has changed in the district over the time period covered in this study. Between the 1999–2000 and 2001–2002 school years, small school was defined as any school with an enrollment of less than 400. During the 2002–03 school year, small school was defined as any school with an enrollment of less than 500. Beginning in 2003–04, the definition of small school was changed to be grade level specific. Any elementary school with less than 500 students, middle school with less than 750 students, or high school with less than 1000 students was classified as a small school. These definitions were applied to each campus year of data. If a school met the condition for being classified as a small school, it was coded 1, and all non-small schools were coded 0.

Separate and Unique Schools (SUS)

Separate and unique schools (SUS) were identified using lists from Houston ISD's website of magnet choice programs located here. These programs were present during the 2017–18 school year, and schools were identified as SUS, regardless of when a program started at a school. Schools appearing on the list of magnet choice programs were coded as 1, and all other schools were coded as 0.

Chronically Improvement Required (IR) schools

Chronically improvement required schools were identified as any school appearing on the list of schools currently associated with the "Achieve 180" program at the start of the 2017–18 school year. These include schools at all four levels of the Achieve 180 program: tertiary group, secondary group, primary group, and Superintendent's schools. Schools appear on the list of Achieve 180 schools were coded as 1, and all other schools were coded as 0. Note, Achieve 180 status could indicate that a school was a first year IR school, a second year IR school, or perhaps, a former IR school.

Resource Allocation Components

Four of the six student characteristic that have funding weights applied to them, as well as career and technical education (CTE) students at a school were included in the study. The original data provided information on the percent of students at a school for a given year who were economically disadvantaged, gifted/talented, English language learners, special education, and CTE. These campus-year percentages were categorized into high-, medium-, and low-percent schools based on the distribution of percentages for each year (see Exhibit A). The cut-point for identifying high-percent schools was the 80th percentile, the cut-point for identifying low-percent schools was the 20th percentile, and the medium-percent group was defined as all schools between the high- and low-percent schools. These cut-points were largely data driven, and set to ensure sufficient sample sizes in each group to allow for stable estimates. The high-percent and medium-percent indicators were included in the models, with the low-percent indicator left out as the reference group. Since the low-percent indicator was set as the reference group, all comparisons are made to this group.

Student body characteristics

Four measures of student body characteristics were included in the analysis reflecting the percent of students in a school who were bilingual, black, Hispanic, or white. Similar to the Resource Allocation Component variables, the percent variables for student body characteristics were categorized into high-, medium-, and low-percent schools based on the distribution of percentages for each year (see Exhibit A). The cut-point for identifying high-percent schools was the 80th percentile, the cut-point for identifying low-percent schools was the 20th percentile, and the medium-percent group was defined as all schools between the high- and low-percent schools. These cut-points were largely data driven, and set to ensure sufficient sample sizes in each group to allow for stable estimates. The high-percent and medium-percent indicators were included in the models, with the low-percent indicator left out as the reference group. Since the low-percent indicator was set as the reference group, all comparisons are made to the low-percent group.

Count of professional staff at a school

Texas Academic Performance Reports (TAPR) and Academic Excellence Indicator System (AEIS) data were used to determine the number of professional staff at a school during each campus-year a school was present in the data. The variable CPSTOFC was used for these analyses, which contains information on the total full time equivalent (FTE) professional staff at a school in a given school year.

Time

Data were provided in campus-year format, so to adjust for changes in the budget taking place over time, the analyses included a linear effect of time using the fiscal year associated with each campus-year. In order for the intercept to be somewhat meaningful, fiscal-year was centered, so that fiscal-year 2008 is now set to 0, so that the intercept reflect the average expected value for the 2008 fiscal year.

Enrollment size

Enrollment size was reported for each campus-year. In order for the intercept to be somewhat meaningful, enrollment was centered, so that the intercept reflects the average expected value for the average sized school.

For models predicting total general fund budgets, per student spending, and percent general fund budget spent on instruction, a multi-level mixed effect model was used. For models predicting the presence of key personnel in a school, a logistic regression model with variance adjustments for clustered data was used

In addition to the independent variables of interest (i.e., grade level served, small school status, percent economically disadvantaged, and percent Hispanic, black, or white students), full models included control variables for Achieve 180 status (as of 2017–18), separate and unique school status (as of 2017–18), enrollment size, proportion career and technical education (CTE) students, proportion special education students, proportion English language learner (ELL) students, proportion gifted/talented students, and proportion bilingual students.

Mixed-effect linear regression model

For models predicting total general fund budget, general fund budget per student spending, and percent of total general fund budget spent on instruction, a mixed-effect linear model was used. Mixed-effect linear regression models are able to incorporate time-varying (level-1) and time-invariant (level-2) measures, which was important given the different ways variables in the data were coded. For analyses using the budget data, the time-varying campus-year measures (n = 3,891) were nested in schools (n = 251). Descriptive statistics were computed for each campus-year of data and are reported in Appendix E. For each of the outcome (dependent) variables, a step-wise modeling strategy is used to first, establish if a bivariate association exists between the predictor (independent) variable and the outcome, and then second, a full(er) model is used to see if the association observed at the bivariate level remains under more stringent conditions.

Most of the results discussed in this brief focus on findings from the full models, as these represent the most stringent tests of an association, and allow for the reader to determine if an association exists between the predictor variable and outcome variable after other variables are included in the model, it provides more convincing evidence that the two variables are related. If after including other variables in the model the bivariate relationship goes away, it suggests that there may not be a direct relationship between the predictor variable and outcome variable.

The equations for the full models are presented below:

Level 1:

$$Y_{ti} = \pi_{0i} + \pi_{1i}\,(TIME_{ti}) + \pi_{2i}\,(ENROLL_{TI}) + \pi_{si}\,(SMALL_{TI}) + \pi_{ni}\,(RAC_{TI}) + \pi_{ki}\,(STUDENT_{TI}) + e_{ti}$$

Level 2:

$$\pi_{0i} = \beta_{00} + \beta_{01}\,ACHIEVE180_{i} + \beta_{02}\,SUS_{i} + \beta_{03}\,LEVEL_{i} + r_{0i}$$

$$\pi_{1i} = \beta_{10}$$

$$\pi_{2i} = \beta_{20}$$

$$\pi_{si} = \beta_{s0}$$

$$\pi_{ni} = \beta_{n0}$$

$$\pi_{ki} = \beta_{k0}$$

where Y is total general fund budget in $100K, total general fund per student spending, or percent of total general fund budget spent on instruction. TIME is the fiscal year variable that has been centered on 2008 and represents the average linear change in annual funding during the duration of years of data used in this analysis. ENROLL is the enrollment variable that has been centered on the grand mean for enrollment in Houston ISD during the duration of years of data in this analysis, and represents the expected average change in the predictor variable associated with one additional student at a school. SMALL is a time-varying measure of small school status, and represents the expected average difference in the predictor variable of being a small school versus a non-small school. RAC is a vector of time-varying Resource Allocation Component variables coded into high-percent, medium-percent, and low-percent, and represents the average difference in the outcome variable for either a medium-percent or high-percent school relative to a low-percent school. At level 2, ACHIEVE180 is the time-invariant measure indicating if a school is designated as part of the Achieve 180 program during the 2017–18 school year, and represents the average difference in the outcome variable between Achieve 180 and non-Achieve 180 schools. SUS is the time-invariant measure of separate and unique schools, and represents the average difference in the outcome variable between SUS and non-SUS schools. LEVEL is the time-invariant measure of grade level served, and is a categorical measure of elementary school, middle school, and high school; with elementary school set as the reference group, representing the average difference in the outcome variable for either middle schools or high schools.

Logistic regression model with variance adjustments for clustered data

For models predicting the presence of key personnel, because the outcome variable was a binary measure (i.e., a variable with a value of 1 or 0), the mixed-effect linear regression model would not be a sufficient estimation strategy. As a result, logistic regression was used with adjustments to the variance for the clustered nature of the data. In logistic regression, the models produce coefficients that represented the predicted change in the log odds of the outcome variable associated with the predictor variable. These units (i.e., log odds) are generally unintelligible, so to make the results more intuitive, all regression coefficients from the logistic regression models are reported in odds ratios. Odds ratios can be interpreted as "for a one unit change in the predictor variable, the predicted odds of the outcome variable happening changes by $[(e^{b}-1) * 100]$ percent". More simply stated, odds ratio values greater than 1 mean that as the predictor variable changes the odds of the outcome variable happening go up, while odds ratio values less than 1 means that as the predictor variable changes the odds of the outcome variable happening goes down.

Results from logistic regression models can be used to create "predicted probabilities", which reflect the predicted likelihood of an event happening based on certain values of the predictor variable. Figure X reports predicted probabilities of key personnel for different enrollment sizes to make clear the important role of enrollment size in the presence of key personnel at a school.

Appendix E: Study results from analyses run separately by school level

In addition to the analyses reported in the main body of the text, which performed analyses on the entire district, when sufficient data were available, these analyses were also run separately by school level (i.e., elementary, middle, and high schools). Selected results from the school level-specific analyses are reported below, as are tables containing the full set of results from these analyses. Please note, any results mentioned below are from the full analysis model, which included the full set of control variables. See main body of text for list of control variables.

General fund budget—Total budget and per student spending—By school level

Among elementary schools, schools serving more black students had smaller total general fund budgets than schools serving fewer black students. High-percent black elementary schools had total general fund budgets that were $80,000 less than the total general fund budgets of low-percent black elementary schools, even after controlling for number of professional staff in a school.

Among elementary schools, schools serving more white students had smaller total general fund budgets than schools serving fewer white students. High-percent white elementary schools had total general fund budgets that were about $70,000 less than the total general fund budgets of low-percent white elementary schools, even after controlling for number of professional staff in a school.

Among middle schools, small schools had smaller general fund budgets than non-small schools. Middle schools that were classified as small schools had total general fund budgets that were about $270,000 less than the total general fund budgets of middle schools that were non-small schools, even after considering enrollment size, student body characteristics, and number of professional staff.

Among high schools, small schools had smaller total general fund budgets than non-small schools. High schools that were classified as small schools had total general fund budgets that were about $660,000 less than the total general fund budgets of high schools that were non-small schools, net of enrollment size, student body characteristics, and number of professional staff.

Among high schools, schools serving more white students had lower per student spending than schools serving fewer white students. High-percent white high schools had per student spending based on the total general fund budget that was about $630 less than the per student spending of low-percent white high schools.[20] Medium-percent white high schools had per student spending that was about $390 less than the per student spending of low-percent white high schools.[21]

Percent spent on instruction and presence of key personnel—By school level

Among elementary schools, small schools spent a lower percentage of their total general fund budget on instruction than did elementary schools that were non-small schools. Elementary schools classified as small schools spent about 1.4% less of their total general fund budget on instruction (i.e., category 11 expenses), than did elementary schools that were non-small schools. There was no difference between small and non-small schools at the middle school and high school levels.

20 See Exhibit A for definition of “high-percent” and “low-percent”.
21 See Exhibit A for definition of “medium-percent” and “low-percent”.

Among middle schools, schools serving more black students spent a lower percent of their total general fund budget on instruction than schools serving fewer black students. High-percent black middle schools spent about 4.1% less of their total general fund budget on instruction than did low-percent black middle schools.[22]

Within each school type, enrollment was positively and significantly related to the likelihood of key personnel at a school. For elementary schools, middle schools, and high schools, enrollment size was positively related to the likelihood of a school having an assistant principal, counselor, librarian, or nurse on staff.

Due to the limited number of years of available personnel data (i.e., 2013–14, 2014–15, and 2015–16), we were unable to look at the likelihood of key personnel by certain student body characteristics separately for each grade type (i.e., elementary, middle, and high).

In summary, results from the analyses run separately by school level returned findings that did not always align with the findings from the models reported on in the main body of the text, which were run on data from the whole district in a single model. For example, overall in the district, small school status is not related to the total general fund budget; however, when looking at small school separately by level (i.e., elementary, middle, and high), the total general fund budgets of small middle schools and small high schools were smaller than the total general fund budgets of non-small middle schools and non-small high schools. As another example, when looking at the overall district, schools serving more economically disadvantaged students had larger total general fund budgets, but this pattern did not remain when looking within elementary, middle, or high schools.

22 See Exhibit A for definition of "high-percent" and "low-percent".

Table E-1. Regression models predicting school's total general fund budget (in $100Ks) for elementary schools, middle schools, and high schools, 1999–2000 through 2015–16 school year

	Elementary schools		Middle schools		High schools	
	Model 1 b	Model 2 b	Model 1 b	Model 2 b	Model 1 b	Model 2 b
Fiscal year	0.60***	0.62***	1.01***	1.08***	1.89***	1.78***
Enrollment size	0.03***	0.01***	0.03***	0.00	0.04***	0.01***
Achieve180 status (*reference group—no*)						
Yes	-0.90	-0.45	4.87	1.45	7.42**	3.73
Separate and unique schools (*reference group—no*)						
Yes	1.04**	0.70***	7.44***	5.16***	6.41**	6.01**
Small school status (*reference group—no*)						
Yes	-0.71***	-0.18	-2.39***	-2.66***	-8.40***	-6.64***
Percent economically disadvantaged (*reference group—low percent*)						
Medium		-0.11		-1.40		-0.55
High		0.10		-2.06		0.60
Percent career and technical education (*reference group—low percent*)						
Medium		- -		-2.27**		-0.07
High		- -		-2.55**		0.00
Percent special education (*reference group—low percent*)						
Medium		0.53***		2.01**		0.34
High		0.94***		2.24*		0.07
Percent English language learner (*reference group—low percent*)						
Medium		-0.13		-0.76		-1.63
High		0.52		-2.39*		-2.50
Percent gifted/talented (*reference group—low percent*)						
Medium		0.78***		-1.25*		-0.27
High		1.48***		-1.41		-7.09***
Percent bilingual (*reference group—low percent*)						
Medium		-0.15		-0.63		-0.72
High		-0.50		-0.83		1.18
Percent black (*reference group—low percent*)						
Medium		-0.13		-0.91		1.52
High		-0.75*		0.55		1.50
Percent Hispanic (*reference group—low percent*)						
Medium		-0.42		-0.26		0.73
High		-0.57		1.03		-1.07
Percent white (*reference group—low percent*)						
Medium		-0.18		0.13		-1.23
High		-0.67*		0.16		0.33
Count of professional staff		0.42***		0.46***		0.39***
Intercept	8.57***	2.91***	12.15***	12.69***	8.06**	6.86

* p<0.05, **p<0.01, *** p<0.001
NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.
SOURCE: Houston Independent School District General Fund Budget Data, 1999–2000 through 2015–16

Table E-2. Regression models predicting school's per student spending of general fund budget for elementary schools, middle schools, and high schools, 1999–2000 through 2015–16 school year

	Elementary schools		Middle schools		High schools	
	Model 1 b	Model 2 b	Model 1 b	Model 2 b	Model 1 b	Model 2 b
Fiscal year	85.75***	85.68***	119.79***	125.12***	129.31***	127.23***
Achieve180 status (*reference group—no*)						
Yes	-33.11	-34.51	471.07	82.10	657.03*	432.57
Separate and unique schools (*reference group—no*)						
Yes	195.24***	200.46***	399.05	355.20	365.28	345.32
Small school status (*reference group—no*)						
Yes	442.45***	442.22***	698.29***	623.09***	569.55***	571.80***
Percent economically disadvantaged (*reference group—low percent*)						
Medium		11.72		-146.74		89.60
High		28.43		-152.46		70.26
Percent career and technical education (*reference group—low percent*)						
Medium		- -		-98.10		-144.79
High		- -		-280.49		138.93
Percent special education (*reference group—low percent*)						
Medium		120.55***		-215.78		-16.45
High		281.63***		-128.60		-9.95
Percent English language learner (*reference group—low percent*)						
Medium		-61.13		-52.21		14.53
High		-23.56		-273.37		-157.02
Percent gifted/talented (*reference group—low percent*)						
Medium		39.48		-0.64		13.95
High		109.92*		-54.13		-48.87
Percent bilingual (*reference group—low percent*)						
Medium		35.28		-36.83		93.33
High		32.31		-89.89		186.95
Percent black (*reference group—low percent*)						
Medium		-15.38		295.36		505.44*
High		-83.08		1111.45***		353.62
Percent Hispanic (*reference group—low percent*)						
Medium		-49.52		1.86		-190.31
High		-23.40		58.38		77.13
Percent white (*reference group—low percent*)						
Medium		-28.26		116.41		-391.23**
High		-38.66		-269.10		-632.63*
Intercept	3953.03***	3863.74***	4252.23***	4442.20***	4109.86***	4216.01***

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.

SOURCE: Houston Independent School District General Fund Budget Data, 1999–2000 through 2015–16

Table E-3. Regression models predicting school's percent spent on instruction for elementary schools, middle schools, and high schools, 1999–2000 through 2015–16 school year

	Elementary schools		Middle schools		High schools	
	Model 1 b	Model 2 b	Model 1 b	Model 2 b	Model 1 b	Model 2 b
Fiscal year	0.10***	0.10***	0.05	0.08*	-0.15***	-0.14***
Enrollment size	0.01***	0.01***	0.00	0.00*	0.00*	0.00
Achieve180 status (*reference group—no*)						
Yes	-0.72	-0.36	-5.85*	-4.46	-7.13**	-4.76
Separate and unique schools (*reference group—no*)						
Yes	0.72	0.47	-4.92*	-5.05**	-6.57**	-6.91**
Small school status (*reference group—no*)						
Yes	-1.45***	-1.39***	-0.51	-0.19	-0.65	-0.26
Percent economically disadvantaged (*reference group—low percent*)						
Medium		-0.22		-1.70		-0.98
High		-0.40		-2.34*		-1.85
Percent career and technical education (*reference group—low percent*)						
Medium		- -		-3.14**		0.31
High		- -		-3.10**		0.10
Percent special education (*reference group—low percent*)						
Medium		0.25		-0.90		0.47
High		0.26		-0.76		-1.38
Percent English language learner (*reference group—low percent*)						
Medium		-0.47		0.18		1.90*
High		-0.70		0.68		1.96
Percent gifted/talented (*reference group—low percent*)						
Medium		0.01		0.44		1.24*
High		0.28		-0.44		3.05***
Percent bilingual (*reference group—low percent*)						
Medium		0.09		-0.78		0.23
High		0.52		-0.65		0.48
Percent black (*reference group—low percent*)						
Medium		0.57		-2.07*		-0.94
High		-0.17		-4.12**		-2.22
Percent Hispanic (*reference group—low percent*)						
Medium		0.54		1.07		1.87*
High		0.81		0.22		0.68
Percent white (*reference group—low percent*)						
Medium		-0.42*		-0.82		-0.03
High		0.21		-1.65		1.04
Intercept	74.67***	74.32***	76.27***	83.17***	77.07***	74.01***

* p<0.05, **p<0.01, *** p<0.001
NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. See table in appendix for standard errors.
SOURCE: Houston Independent School District General Fund Budget Data, 1999–2000 through 2015–16

Appendix F: Supplemental analysis on sample size versus small school status

In Houston ISD, a school is designated a small school based on its enrollment size; therefore, models controlling for enrollment size and small school status were in part double-counting the important that the number of students in a school had in predicting the presence of personnel at a school. To provide additional insight into whether small school status mattered for the presence of personnel in a school, an additional analysis was done in which the sample was limited to a set of schools whose enrollment size was within a restricted range around the definition of "small school" (see Footnote 1 in main body of text for more detail on definition of small school in Houston ISD). Specifically, the sample of schools was limited to schools with enrollment sizes +/−100 of the small school threshold. For example, currently, the definition of a small school for middle schools is 750 students. In the restricted range analysis, for a middle school to be included in the analysis, the enrollment size of the middle school needed to range between 650 and 850 students (i.e., small school threshold +/- 100 students).

The logic behind the limited range analysis is that these schools are, generally speaking, more similar to each other in their appearance, structure, and functioning because they are all roughly the same size, than other schools that are either much larger or much smaller. To offer a more concrete example, a middle school that has 675 students is more similar to a middle school that has 825 students than either school is to a middle school serving 1,350 students.

With this restricted range sample in place, a regression analysis was run predicting the presence of certain personnel at a school and including in the model fiscal year, school level, and small school status. In other words, enrollment size was not controlled. In the context of these models with a restricted range of enrollment size, small school status was not a statistically significant predictor for the presence of any personnel.

In other words, small school status did not differentiate the presence of absence of personnel among schools whose enrollment size was immediately above or immediately below the cut-off for what it meant to be a small school.

Taking the results from these restricted-range analysis, along with the other models presented in this brief that show a consistent statistically significant associations between enrollment size and the outcomes and inconsistently significant associations between small school status and the outcomes, we conclude that enrollment size, as a continuum of sizes, is more important for understanding a school's budget and how a school is spending its budget than whether a school is above or below a certain threshold in size (i.e., the small school status).

See Table E-1 for results from regression models run with the sample filtered based on a restricted range of enrollment size.

Table F-1. Regression models predicting presence of assistant principal, counselor, librarian, or nurse at a school with restricted range of enrollment size +/-100 of the small school threshold, 2013–14 through 2015–16 school years

	Assistant principal		Counselor		Librarian		Nurse	
	Model 1 OR	Model 2 OR	Model 1 OR	Model 2 OR	Model 1 OR	Model 2 OR	Model 1 OR	Model 2 OR
Fiscal year	1.75***	1.88**	1.09	1.04	0.87	0.85	0.87	0.86
Grade levels served (*reference group—elementary*)								
Middle		22.27***		5.82*		1.17		3.41
High		3.31		- -		2.39		0.95
Small school status (*reference group—no*)								
Yes		0.69		0.70		0.63		0.55

* p<0.05, **p<0.01, *** p<0.001

NOTE: Analytic sample includes schools open as of the 2017–18 school year, classified as either an elementary, middle, or high school, whose general fund budget per student amount was less than or equal to $15,000 and greater than or equal to $2,000, and whose enrollment size was +/-100 of the threshold for small school status. Setting the restricted range of sample size compares schools immediately above and below the cut-off for small school, to detect if small school status significantly alters the likelihood of key personnel at a school. Models include adjustment to variance estimate due to nested nature of data. Data from human resource records from Houston ISD for the 2013–14, 2014–15, and 2015–16 school years. Coefficients are reported in odds ratios. A coefficient greater than 1 means something is more likely, and a coefficient less than 1 means something is less likely. Coefficients with standard errors more than 50 percent the size of the coefficient should be interpreted with extreme caution, as the relative size of the standard error suggests the estimate is unstable.

SOURCE: Houston Independent School District, Human Resource Data, 2013–14 through 2015–16

Mission

The Kinder Institute for Urban Research builds better cities and improves people's lives by bringing together data, research, engagement, and action.

RICE | KINDER
INSTITUTE FOR URBAN RESEARCH

6100 Main Street MS-208 • Houston, TX 77005 • Phone 713-348-4132 • Email kinder@rice.edu

22

Michele Moser
The George Washington University

Ross Rubenstein
Georgia State University

The Equality of Public School District Funding in the United States: A National Status Report

For over 30 years, the distribution of educational opportunities and the equality of education funding across communities has generated considerable interest among policy makers, the public, and the courts. This article takes advantage of national data sets to examine funding equality across school districts in 49 states for fiscal years 1992 and 1995. It presents rankings of each state's funding equality and explores factors that may be related to the level of equality within states and to changes across years.

The analyses suggest that, overall, within-state equality improved slightly between 1992 and 1995, although most states' relative rankings changed little during the period. States with fewer school districts relative to students tended to have a more equal distribution of education dollars than states with more districts. States with higher proportions of revenues provided by state governments generally showed a more equitable distribution of resources than states in which districts were more dependent on local revenues.

Public education is the largest area of state and local government spending in the United States, accounting for almost one-fifth of direct state and local government expenditures in 1996 (*Statistical Abstract of the United States* 1999, table 504). Given the enormous resources involved and—more importantly—the critical private and societal benefits that education produces, the distribution of educational opportunities across communities has generated considerable interest among policy makers, the public, and the courts. This article takes advantage of national data sets to examine the equality of education funding across school districts in 49 states for fiscal years 1992 and 1995.[1] It presents rankings of each state's funding equality and explores factors that may be related to the level of equality within states and to changes across years.

The focus of this article is the equality of revenues that are available to school districts within states, one of a number of broad goals of education financing systems. In recent years, policy initiatives and court cases in many states have focused on other goals, such as eliminating the relationship between local property wealth and education spending or achieving an adequate level of funding for all students. Still, ensuring equality of resources across school districts (often referred to as "horizontal equity") remains a fundamental benchmark in evaluating state education funding systems, and it continues to be an important concern of the public and the broad education community.

Comparing the national averages of a number of intrastate equity measures, our results show that the equality of the distribution of education revenues improved slightly between 1992 and 1995. Relative equity rankings for most states changed little between 1992 and 1995, however. Our analysis of univariate equity measures suggests that states with fewer school districts relative to students tended to have a more equal distribution of education dollars than did states with more districts, although states with a greater

Michele Moser** is an assistant professor of public administration at The George Washington University. Her teaching and research interests include budget theory and policy and state and local financial management, especially education finance.* ***Email: moser@gwu.edu.

Ross Rubenstein** is an assistant professor of public administration and urban studies in the Andrew Young School of Policy Studies and the College of Education at Georgia State University, where he teaches courses in economics of education, public budgeting, and nonprofit finance. His research focuses on education policy and finance.* ***Email: prcrhr@langate.gsu.edu.

number of districts had somewhat larger improvements across the two years. We also found a weak but significant relationship between intrastate equity and median revenues for education, with lower-revenue states tending to have a more equal distribution of resources. Finally, states with higher proportions of revenues provided by state governments generally showed a more equitable distribution of resources than did states that were more dependent on local revenues.

The Role of Equity in School Finance

Concerns over the equality of educational opportunity date back well over 40 years. In 1954, the U.S. Supreme Court's decision in *Brown v. Board of Education* (347 U.S. 483 [1954]) overturned the long-standing system of separate educational institutions for whites and African Americans, ruling that "separate but equal" schools are inherently unequal. The country's awakening to the perils of unequal access to employment and education helped bring about the enactment of three important pieces of federal legislation related to education: the Civil Rights Act of 1964, the Economic Opportunity Act of 1964, and the Elementary and Secondary Education Act of 1965. The latter act created new federal funding (Title 1) for "at-risk" pupils, while the Civil Rights and Economic Opportunity acts more broadly addressed poverty and discrimination in society. The Civil Rights Act, in particular, is important for proponents of educational equity because it required a study of the factors leading to unequal educational opportunity. A team of researchers led by James Coleman conducted the study, which produced a long line of quantitative research examining the factors, including dollars and the resources they buy, that might affect student achievement (see Coleman et al. 1966; Hanushek 1972, 1981, 1989; Murnane 1975; Hedges, Laine, and Greenwald 1994).

While the debate about whether (and how) money matters to educational achievement continues among researchers (Hanushek 1989; Hedges, Laine and Greenwald 1994), courts in virtually every state have addressed the constitutionality of funding disparities across districts within states. Beginning with California's 1971 *Serrano v. Priest* (5 Cal. 3d 584, 487 P.2d1241, 69 Cal. Rptr. 601 [1971]) case,[2] in which that state's highest court ruled that a child's education could not depend on the wealth of the child's parents or neighbors, state supreme courts in 19 states have invalidated state systems of funding public education (Minorini and Sugarman 1999). While the U.S. Supreme Court ruled five to four in *San Antonio School District v. Rodriguez* (411, U.S. 1 [1973]) that the Texas school-finance system did not violate the Fourteenth Amendment of the U.S. Constitution, plaintiffs continued to use the equal opportunity clauses in state constitutions, along with other education clauses that focus on efficiency and adequacy, to support their claims in state courts.[3]

School-finance equity has been a particularly intractable issue in many states because of the traditional reliance in the United States on a combination of state and local funding, with the relative share of total funding provided by each level of government varying considerably across states.[4] With the majority of local revenues raised through property taxes, vast differences in property wealth across localities typically result in large disparities in education spending. In many cases, these differences may be unrelated to any differences in local "taste" for education. Responsibility for equalizing these disparities has rested with state governments, which have developed a variety of intergovernmental grant schemes intended to promote equity in education spending (see Odden and Picus 1992 and Monk 1990, for an overview of common intergovernmental grants for education). State government defendants in school-finance suits often argue that spending differences are related to local taxing and spending decisions, or that these differences are irrelevant because there is no convincing evidence linking higher spending to improved student achievement. Courts have typically rejected these arguments, though, and have often ordered tight limits on spending differences across districts.[5] The Supreme Court's *Rodriguez* decision returned school-finance litigation to state courts, resulting in state-by-state analyses of equity and the constitutionality of state funding systems. Studies of more recent court cases and legislative initiatives in states such as Georgia, Kansas, and Michigan, suggest that slight improvements in funding equality have occurred in selected states (Rubenstein, Doering, and Gess 2000; Johnston and Duncombe 1998; Fisher 1996).

While these and numerous other studies have focused on funding changes and the distribution of resources in individual states, relatively little work has been done to examine equity from a national perspective and to compare within-state disparities across the country. There are several notable exceptions: Schwartz and Moskowitz (1988) and Wyckoff (1992), for instance, examine changes in intrastate equity in 1977–85 and 1980–87, respectively. Wyckoff found that equity gains were greatest in states with large increases in expenditures over the period. Similarly, Evans, Murray, and Schwab (1997) study the impact of judicial and legislative activity on within-state equity over a 20-year period and find that states where the funding system was found unconstitutional had larger increases in state spending and greater improvements in equity than did states with purely legislative efforts. Other recent work (Hertert, Busch, and Odden 1994; Parrish and Fowler 1995; General Accounting Office 1997; Parrish, Hikido, and Fowler 1998) using National Center for Education Statistics (NCES) data for 1992 indicates that, although state and federal revenues help to improve the equity of funding across districts, persistent inequalities remain; most often, these inequalities are related to differences in property wealth and income. Odden and Clune (1998) point out, however, that recent state court decisions have shifted the focus of litigation from the relationship between spending and property wealth to a more stringent emphasis on reducing per-pupil spending disparities.

The relative paucity of national research in this area is the result, in part, of a lack of readily available data on revenues and expenditures in each of the nation's almost 15,000 school districts. The NCES (part of the U.S. Department of Education), along with the Bureau of the Census, has been working to fill this void by collecting and releasing district-level financial data for the population of U.S. public school districts. The analyses presented here use NCES data for the 1991–92 and 1994–95 school years (the most recent years for which financial data for all districts were available) to examine the dispersion of state and local revenues for education within states. We also explore a number of factors within the control of state policy makers that may be related to the level of funding equality within states. In addition, we have indexed the dispersion statistics for each state relative to the national average to facilitate comparisons across states, and we have created a single composite measure to rank each state's relative equality for each year.[6] (Appendix A presents a more detailed description of the measures and methodology used in the analyses.) From these analyses, we draw conclusions about the status and trends for school-finance equity in the United States.

Equity Results and Trends

Equity is a relative rather than an absolute concept, and it can be defined and measured in a variety of ways. Berne and Stiefel (1984), in their groundbreaking work on school-finance equity, set out a three-part framework for defining equity: horizontal equity, vertical equity, and equal opportunity. In this study, we focus on the first of these concepts, horizontal equity. Defined as the equal treatment of equals, horizontal equity examines the dispersion of per-pupil resources across districts or schools. Greater equality of per-pupil funding indicates higher levels of horizontal equity.[7]

Comparing the national averages of the dispersion measures, the data indicate that funding equality improved slightly between 1992 and 1995 (see table 1). For the McLoone index, a higher value indicates a higher level of equity. For all other measures, lower values reflect a more equal distribution of resources. All measures show a slightly more equitable distribution of revenues in 1995. For example, the national average of the Gini coefficient fell from .093 to .085, and the federal range ratio fell from .684 to .620. While there are no generally accepted standards against which to judge these measures, Odden and Picus (1992) suggest benchmarks of .10 or lower for the coefficient of variation and the Gini coefficient, and .90 or higher for the McLoone index, as representing "acceptable" levels of horizontal equity. Nationally, the mean Gini coefficient and McLoone index achieved this benchmark in both years. However, the coefficient of variation, which improved slightly from .204 to .190 between the two years, did not achieve the benchmark. In fact, in 1992, only three states (Florida, Kentucky, and West Virginia) reached the benchmark for the coefficient of variation, while two states (Florida and West Virginia) achieved the benchmark in 1995.

Horizontal-Equity Index

The multitude of measures available to assess horizontal equity can be both a strength and weakness of the analysis. The measures allow researchers and policy makers to take a broad view of resource distribution and to avoid problems that may arise from reliance on a single, possibly misleading statistic. As the preceding discussions may demonstrate, however, the array of measures can also complicate the analysis, making the results difficult to summarize. The problem is exacerbated when numerous objects of analysis are used, such as multiple revenue or expenditure variables, or real and nominal data. To address this issue, we have created indexed values of the four dispersion measures (see appendix A for a description of each). Each measure for each state is set relative to the unweighted mean value for all states and multiplied by 100. A single summary statistic is calculated for each state by averaging the four indexes.[8] Thus, the national average (which is set to 100 by construction) becomes a benchmark of sorts, with each state compared to all others and to the nation. All indices are created so that higher values indicate a *less equal* distribution of resources. For example, in 1992, Florida had the lowest index and therefore the most equitable distribution, while Missouri had the highest index and least equitable distribution (see table 2). In 1995, West Virginia had the most equitable distribution and Alaska the least equitable.

The mean index facilitates comparisons of each state's equity relative to other states and over time. In 1992, 27 states were equal to or better than the national average, while 22 states were worse (see table 2). In 1995, 29 states were equal to or better than the national average, while 20 were worse. Only Rhode Island (ranked 16) and Illinois (46) had the same ranking in both years, but most state rankings changed little between the two years (Spearman rank correlation coefficient = .82). Clearly, each state faces

Table 1 Interdistrict Equity Measures: State and Local Revenues per Pupil, FY 1992 and FY 1995

State	1992 Federal range ratio	1992 Coefficient of variation	1992 Gini coefficient	1992 McLoone index	1995 Federal range ratio	1995 Coefficient of variation	1995 Gini coefficient	1995 McLoone index
Alabama	0.581	0.161	0.077	0.918	0.428	0.151	0.070	0.932
Alaska	0.795	0.274	0.128	0.938	1.191	0.625	0.154	0.993
Arizona	0.871	0.204	0.093	0.923	0.814	0.199	0.087	0.914
Arkansas	0.597	0.159	0.068	0.944	0.461	0.116	0.061	0.948
California	0.626	0.328	0.097	0.888	0.601	0.344	0.099	0.911
Colorado	0.396	0.185	0.073	0.921	0.595	0.168	0.083	0.927
Connecticut	0.717	0.182	0.086	0.916	0.631	0.175	0.086	0.921
Delaware	0.681	0.369	0.103	0.943	0.685	0.180	0.078	0.928
Florida	0.291	0.093	0.047	0.957	0.320	0.095	0.049	0.924
Georgia	0.636	0.157	0.082	0.901	0.606	0.137	0.071	0.927
Idaho	0.502	0.159	0.078	0.935	0.512	0.156	0.075	0.958
Illinois	1.318	0.317	0.143	0.893	1.095	0.272	0.126	0.851
Indiana	0.424	0.138	0.069	0.920	0.348	0.104	0.055	0.939
Iowa	0.456	0.140	0.065	0.949	0.295	0.106	0.049	0.949
Kansas	0.769	0.216	0.107	0.903	0.786	0.276	0.115	0.933
Kentucky	0.233	0.077	0.043	0.936	0.304	0.107	0.051	0.919
Louisiana	0.408	0.117	0.059	0.899	0.513	0.136	0.072	0.904
Maine	0.683	0.211	0.101	0.904	0.751	0.235	0.104	0.910
Maryland	0.503	0.133	0.074	0.921	0.598	0.137	0.073	0.923
Massachusetts	0.873	0.242	0.114	0.899	0.805	0.201	0.106	0.894
Michigan	0.894	0.201	0.105	0.905	0.623	0.158	0.082	0.918
Minnesota	0.426	0.156	0.074	0.921	0.417	0.211	0.073	0.936
Mississippi	0.423	0.131	0.072	0.923	0.406	0.110	0.062	0.926
Missouri	1.394	0.412	0.183	0.864	1.044	0.265	0.125	0.900
Montana	1.539	0.427	0.188	0.897	1.138	0.317	0.146	0.905
Nebraska	0.877	0.247	0.118	0.899	0.843	0.229	0.110	0.914
Nevada	0.634	0.217	0.080	0.936	0.274	0.171	0.039	0.971
New Hampshire	1.064	0.257	0.129	0.894	1.006	0.256	0.128	0.885
New Jersey	0.780	0.231	0.101	0.898	0.711	0.182	0.090	0.901
New Mexico	0.637	0.177	0.068	0.971	0.562	0.171	0.072	0.906
New York	0.942	0.262	0.135	0.817	0.806	0.231	0.120	0.831
North Carolina	0.446	0.121	0.065	0.935	0.430	0.107	0.058	0.929
North Dakota	1.040	0.269	0.129	0.867	0.921	0.250	0.124	0.865
Ohio	0.767	0.296	0.115	0.880	0.704	0.193	0.094	0.894
Oklahoma	0.691	0.194	0.087	0.926	0.461	0.150	0.064	0.951
Oregon	0.658	0.178	0.092	0.896	0.398	0.143	0.064	0.922
Pennsylvania	0.577	0.140	0.073	0.929	0.472	0.134	0.072	0.929
Rhode Island	0.500	0.133	0.069	0.915	0.543	0.124	0.064	0.945
South Carolina	0.458	0.111	0.060	0.945	0.440	0.120	0.063	0.942
South Dakota	0.853	0.249	0.120	0.881	0.757	0.213	0.097	0.869
Tennessee	0.699	0.178	0.095	0.863	0.369	0.116	0.061	0.913
Texas	0.613	0.196	0.081	0.926	0.652	0.392	0.102	0.914
Utah	0.358	0.174	0.072	0.956	0.388	0.156	0.068	0.894
Vermont	1.361	0.301	0.160	0.816	1.404	0.302	0.164	0.832
Virginia	0.710	0.182	0.099	0.894	0.562	0.150	0.082	0.900
Washington	0.412	0.150	0.064	0.927	0.369	0.139	0.060	0.934
West Virginia	0.263	0.097	0.048	0.951	0.309	0.090	0.046	0.944
Wisconsin	0.427	0.120	0.061	0.946	0.360	0.109	0.057	0.949
Wyoming	0.699	0.304	0.116	0.950	0.664	0.194	0.093	0.914
Mean	0.684	0.204	0.093	0.913	0.620	0.190	0.085	0.917

Source: Common Core Data, National Center for Education Statistics.

a unique set of political, legal, and economic circumstances that may affect changes (or lack of changes) in its relative equity over time. But the availability of national financial data allows analysts to view each state in a national context rather than in isolation.

Horizontal Equity by Number of Districts

One factor within the control of state and local policy makers is the number of school districts in a state. One might expect that as the number of districts increases—particularly if the average size of districts also declines—greater differences may arise across localities as people sort themselves among communities. These interdistrict differences are likely to affect districts' abilities to raise revenues for education, as some communities will have smaller tax bases or citizens who desire a lower level of education spending.[9] Conversely, fewer larger districts within a state may discourage sorting, resulting in fewer revenue disparities.

To examine whether horizontal equity is related to the number of school districts in a state, we divided the states into quartiles based on the number of school districts in each state per 10,000 students (table 2).[10] In both years, the state of Maryland had the fewest school districts per 10,000 students, while the state of Montana had the most. As expected, the results of the analyses suggest that states with fewer school districts (less than 1.87 per 10,000 students) tend have a more equitable distribution of education dollars than do states with more districts. In addi-

Table 2 Intrastate Equity Measures by Districts per 10,000 Students by Quartile, 1992 and 1995

	1992				1995		
State	Districts per 10,000 students	Mean index	Rank of mean index	State	Districts per 10,000 students	Mean index	Rank of mean index
1st Quartile				**1st Quartile**			
Maryland	0.31	77	17	Maryland	0.30	90	22
Florida	0.35	47	1	Florida	0.32	66	2
Nevada	0.80	90	23	Nevada	0.68	72	7
Louisiana	0.87	74	13	Louisiana	0.83	85	20
Utah	0.88	66	7	Utah	0.85	82	15
North Carolina	1.08	67	8	North Carolina	1.03	75	9
Virginia	1.31	106	30	Virginia	1.25	92	24
South Carolina	1.45	62	5	Georgia	1.42	90	21
Georgia	1.55	93	24	South Carolina	1.43	79	13
Tennessee	1.65	112	33	Tennessee	1.59	74	8
West Virginia	1.72	48	3	Alabama	1.75	84	19
Alabama	1.78	85	21	West Virginia	1.77	64	1
Delaware	1.86	114	36	Delaware	1.78	101	30
Quartile mean	1.20	80		Quartile mean	1.15	81	
2nd Quartile				**2nd Quartile**			
California	1.98	121	39	California	1.91	125	40
Rhode Island	2.62	77	16	Rhode Island	2.46	84	16
New York	2.63	155	45	New York	2.53	123	38
Kentucky	2.78	48	2	New Mexico	2.74	92	25
New Mexico	2.88	72	9	Colorado	2.75	97	28
Colorado	2.97	80	20	Kentucky	2.75	67	4
Mississippi	2.98	73	11	Texas	2.85	134	43
Pennsylvania	3.01	78	19	Pennsylvania	2.87	84	17
Texas	3.02	89	22	Arizona	2.88	111	34
Indiana	3.08	74	12	Mississippi	2.97	75	10
Arizona	3.25	104	28	Indiana	3.02	70	5
Washington	3.42	72	10	Washington	3.15	77	11
Quartile mean	2.89	87		Quartile mean	2.74	95	
3rd Quartile				**3rd Quartile**			
Ohio	3.43	130	42	Ohio	3.34	107	33
Michigan	3.45	113	34	Connecticut	3.39	100	29
Connecticut	3.56	96	26	Massachusetts	3.43	116	36
Massachusetts	3.97	121	38	Michigan	3.45	96	27
Alaska	4.38	115	37	Alaska	4.17	205	49
Wyoming	4.86	108	31	Idaho	4.62	90	23
Idaho	4.87	78	18	Minnesota	4.65	93	26
Oregon	4.93	100	27	Oregon	4.74	80	14
Illinois	4.97	156	46	Illinois	4.81	142	46
Minnesota	4.97	77	15	New Jersey	4.81	105	31
New Jersey	5.00	113	35	Wyoming	4.88	106	32
Wisconsin	5.24	62	4	Wisconsin	4.96	72	6
Quartile mean	4.47	106		Quartile mean	4.27	109	
4th Quartile				**4th Quartile**			
Missouri	6.41	190	49	Missouri	6.16	140	45
Kansas	6.96	111	32	Kansas	6.60	129	41
Arkansas	7.32	76	14	Arkansas	6.92	78	12
Iowa	7.88	66	6	Iowa	7.80	67	3
New Hampshire	9.17	136	43	New Hampshire	8.75	138	44
Oklahoma	9.35	94	25	Oklahoma	9.01	84	18
Maine	10.55	105	29	Maine	10.53	118	37
South Dakota	13.23	128	41	South Dakota	12.80	112	35
North Dakota	19.72	144	44	North Dakota	19.41	132	42
Nebraska	22.71	123	40	Nebraska	22.16	123	39
Vermont	25.19	183	47	Vermont	24.44	170	48
Montana	29.30	189	48	Montana	27.94	157	47
Quartile mean	13.98	129		Quartile mean	13.54	121	
Total mean	5.54	100		Total mean	5.34	100	

Note: Indices are constructed so that higher values indicate less equity.
Source: Common Core Data, National Center for Education Statistics.

tion, states with a higher number of districts made larger equity gains between 1992 and 1995 than states with fewer districts, though the states with more districts still tended to have greater disparities in both years. For example, the mean equity index for states with the largest number of districts (greater than 6.40 per 10,000 students) decreased from 129 in 1992 to 121 in 1995, while the measure increased slightly or remained unchanged for districts in the lower quartiles. There was also a reduction in the number of districts per 10,000 students for many states, which may be the result of targeted district consolidation. Two-tailed Pearson correlation results also show a strong relationship between the equity index and the number of districts in a state (Pearson correlation coefficient = .53).

Horizontal Equity by Median Revenues

Equality of resource distribution must be viewed in the context of other available information about each state's education system. Funding equality may not be desirable if it is achieved because all districts spend relatively little for education. To address this issue, we examined the equity index by quartile of median per-pupil revenue, adjusted for cost-of-education differences. In 1992, the national median of per-pupil state and local revenue was \$5,429; by 1995, it had increased to \$6,210.[11] In 1995, Mississippi had the lowest median revenue level of \$4,056 per pupil, while New Jersey had the highest at \$8,021. With some exceptions, such as Florida, southern states tended to have lower levels of per-pupil revenues, while northeastern states tended to have higher levels. No clear pattern emerges, though, in the relationship between median revenue levels and equity.

Horizontal Equity by State's Share of Revenue

A number of states have responded to equity concerns by increasing state revenues for education in combination with stable or decreasing local revenues (see Picus 1991 and Theobald and Hanna 1991 for examples from California and Washington state, respectively). A state government's ability to redistribute resources across districts seems to make this a reasonable approach. Therefore, it is important to examine whether, in practice, a higher state share of education funding is closely linked to greater equality.

Nationally, states' average contributions to public education remained relatively stable from 1992 to 1995 at approximately 47 percent. New Hampshire contributed the smallest percentage of revenues in both years, while New Mexico contributed the largest (see table 4). While the national average share of revenues remained stable, the data strongly suggest that as a state's share of revenues for education increases, horizontal equity improves. In 1995, the equity measures for the bottom quartile of state share (less than 40 percent state funding) showed considerably more inequality than those for the highest quartile (greater than 58 percent state funding), with an even larger spread between the lowest and third quartiles. The 1992 data show an even more dramatic difference between states at the lowest level of state assistance and those at the upper levels.

One example of how the relative share of state funding may affect horizontal equity is the state of Michigan, which has significantly altered its revenue sources for education since 1993. In 1992, the state contributed 26.6 percent of education revenues; by 1995, that share had increased dramatically to 67.3 percent. Michigan shifted from a

Table 3 Intrastate Equity Measures by Median Revenue per Pupil by Quartile, 1992 and 1995

1992 State	1992 Median revenue per pupil	1992 Mean index	1992 Rank of mean index	1995 State	1995 Median revenue per pupil	1995 Mean index	1995 Rank of mean index
1st Quartile				**1st Quartile**			
Mississippi	3,090	73	11	Mississippi	4,056	75	10
Utah	3,145	66	7	Utah	4,086	82	15
Nevada	3,480	90	23	California	4,214	125	40
Alabama	3,530	85	21	Idaho	4,245	90	23
Idaho	3,618	78	18	Tennessee	4,445	74	8
Tennessee	3,628	112	33	Alabama	4,540	84	19
Missouri	3,739	190	49	Arkansas	4,547	78	12
New Mexico	3,787	72	9	Arizona	4,558	111	34
Oklahoma	3,787	94	25	Louisiana	4,680	85	20
Arkansas	3,853	76	14	Oklahoma	4,719	84	18
California	3,877	121	39	New Mexico	4,740	92	25
Kentucky	4,186	48	2	Montana	4,893	157	47
South Dakota	4,250	128	41	Missouri	4,994	140	45
Quartile mean	3,690	95		Quartile mean	4,517	98	
Quartile 2*				**Quartile 2***			
South Carolina	4,328	62	5	Alaska	5,050	205	49
Arizona	4,331	104	28	North Dakota	5,152	132	42
Illinois	4,353	156	46	South Carolina	5,153	79	13
Louisiana	4,410	74	13	North Carolina	5,262	75	9
Virginia	4,450	106	30	Texas	5,269	134	43
Texas	4,475	89	22	Georgia	5,359	90	21
Georgia	4,492	93	24	Ohio	5,369	107	33
North Dakota	4,531	144	44	Nevada	5,371	72	7
Montana	4,558	189	48	South Dakota	5,410	112	35
North Carolina	4,672	67	8	Colorado	5,471	97	28
Ohio	4,716	130	42	New Hampshire	5,532	138	44
Massachusetts	4,881	121	38	Virginia	5,603	92	24
Quartile mean	4,517	111		Quartile mean	5,333	111	
Quartile 3*				**Quartile 3***			
Oregon	5,057	100	27	Kentucky	5,653	67	4
Colorado	5,061	80	20	Washington	5,656	77	11
West Virginia	5,094	48	3	Oregon	5,703	80	14
Washington	5,105	72	10	Illinois	5,777	142	46
Maine	5,137	105	29	Kansas	5,972	129	41
Michigan	5,178	113	34	Wyoming	6,119	106	32
New Hampshire	5,182	136	43	Maine	6,153	118	37
Kansas	5,223	111	32	Florida	6,173	66	2
Indiana	5,329	74	12	Rhode Island	6,176	84	16
Iowa	5,363	66	6	Massachusetts	6,202	116	36
Delaware	5,410	114	36	Iowa	6,223	67	3
Alaska	5,450	115	37	Nebraska	6,228	123	39
Quartile mean	5,216	95		Quartile mean	6,003	98	
Quartile 4				**Quartile 4**			
Rhode Island	5,481	77	16	West Virginia	6,294	64	1
Nebraska	5,504	123	40	Maryland	6,450	90	22
Florida	5,518	47	1	Minnesota	6,463	93	26
Wyoming	5,608	108	31	Michigan	6,496	96	27
Minnesota	5,684	77	15	Pennsylvania	6,565	84	17
Maryland	5,689	77	17	Delaware	6,660	101	30
Pennsylvania	5,965	78	19	Indiana	6,705	70	5
Wisconsin	5,983	62	4	Wisconsin	6,772	72	6
New York	6,809	155	45	Connecticut	7,332	100	29
Connecticut	6,838	96	26	New York	7,614	123	38
Vermont	7,427	183	47	Vermont	7,777	170	48
New Jersey	7,931	113	35	New Jersey	8,021	105	31
Quartile mean	6,203	100		Quartile mean	6,929	97	
Total mean	5,429*	100		Total mean	6,210*	100	

*Calculated as median revenue per pupil in the United States.

Note: Indices are constructed so that higher values indicate less equity.

Source: Common Core Data, National Center for Education Statistics.

Table 4 Intrastate Equity Measures by Percentage of State Share Funding by Quartile, 1992 and 1995

1992 State	Percent of state funding	Mean index	Rank of mean index	1995 State	Percent of state funding	Mean index	Rank of mean index
Quartile 1				**Quartile 1**			
New Hampshire	8.50	136	43	New Hampshire	7.30	138	44
Michigan	26.60	113	34	South Dakota	26.50	112	35
South Dakota	27.00	128	41	Illinois	28.00	142	46
Illinois	28.90	156	46	Vermont	29.80	170	48
Oregon	30.60	100	27	Nevada	30.10	72	7
Massachusetts	30.70	121	38	Virginia	31.80	92	24
Virginia	31.10	106	30	Nebraska	32.40	123	39
Vermont	31.60	183	47	Massachusetts	36.30	116	36
Nebraska	34.30	123	40	Maryland	37.00	90	22
Missouri	38.00	190	49	New Jersey	38.00	105	31
Maryland	38.20	77	17	Missouri	38.70	140	45
Rhode Island	38.50	77	16	Connecticut	39.50	100	29
Nevada	38.70	90	23	Ohio	40.00	107	33
Quartile mean	30.98	123		Quartile mean	31.95	116	
Quartile 2*				**Quartile 2***			
Wisconsin	39.40	62	4	Pennsylvania	40.10	84	17
New York	40.30	155	45	Texas	40.20	134	43
Connecticut	40.70	96	26	Rhode Island	40.50	84	16
Ohio	40.80	130	42	New York	40.70	123	38
Pennsylvania	41.40	78	19	Wisconsin	41.10	72	6
Montana	41.80	189	48	North Dakota	42.10	132	42
New Jersey	42.20	113	35	Colorado	42.90	97	28
Tennessee	42.20	112	33	Arizona	44.00	111	34
Arizona	42.40	104	28	Oregon	46.20	80	14
Kansas	42.40	111	32	South Carolina	46.30	79	13
Colorado	42.80	80	20	Tennessee	47.50	74	8
Texas	43.40	89	22	Iowa	47.90	67	3
North Dakota	44.80	144	44	Maine	47.90	118	37
Quartile mean	41.89	113		Quartile mean	43.65	97	
Quartile 3*				**Quartile 3***			
Iowa	47.30	66	6	Wyoming	48.00	106	32
Georgia	47.70	93	24	Florida	49.10	66	2
Florida	48.30	47	1	Montana	49.60	157	47
South Carolina	48.30	62	5	Georgia	50.70	90	21
Maine	49.80	105	29	Louisiana	52.10	85	20
Wyoming	50.00	108	31	Minnesota	52.40	93	26
Minnesota	51.60	77	15	Indiana	53.30	70	5
Indiana	52.80	74	12	California	54.20	125	40
Mississippi	53.50	73	11	Utah	54.30	82	15
Louisiana	54.80	74	13	Mississippi	56.40	75	10
Utah	57.20	66	7	Kansas	57.40	129	41
Quartile mean	51.03	77		Quartile mean	52.50	98	
Quartile 4				**Quartile 4**			
Alabama	58.80	85	21	Arkansas	58.20	78	12
Arkansas	59.90	76	14	Oklahoma	59.40	84	18
Idaho	61.80	78	18	Alabama	61.00	84	19
Oklahoma	62.20	94	25	Idaho	61.20	90	23
North Carolina	63.60	67	8	West Virginia	63.60	64	1
California	65.90	121	39	Delaware	64.30	101	30
Delaware	65.90	114	36	North Carolina	65.10	75	9
Kentucky	67.00	48	2	Kentucky	65.80	67	4
West Virginia	67.10	48	3	Michigan	67.30	96	27
Alaska	68.00	115	37	Alaska	67.60	205	49
Washington	71.70	72	10	Washington	68.70	77	11
New Mexico	73.80	72	9	New Mexico	74.40	92	25
Quartile mean	65.48	83		Quartile mean	64.72	93	
Total mean	46.82	100		Total mean	47.69	100	

*Number of states in quartiles differs due to rounding.

Note: Indices are constructed so that higher values indicate less equity.

Source: Common Core Data, National Center for Education Statistics.

funding system that relied heavily on property taxes to a more complex system of tax reform that includes a two-cent sales tax increase, a 50-cent-per-pack tax increase on cigarettes, a reduction in the state income tax rate, and a standard statewide property tax millage rate (Courant and Loeb 1997). Comparing the horizontal-equity measures for Michigan in 1992 and 1995, revenue distribution appears to be more equitable following this effort, which reduced reliance on local wealth and distributed state funding for education more evenly.

Kansas also has undergone a major restructuring of its school funding formula. In 1992, the legislature adopted a new financing structure that reduced reliance on local property taxes and imposed a strict relative-equity standard on school district spending to limit local taxing and spending decisions (Johnston and Duncombe 1998).[12] While the state's share of funding increased from 42 percent to 57 percent during this period, our results suggest that equity declined slightly between 1992 and 1995.

Multivariate Results

To further examine the relationship between factors within the control of state policy makers and the level of funding equality within states, we use weighted least squares regression analysis. Specifically, we regress the mean equity index on median revenue per pupil, districts per 10,000 students, and the state's share of education funding for 1992 and 1995, weighting by each state's student enrollment. The results presented in table 5 indicate that, in both years, a higher number of districts in a state is related to lower equality of funding across districts, while a higher proportion of funding from state sources is related to greater equality of funding. The level of median revenue for education is negatively related to the mean equity index in both years, though the results are statistically significant only in 1995. These results further support the conclusions suggested by the earlier tables: the number of school districts in a state and the share of revenues from state sources are related to the equality of education funding across districts.

Table 5 Regression Model of Horizontal Equity, 1992 and 1995

(Higher index values reflect lower equality across districts)

	Mean Equity Index	
	1992	**1995**
Constant	151.02	181.91
	(34.43)	(27.13)
Districts per 10,000 students	2.59*	1.86*
	(1.38)	(1.03)
Median revenues per pupil (thousands)	-3.57	-6.72**
	(4.59)	(3.25)
Percentage of state funding	-.86**	-1.00***
	(0.38)	(.309)
N	49	49
R-square	0.194	0.222

Standard error in parentheses.
***Significant at p<.01.
**Significant at p<.05.
*Significant at p<.10.
Regression weighted by state enrollment.

Conclusions

This article presents a longitudinal "status report" on intrastate school-finance equity in the United States. Using national data on school district revenues and on differences in the cost of education across localities, the study provides a method for combining numerous measures to more readily compare equity across states. Results of the analyses suggest the following:

- When comparing the national averages of the equity measures, overall intrastate funding equality improved slightly between 1992 and 1995.
- The relative rankings for most states changed little between 1992 and 1995.
- States with fewer school districts tended to have a more equal distribution of education dollars than states with more districts. States with a higher number of districts made larger equity gains than states with fewer districts, but the disparities still tended to be larger in states with more districts.
- States with higher proportions of revenues provided by state governments generally showed a more equal distribution of resources than states that were more dependent on local revenue sources.
- While these patterns suggest that increasing state responsibility for funding education or consolidating school districts might improve horizontal equity, they should not be taken as an easy prescription to remedy this systemic problem. As with most complex public policy issues, there are multiple causes of school-finance inequities, as well as institutional barriers to implementing reforms. However, the availability of national benchmarks can help policy makers to identify similar states with more equitable funding systems and to use them as models to develop reform alternatives for their own states. Additionally, case studies and analyses of individual states can help to determine the factors that may help such reforms to succeed or fail (see, for example, Johnston and Duncombe 1998; Odden, Busch, and Hertert 1996; Goertz 1992). In an area as complex and politically contentious as school-finance reform, data and analysis alone cannot resolve debates about the best way to provide equitable educational opportunities to all children. But the availability of national analyses and state-by-state information can provide an important resource as states move ahead on the path to reform.

Acknowledgments

Funding for this study was provided by the American Education Finance Association/National Center for Education Statistics New Scholars Grant. The views expressed in this article are those of the authors and do not reflect the views of the AEFA or NCES. The authors would also like to acknowledge the research assistance of Nicole Halterman-Mitchell and comments by Philip Joyce, Gregory Lewis, Kathryn Newcomer, and anonymous reviewers.

Notes

1. Hawaii has a single statewide school district, so there is no dispersion of funding across districts.
2. In this case, plaintiffs argued that property-wealth disparities across school districts created a "suspect class," thereby violating the state's equal protection clause by unfairly disadvantaging students in property-poor districts.
3. See Swanson and King (1998) for a thorough review of school-finance litigation.
4. In 1997, the state share of total K–12 education spending varied from 90 percent in Hawaii, which has no local school districts, to less than 10 percent in New Hampshire.
5. For example, in the *Serrano v. Priest* case, the superior court judge ordered California to reduce spending differences to less than $100 per pupil across districts, regardless of property wealth (Picus 1991).
6. Because differences in spending are likely to reflect, in part, differences in purchasing power across localities, we use a cost-of-education index created by Chambers (1998) to adjust the data. Chambers's Geographical Cost of Education Index estimates differences across school districts in the cost of purchasing the inputs—primarily teachers—used to provide educational services. See appendix A for more detail.
7. Because the study focuses on horizontal equity, we refer to both "equity" and "equality" in the text. No attempt is made to measure differences in funding related to student needs (such as learning and physical disabilities or limited proficiency in English) or to differences in wealth across districts. While it is essential to conduct analyses related to differential student needs and wealth, the courts and the public are often most concerned with the bottom-line issue of per-pupil spending differences across districts. See Parrish, Matsumoto, and Fowler (1995) and Parrish, Hikido, and Fowler (1998) for examples of equity analyses using pupil weights to account for student needs.
8. While the statistics for each state are weighted by the number of pupils in each district, the national average is constructed as the simple (unweighted) mean of each state's values (n=49). The mean index number is sensitive to the four index values it includes. For example, Texas's 1995 coefficient of variation was substantially above (worse than) the national average, while its other measures were at or close to the average. Excluding the coefficient of the variation from the mean-index calculation would considerably improve Texas's relative ranking.
9. As Oates (1972) notes, public goods will be provided by jurisdictions that cover the smallest geographic area over which benefits are distributed, so that efficiencies are maximized and the effects of taste differences are minimized.
10. We divide the number of districts by 10,000 students because larger states are likely to have more districts simply because they have more students.
11. While these data are adjusted for geographic cost differences, they are not adjusted for changes caused by inflation.
12. This plan created a local option budget that allows districts to exceed the state-imposed budget limit by up to 25 percent. Johnston and Duncombe (1998) find that horizontal equity improved after the funding changes, even after accounting for the inclusion of the local budget option.

References

Berne, Robert, and Leanna Stiefel. 1984. *The Measurement of Equity in School Finance*. Baltimore, MD: Johns Hopkins University Press.

Chambers, Jay G. 1998. *Geographic Variations in Public Schools' Costs*. U.S. Department of Education, Office of Educational Research and Improvement, Working Paper 98-04.

Coleman, James, et al. 1966. *Equality of Educational Opportunity*. Washington, DC: Government Printing Office.

Courant, Paul, and Susanna Loeb. 1997. Centralization of School Finance in Michigan. *Journal of Policy Analysis and Management* 16(4): 114–36.

Evans, William N., Sheila Murray, and Robert M. Schwab. 1997. Schoolhouses, Courthouses, and Statehouses after Serrano. *Journal of Policy Analysis and Management* 16(4): 10–31.

Goertz, Margaret E. 1992. School Finance Reform in New Jersey: The Saga Continues. *Journal of Education Finance* 18(4): 346–65.

Government Accounting Office (GAO). 1997. *State Efforts to Reduce Funding Gaps Between Poor and Wealthy Districts*. Washington, DC: Government Printing Office.

Hanushek, Eric A. 1972. *Education and Race: An Analysis of the Educational Production Process*. Cambridge, MA: Heath-Lexington.

———. 1981. Throwing Money at Schools. *Journal of Policy Analysis and Management* 1(1): 19–41.

———. 1989. The Impact of Differential Expenditures on School Performance. *Educational Researcher* 18(4): 45–51.

Hedges, Larry, Richard D. Laine, and Rob Greenwald. 1994. Does Money Matter? A Meta-analysis of Studies of the Effects of Differential School Inputs on Student Outcomes. *Educational Researcher* 23(3): 5–14.

Hertert, Linda, Carolyn Busch, and Allan R. Odden. 1994. School Financing Inequities among the States: The Problem for a National Perspective. *Journal of Education Finance* 19(3): 231–55.

Johnston, Jocelyn M., and William Duncombe. 1998. Balancing Conflicting Policy Objectives: The Case of School Finance Reform. *Public Administration Review* 58(2): 145–58.

Minorini, Paul A., and Stephen D. Sugarman. 1999. School Finance Litigation in the Name of Educational Equity: Its Evolution, Impact, and Future. In *Equity and Adequacy in Education Finance: Issues and Perspectives*, edited by Helen F. Ladd, Rosemary Chalk, and Janet S. Hansen, 34–71. Washington, DC: National Academy Press.

Monk, David. 1990. *Education Finance: An Economic Approach.* New York: McGraw-Hill.

Murnane, Richard J. 1975. *The Impact of School Resources on the Learning of Inner City Children.* Cambridge, MA: Ballinger.

Oates, Wallace. 1972. *Fiscal Federalism.* New York: Harcourt Brace Jovanovich.

Odden, Allan R., and William H. Clune. 1998. School Finance Systems: Aging Structures in Need of Renovation. *Educational Evaluation and Policy Analysis* 20(3): 157–77.

Odden, Allan R., and Lawrence O. Picus. 1992. *School Finance: A Policy Perspective.* New York: McGraw Hill.

Odden, Allan R., Carolyn Busch, and Linda Hertert. 1996. The Intricacies of Reforming School Finance and Providing Property Tax Relief in Wisconsin. *Journal of Education Finance* 21(3): 321–42.

Parrish, Thomas B., Christine S. Hikido, and William J. Fowler. 1998. *Inequalities in Public School District Revenues.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Parrish, Thomas B., Christine S. Matsumoto, and William J. Fowler, Jr. 1995. *Disparities in Public School District Spending 1989–90, A Multivariate, Student-Weighted Analysis, Adjusted for Differences in Geographic Cost of Lining and Student Need.* Washington, DC: U.S. Department of Education.

Picus, Lawrence O. 1991. Cadillacs or Chevrolets? The Evolution of State Control over School Finance in California. *Journal of Education Finance* 17(1): 33–59.

Rubenstein, Ross, Dwight R. Doering, and Larry R. Gess. 2000. The Equity of Public Education Funding in Georgia, 1988–1996. *Journal of Education Finance* 26(2): 187–208.

Schwartz, M., and J. Moskowitz. 1988. *Fiscal Equity in the United States, 1984–88.* Washington, DC: Decision Resources Corp.

Swanson, Austin D., and Richard King. 1997. *School Finance: Its Economics and Politics.* 2nd ed. New York: Longman Publishers.

Theobald, Neil D., and Faith Hanna. 1991. Ample Provision for Whom? The Evolution of State Control over Finance in Washington. *Journal of Education Finance* 17(1): 7–32.

Wassmer, Robert W., and Ronald C. Fisher. 1996. An Evaluation of the Recent Move to Centralize the Finance of Public Schools in Michigan. *Public Budgeting and Finance* 16(3): 90–112.

Wyckoff, James H. 1992. The Intrastate Equality of Public Primary and Secondary Education Resources in the U.S., 1980–1987. *Economics of Education Review* 11(1): 19–30.

Appendix Methodology and Equity Measures

All revenue and enrollment data come from the Common Core of Data, produced by the National Center for Education Statistics, for the 1991–92 and 1994–95 school years. The analyses measure the dispersion of combined state and local revenues by district for all states, with the exception of Hawaii. Federal revenues, because they are outside the control of state and local policy makers, are excluded from the analyses. Districts with fewer than five students and those with over 50 percent of students in special education were removed from the data set.

To account for differences in exogenous costs facing each district, the data were adjusted using the cost-of-education index created by Chambers (1998). Chambers's Geographical Cost of Education Index uses a hedonic wage model to control for factors outside local districts' control that affect their costs, including amenities that make teaching and other staff positions relatively more or less attractive.

A data set was constructed for each state consisting of pupil enrollments and per-pupil revenues from state and local sources. Using the cost-adjusted revenue data, we calculated univariate dispersion measures for each state. The measures use a pupil unit of analysis; that is, all calculations were weighted by the number of pupils in each district. Thus, very small districts (which often have higher per-pupil costs due to diseconomies of scale, remote locations, or other factors) had less influence on the results than did large districts. The unit of analysis is especially important in states with a single district much larger than any other (for example, New York or Nevada). Average per-pupil revenues in such districts will have a strong influence on the measures for those states.

These analyses use four univariate dispersion measures to quantify differences in per-pupil revenues across districts (see Berne and Stiefel 1984, for a comprehensive list of equity measures). Each measure focuses on different parts of the distribution. The measures used in this analysis are:

- **Federal range ratio**—the difference between per-pupil revenues at the ninety-fifth and fifth percentiles, divided by the per-pupil revenues at the fifth percentile.
- **Coefficient of variation**—the standard deviation divided by the mean. A value of 0 represents perfect equity.
- **McLoone index**—the sum of per-pupil revenues for students at or below the median, divided by the sum of per-pupil revenues if all students below the median received the median amount. A value of 1 indicates perfect equity.
- **Gini coefficient**—calculated as the area between a Lorenz curve and a 45-degree line (representing prefect equality), divided by the area under the 45-degree line. The Gini coefficient measures the difference between the actual distribution of revenue and the distribution if all students received equal amounts of revenue, with a value of 0 representing perfect equity.

23

INVESTING SO SCHOOLS WORK:
THE EVIDENCE-BASED CALCULATION TOOL IN THREE PENNSYLVANIA SCHOOL DISTRICTS

Prepared for
Research for Action
Philadelphia, Pennsylvania

Allan Odden
Lawrence O. Picus

PICUS ODDEN & ASSOCIATES

April 2019

Table of Contents

Chapter 1

Introduction and Overview

For the past eighteen years, Picus Odden & Associates (known as Lawrence O. Picus and Associates prior to 2013) have worked across the country helping state legislatures and other state agencies estimate the level of funds needed for all students to allow them to "work," i.e., produce high levels of performance on state standards. The goal of this work has been to identify a level of resources that would enable all districts and each school within those districts to provide every student, regardless of individual characteristics or circumstances, with an equal opportunity to learn to high performance standards. Over time, as both curriculum and performance standards have been increased and as states have adopted college and career ready standards for reading/language arts, mathematics, and science, the Evidence Based (EB) model developed by Odden and Picus has evolved to meet the changing and more rigorous expectations of K-12 schools, as well as the changing health, psychological, mental health and behavioral conditions of the country's school children.

For this project, the ratios, formulas and per pupil dollar figures in the Evidence-Based (EB) Model were incorporated into an EXCEL-based Schools That Work Calculation Tool. Three Pennsylvania school districts populated the tool with their current student, staffing, and budget data. The Tool then calculated the resources needed for all schools in each district to become "schools that work." In other words, schools with the resources necessary to offer every student – including students in poverty, ELL students, and students with mild and moderate disabilities – an opportunity to achieve to the state's college and career ready standards. This report explains the methodology and presents the results for the three Pennsylvania school districts who participated in the study.

ORGANIZATION OF THE REPORT

Three chapters follow this introductory chapter. Chapter 2 describes the school improvement approach that is the foundation of the EB funding model. Chapter 2 draws from research we and others have conducted on schools that have dramatically moved the student achievement needle, i.e., schools that work. Such schools exist across the country and vary by location – urban, suburban and rural – and by school size – large, medium, and small – and with high, medium and low percentages of low income and ELL students.

Chapter 3 then "unpacks" the elements of these "schools that work" and includes specific recommendations for every element of the model. Chapter 3 describes in brief all the elements of the EB model that were used in this project, organized into five categories: Tier 1 or core instruction, extra resources for students struggling to meet standards, school administration, non-academic pupil supports, and other operational school elements. Appendix A provides more detail on all elements of the EB model, including those that were not addressed in this project.

Chapter 4 discusses the gap between EB costs and the actual resources in the three districts that were part of the study, drawing from the EXCEL-based computer simulation we have developed, called the Schools That Work Calculation Tool. This tool allows districts to compare their current, school-base curriculum and instructional resources to those that would be provided by the EB model.

Please note that none of the figures in this analysis include resources for preschool, the central office, student activities, transportation, food services, costs of students with severe and profound disabilities, or capital construction costs. The EB model mainly addresses the curriculum and instructional resources at the school level, and thus the Calculation Tool excludes all central office functions. The project also focused on kindergarten through grade 12, and thus preschool was excluded.

A Metaphor for Understanding the Evidence-Based Funding Model. The EB approach to school finance provides a set of resource and program recommendations that we call the "Education Hybrid Car." The typical hybrid car costs about the what the average car costs in America (about $30,000) but gets double the miles per gallon (50 v. 25 miles per gallon). One can easily spend more on a car than the cost of a basic hybrid but not get the high mileage; for example, one could buy a speedy V-8 engine-powered car, with moon roof and leather. Such a car may provide better "performance" by some measures, but also compromises efficiency in other areas, such as gas mileage.

The EB Model, similar to a hybrid car, is designed for high performance with the most efficiency. The school cases that we have studied, and which deploy strategies that are funded by the EB model (e.g., Odden, 2009, 2012), generally produce dramatic improvement in student achievement. Further, many of these schools enroll large percentages of ELL and poverty students so the combined strategies are effective for these students as well. Moreover, it is our professional position that if Pennsylvania provided school funding at the level of the EB model, including the extra resources triggered by the ELL and poverty students, and if schools used the resources in the model as indicated in Chapter 2, then student achievement in the state would dramatically rise, including achievement of ELL and poverty students. The following chapters describe the high performance EB school funding model, and a funding model that if implemented would allow all schools in Pennsylvania to "work," i.e., produce much higher levels of student achievement and reduce current demographic-related achievement gaps.

Chapter 2

The Evidence Based School Improvement Model as an Approach to Schools That Work

Although the intent of this report is to identify the gap between current school resources and the array of educational goods that would allow Pennsylvania schools to "work," i.e., provide each student, including ELL and poverty students, an equal opportunity to meet the state's student performance standards, the purpose of this chapter is to describe the elements of the school improvement strategy that are embedded within the EB funding model. While the linkage between school funding and student performance is complex, the Evidence-Based (EB) model is designed to identify a level of resources that would enable all schools to provide every student with robust opportunities to meet college and career ready standards, and dramatically move the student achievement needle.

No matter what course of studies a high school student completes – college prep or career tech – all of Pennsylvania's students are expected to achieve to college and career-ready standards in order to be competitive after high school or college in today's global, knowledge-based economy. This includes children from low-income homes, students of color, English language learners (ELL) and students with mild and moderate disabilities. The basket of educational goods and services and a cost-based funding model to support that basket must be sufficiently robust to allow students in all school districts in the state to have sufficient opportunities to attain these rigorous standards.

Before presenting an overview of each component of the Evidence-Based approach to school finance adequacy in Chapter 3, this chapter provides a more general description of the school improvement strategies that form the foundation of the EB Model and describe how the key resource elements are used to increase student performance.

THE HIGH-PERFORMANCE SCHOOL STRATEGY EMBEDDED IN THE EVIDENCE-BASED MODEL

The EB Model is unique in that it is derived from research and best practices that identify programs and strategies that boost student learning, including learning for ELL and poverty students. Further, the formulas and ratios for school resources developed from that research have been reviewed by dozens of educator panels in multiple states over the past decade. The EB Model relies on two major types of research:

1. Reviews of research on the student achievement effects of each of the EB Model's individual major elements, with a focus on randomized controlled trials, the "gold standard" of evidence on "what works." Analyses of this research can be found in the fifth edition of our school finance text (Odden & Picus, 2014, Chapter 4) and in our most recent adequacy studies conducted for Michigan (Odden & Picus, 2018).
2. Studies of schools and districts that have dramatically improved student performance over a 4-6-year period – what is sometimes labeled "a doubling of student performance" on state assessments.

As a result of our research and work in other states, the EB approach today is more explicit in identifying the components of the school improvement strategies that deploy the resources in the funding model, and it articulates how all the elements of the EB Model are linked at the school level to strategies that, when fully implemented, produce notable improvements in student achievement.

High performing "schools that work"[1] have clear and specific, as well as ambitious and rigorous, student achievement goals, including goals to reduce achievement gaps linked to poverty and minority and English proficiency status. The goals are most often specified in terms of performance on state assessments.

Compared to schools where teachers work in isolated classrooms, high performing schools organize instruction differently. Regardless of the context – urban, suburban, or rural, rich or poor, large or small – high performing schools organize teachers into collaborative teams: grade level teams in elementary schools and subject or course teams in secondary schools. With the guidance and support of instructional coaches, the teacher teams work with student data – usually short-cycle or formative assessment data – to:

- Plan standards-based curriculum units,
- Teach those units simultaneously,
- Debrief on how successful the units were, and
- Make changes when student performance does not meet expectations.

This collaborative teamwork makes instruction "public" over time by identifying a set of instructional strategies that work in the teachers' school. Over time all teachers in these schools are expected to use the instructional strategies that have been demonstrated to improve student learning and achievement.

High performing schools that work also provide an array of "extra help" programs for students struggling to achieve to standards. This is critical because the number of struggling students is likely to increase as more rigorous programs are implemented and the goal is to prepare all students for college and careers. Individual tutoring, small group tutoring, after-school academic help and summer school focused on reading and mathematics for younger students, and courses needed for high school graduation for older students, represent the array of "extra help" strategies these improving schools deploy. These strategies are particularly key for students from poverty and ELL backgrounds. The school approach is to "hold standards" constant for all students and vary instructional time as needed.

These schools exhibit multiple forms of leadership. Teachers lead by coordinating collaborative teams and through instructional coaching. Principals lead by structuring the school to foster instructional improvement. The district leads by ensuring that schools have the resources to deploy the strategies outlined above with a focus on attaining aggressive student performance goals, improving instructional practice and taking responsibility for student achievement results.

[1] The report uses the phrases high performing schools, successful schools and schools that work interchangeably, referring to schools that adhere to a set of practices that research and case studies show improve student performance and reduce achievement gaps.

High performing schools seek out top talent. They know that the challenge to prepare students for the competitive and knowledge-based global economy is difficult – and even more challenging for students from poverty and ELL backgrounds – and requires smart and capable teachers and administrators to effectively get the educational job done.

Our firm continuously enhances the details of the strategy of school improvement embedded in the EB Model. The most recent summary of the research undergirding the EB funding model can be found in the Odden and Picus (2014) school finance textbook, and in several books that profile schools and districts that have moved the student achievement needle (Odden & Archibald, 2009; Odden, 2009; Odden, 2012). We recently studied dramatically improving schools in Maryland, Vermont, and Maine as part of school finance studies we completed in those states. We found the theory of improvement embodied in the EB Model reflected in nearly all the successful schools we studied (Picus, Odden, et al., 2012; Odden & Picus, 2015a; Odden & Picus, 2015b). In addition, other researchers and analysts have found similar features of schools that significantly improve student performance and reduce achievement gaps (e.g., Blankstein, 2010, 2011; Chenoweth, 2007, 2009, 2017). We have updated our research in the forthcoming sixth edition of our textbook, *School Finance: A Policy Perspective*.

After a comprehensive set of studies and analyses, Greg Duncan and Richard Murnane (2014) reached conclusions similar to those embedded in the EB Model. They note that if all students in a school are to have a chance at success in the emerging global economy, they will need high-quality preschool programs, followed by effective elementary and secondary schools. The key features needed in each school include: 1) leadership focused on improving instructional practice, 2) within-school organization of teachers into teams that over time create a set of effective instructional practices and then deploy them systematically in all classrooms, 3) a culture of assistance (e.g., instructional coaches and ongoing professional development) and accountability (e.g., adults taking responsibility for the impact of their school actions on student performance), and 4) an array of extra help strategies to extend learning time for any student who needs more time to achieve to standards.

Although the details of studies of improving and high performing schools vary, and different authors highlight somewhat different elements of the process, the overall findings are more similar than different. This suggests all schools can improve the performance of all students if they have adequate resources *and* deploy those adequate resources in the most effective ways.

The EB Model offers a framework for the use of resources by districts and schools to help them focus those resources on programs and strategies that would allow them to produce substantial gains in student academic performance. In addition to the above more global description of the EB effective schools, we have organized the key elements of the school improvement model embedded in the EB Model into ten areas. In general, we find schools and districts that produce large gains in student performance adhere to the following ten similar strategies (see Chapter 4 and 5 of Odden & Picus, 2014; Odden, 2009), resources for each of which are included in the EB Funding Model:

1. **Analyze student data** to gain knowledge about performance issues and to understand the nature of any achievement gaps. The test score analysis usually first includes review of state test results and then, over time, analysis of formative/short cycle (e.g., Renaissance Learning Star Enterprise) as well as benchmark assessments (e.g., NWEA MAP) to help tailor instruction to precise student needs, to progress monitor students with an Individual Education Plan to determine whether interventions are working, and to follow the performance of students, classroom, and the school over the course of the academic year. Improving schools are "performance data hungry."

2. **Set high goals** such as aiming to educate at least 95% of all students in the school to proficiency or higher on state reading, math and science tests; seeing that a significant portion of the school's students reach advanced achievement levels; having more high school students take and pass AP classes; and making significant progress in closing the achievement gap between the average student and students from poverty and ELL backgrounds. The goals tend to be explicit and far beyond just producing "improvement" or "making AYP." Further, because the goals are ambitious, even when not fully attained they help the school produce large gains in student performance and represent a school that works.

3. **Review evidence on good instruction and effective curriculum.** Successful schools throw out the old curriculum, replace it with a different and more rigorous curriculum, and over time create their specific view of what good instructional practice is to deliver that curriculum. Changing curriculum is a must for schools implementing more rigorous college and career ready standards. And such new curriculum requires changes in instructional practice. Successful schools also want *all* teachers to learn and deploy new content-based, instructional strategies in their classrooms and seek to make good instructional practice systemic to the school and not idiosyncratic to teachers' individual classrooms.

4. **Invest heavily in teacher training** that includes intensive summer institutes and longer teacher work years, provide resources for trainers, and, most importantly, fund instructional coaches in all schools. Time is provided during the regular school day for teacher collaboration focused on improving instruction. Nearly all improving schools have found resources to provide instructional coaches to work with school-based teacher data teams, to model effective instructional practices, to observe teachers and to give helpful but direct feedback. This focus has intensified now that schools are delivering a more rigorous curriculum focused on educating all students to college and career proficiency levels. Further, professional development is viewed as an ongoing and not a "once and done activity."

5. **Provide extra help for struggling students** and, with a combination of state funds and federal Title 1 funds, provide some combination of tutoring in a 1:1, 1:3, or 1:5 teacher to student format. In some cases, this also includes extended days, summer school, and in addition English language development for all ELL students. These Tier 2 interventions in the Response to Intervention (RTI) approach to helping struggling students achieve to standards are absolutely critical. For many students, one dose of even high-quality

instruction is not enough; many students need multiple extra help services to achieve to their potential. No school producing large gains in student learning has ignored extra help strategies altogether or argued that small classes or preschool were sufficient on their own.

6. **Restructure the school day to provide more effective ways to deliver instruction.** This can include multi-age classrooms in elementary schools, block schedules and double periods of mathematics and reading in secondary schools, and "intervention" periods at all school levels. Schools also "protect" instructional time for core subjects, especially reading and mathematics. Further, most improving schools today organize teachers into collaborative teams – grade level teams in elementary schools and subject/course teams in secondary schools. These teams meet during the regular school day, often daily, and collaboratively develop curriculum units, lesson plans to teach them, and common assessments to measure student learning that results from them. Further, teams debrief on the impact of each curriculum unit, reviewing student learning overall and across individual classrooms.

7. **Provide strong leadership** and support for data-based decision making and improving the instructional program, usually through the superintendent, the principal and teacher leaders. Instructional leadership is "dense" and "distributed" in successful schools; leadership derives from the teachers coordinating collaborative teacher teams, from instructional coaches, the principal and even district leaders. Both teachers and administrators provided an array of complementary instructional leadership.

8. **Create professional school cultures** characterized by ongoing discussion of high quality instruction, with teachers and administrators taking responsibility for the student performance results of their actions. Over time, the collaborative teams that deliver instruction produce a school culture characterized by: 1) high expectations of performance on the part of both students and teachers, 2) a systemic and school-wide approach to effective instructional practice, 3) a belief that instruction is public and that good instructional practices are expected to be deployed by every individual teacher, and 4) an expectation that the adults in the school are responsible for the achievement gains made or not made by students. Professionals in these schools accept responsibility for student achievement results.

9. **Bring external professional knowledge into the school,** e.g., hire experts to provide training, adopt new research-based curricula, discuss research on good instruction, and work with regional education service agencies as well as the state department of education. Schools that work do not attain their goals by "pulling themselves up by their own boot straps." Faculty in successful schools that work aggressively seek outside knowledge, find similar schools that produce results and benchmark their practices to them, and operate in ways that typify professionals.

10. **Finally, talent matters.** Many improving schools consciously seek to recruit and retain the best talent, from effective principal leaders to knowledgeable, committed, and effective teachers. They seek individuals who are mission-driven to boost student

learning particularly students from poverty and ELL backgrounds, willing to work in a collaborative environment where all teachers are expected to acquire and deliver the school's view of effective instructional practice, and who are accountability focused.

Such successful schools also create a learning atmosphere inside the schools, have a schoolwide approach to discipline and classroom management, and require that every student be accountable to any adult for his/her behavior and that all adults take interest in all students and hold them accountable for the behavioral practices in the school. In addition, schools that work reach out to parents, insure that parents know the expectations of the school and help their children with homework, and welcome all parents into the school.

In sum, the schools that have boosted student performance that we and others have studied deployed strategies strongly aligned with those embedded in the EB Model. These practices bolster our claim that if such funds are provided *and* used to implement these effective and research-based strategies, then significant student performance gains should follow.

Three Tier Approach

It should be clear that the design of the EB Model reflects the Response to Intervention (RTI) model. RTI is a three-tier approach to meeting student needs. Tier 1 refers to core instruction for all students. The EB Model seeks to make core instruction as effective as possible with its modest class sizes, provisions for collaborative time including duty/supervisory aides to relieve teachers from non-teaching duties (bus, hall, recess and lunch coverage), and robust professional development resources including school-based instructional coaches. Effective core instruction is the foundation on which all other educational strategies depend. Tier 2 services are provided to students struggling to achieve to standards before being given an individualized education program (IEP) and labeled as a student with a disability. The EB Model's current Tier 2 resources, which are provided to every ELL and poverty student, include one core tutor for every prototypical school and then additional resources, triggered by poverty and ELL student counts, for tutoring, extended day, summer school, and additional pupil support. To that is added even more language resources for ELL students. We argue also that the robust levels of Tier 2 resources allow schools to provide a range of extra help services that get many modestly struggling students back "on track," and thus reduce the levels of special education students. Tier 3 includes all special education services.

In addition, the EB model provides substantial non-academic pupil support including guidance counselors, nurses, social workers, etc. recognizing the increased health, behavioral, psychological and other needs of today's school children.

Chapter 3

The Elements in the EB Model

INTRODUCTION

This chapter provides an overview of elements in the EB Funding Model that were part of this project's analyses. Detail on the research behind and rationale for each element, as well as EB elements not included in this project, can be found in Odden and Picus (2014; a sixth edition of this text will be available in 2019) and our most recent state adequacy study (Odden & Picus, 2018[2]). The elements of the EB Funding Model are presented in five categories:

1. Elements that constitute Tier 1, core instruction
2. Elements that include extra resources for students struggling to achieve to academic standards – Tier 2 and Tier 3
3. Resources for non-academic pupil support
4. School administration
5. Other operational elements.

Tier One: Core Instruction

Tier one instruction includes core and elective teachers, pupil free time provided by supervisory aides to relieve teachers from duty periods so they can work in collaborative groups, ongoing professional development with instructional coaches, funds for curriculum and instructional materials so all texts are up-to-date, and school-based instructional technologies. The specifics are:

- For core teachers, the model is based on class sizes of 15 for grades K-3 and of 25 for grades 4-12. The model includes full day kindergarten. For a K-5 elementary school, these class size figures produce an average class size of 17. In addition to using these class sizes for determining *core teachers*, the model provides an additional 20% of teachers to provide elective classes (art, music, physical education, career technical education, etc.) in elementary and middle schools, and an additional 33% in high schools.
- Supervisory aides (for bus, lunch, hall and recess duties) are provided at the rate of 1 for every 225 elementary and middle school students and every 200 high school students.
- Professional development: 1 instructional coach for every 200 students and $125 per pupil for the training portion of professional development.
- $215 per pupil for curriculum materials, library books and short-cycle assessments.
- $250 per pupil for school-based technology: computers, printers, servers, software, etc.

[2] See: http://picusodden.com/wp-content/uploads/2018/06/Michigan-2018-Adequacy-Study.pdf

Tier 2: Extra Help for Students Struggling to Meet Rigorous Academic Standards and Tier 3, Special Education Services

The model provides the following staff to provide *extra instructional support for students* needing more help to learn to standards:

- Tutors, or Tier 2 Intervention staff, at the rate of 1 for every 450 elementary and middle school students and 1 for every 600 high school students, as well as one for every 100 ELL students and every 100 non-ELL students in poverty
- Extended day staff at the rate of 1 for every 120 ELL students and 120 non-ELL students in poverty
- Summer school staff at the rate of 1 for every 120 ELL students and 120 non-ELL students in poverty, and
- Staff for ESL instruction at the rate of 1 for every 100 ELL students.
- Special education staff, Tier 3: 1 special education teacher for every 141 students (all students not just students with a disability) and 1 school psychologist for every 1000 students (for developing IEPs)

It is important to note that ELL students trigger tutors, extended day and summer school staff, as well as ESL staff, and as noted next, additional pupil support staff. We note this fact because, when assessing just the ESL staff, the model has been inaccurately criticized for providing too few additional resources for ELL students. (Jimenez-Castellanos &Topper, 2012).

Resources for Non-Academic Pupil Support

In addition, the model provides the following *staff for non-academic services*:

- 1 guidance counselor for every 450 elementary students and for every 250 middle and high school students
- 1 nurse position for every 750 students
- 1 additional pupil support position for every 125 ELL students and 125 non-ELL students in poverty.

School Administration

- 1 principal for every elementary, middle and high school, and assistant principals at the rate of 1 for every 450 elementary and middle school students above the first 450, and one for every 600 high school students
- 1 school secretary for every 225 elementary and middle school students and for every 200 high school students.
- 1 school computer technician for every 600 students.
- 1 librarian for every school, and library paraprofessionals for larger schools.

Other School Elements

- $40 per student for students in gifted and talented programs

- $300 per student for student activities including sports programs, except for transportation (though this element was not included in this project)

As explained above, this project did not address preschool, operations and maintenance, the central office, transportation, food services, high cost special education, debt service or capital construction.

Chapter 4

Pennsylvania Study Districts

The project involved three school districts across Pennsylvania: one in southeast Pennsylvania, one in south-central Pennsylvania (about 30 miles north of Gettysburg) and one in a northwestern suburb of Pittsburgh. In the summer and fall of 2018, each district entered the necessary student, staff and expenditure data into the Schools That Work Calculation Tool. The results below summarize the key findings in comparing the *current* staff and spending for each district to the staff and spending *needed* under the Evidence-Based Model, as estimated by the Calculation Tool.[3]

The main district-level findings from the Schools That Work Calculation tool were summarized for each district in a four-page document. Toward the end of October, late afternoon or evening community meetings were organized in each of the participating districts. Parents, community and school board members, teachers and administrators were invited to participate in these community meetings. Following a short overview of the EB model, those in attendance were provided the four-page district findings and, for each of the main findings, asked to "vote" via text messaging on whether they thought the EB allocations were "much too high," "too high," "about right," "too low," or "much too low."

After each initial vote, attendees broke into small groups to discuss their responses and document reasons for their votes. Following these 5 to 10-minute discussions, attendees were given the opportunity to change their vote. The goal of this exercise was to understand the range of community support, or lack of support, for the various allocations of the EB model in comparison to current district practices. Although the EB model provided more total resources for each of the districts, in some instances and for some elements in some districts, the EB model provided fewer resources for other elements. One objective of the community meetings was to obtain community input about the details of each of the EB elements, as well as to better understand the unique characteristics of each district.

[3] Note that the analysis for this project excludes resources for preschool, high-cost special education, the central office, operations and maintenance, transportation, food services, student activities and capital construction.

Butler Area School District

Butler Area School District is located in Western Pennsylvania, just north and west of Pittsburgh. It is a working-class community, with only one of three historic steel plants still operational. In the past the school district served close to 12,000 students, but the student population in 2016-17 had declined to 6,578. In that year, it spent $15,685 per student on total expenses.[4] This study analyzed only the portion of the budget related to the instructional expenses included in the EB model, which in 2017-18 totaled $7,646 per student.[5]

In terms of demographics, the student body is approximately 93 percent white, 2 percent African-American, 2 percent Latino and 3 percent other. About 41 percent of students are in poverty, 1 percent English Language Learners (ELL) and 15 percent with disabilities.

Table 4.1 provides summary data on the key findings from the Schools That Work Calculation Tool. The first finding is that the EB model would provide about the same school administration, providing one less principal and 2 additional assistant principals. The district actually provided two principal positions to the middle school, while the EB model would provide 1 principal and 1 assistant principal. The EB model also would almost double the number of secretaries in Butler's schools. Further, the model would provide eleven and a half school computer technicians compared to none today.

In terms of core instruction, the EB would make some important additions.

- First, the EB model would provide about 40 additional core teachers and slightly fewer elective teachers. The increased core teachers result primarily from the EB model's class size of 15 in grades K-3.
- Second, the EB would substantially increase funding for professional development. It would increase the training element of professional development (tripling the current amount of $254,250 to $790,250). Following that, the EB model would provide 29 instructional coaches compared to no instructional coaches currently. Thus, the EB allocation would significantly enhance the training element of the district's professional development program by providing the key instructional coaches that give teachers classroom assistance in trying to incorporate new pedagogical strategies into their classroom repertoire.
- Third, the EB model would increase non-instructional aides (for hall, lunch, bus and recess duties) from 6 to 30. Since most teachers in the district's schools have one period a day of non-instructional duties, the EB's non-instructional aide allocations would allow the district to turn these teacher "duty periods" into pupil free time that could then be

[4] We used state expenditure and revenue data to calculate this figure; but all revenue per pupil figures from the Calculation Tool used the pupil count included in the tool, which was slightly different from the state figure.
[5] For Butler Area School District, 6,322 students were included in the EB Calculation Tool. As discussed above, the EB model does not analyze expenditures related to capital costs, operation and maintenance, transportation, student activities, central office, or the costs associated with preschool or students requiring high cost special education services.

used to schedule teacher teams to enable data-based decision making over the curriculum and instructional program.

- Fourth, the EB model would double the amount spent on curriculum materials and increase the amount spent on school-based technologies by a factor of five. In sum, the EB model would allow the district to dramatically strengthen the core, Tier 1 instruction of all teachers.

In terms of the Tier 2 and 3 programs that provide extra help to struggling students – ELL programs, special education and other strategies to help those students learn to standards – it is best to view the special education, academic extra help staff, summer school and extended day staff together. Butler is somewhat unusual in providing no special education aides, a service strategy in line with the EB model. Butler does provide 65 teachers for special education Tier 3 service and just 15 academic extra help staff. The EB model would provide only 45 special

Table 4.1
Current versus EB Staff and Revenues
Butler Summary: Current Versus EB

Title	**Current**	**EB**	**Position Cost**	**Revenue Gap: Current – EB***
District Totals				
Principals	10.00	9.00	$131,033	$131,033
Assistant Principals, deans, etc.	5.00	6.97	$139,682	($274,863)
Instructional Coaches	0.00	28.87	$82,181	($2,372,771)
Core Teachers	259.91	299.95	$82,181	($3,290,253)
Specialist/elective Teachers	74.30	70.60	$82,181	$304,289
SPED Teachers	65.22	44.84	$82,181	$1,675,105
ESL Teachers	1.66	0.34	$82,181	$108,792
Academic Extra Help Staff	26.00	40.77	$82,181	($1,213,448)
Non-Academic Pupil Support	15.00	44.01	$82,181	($2,384,053)
Nurses	8.60	8.43	$82,181	$14,026
Extended Day / Summer School Staff	25.00	23.67	$82,181	$109,575
Instructional Aides	109	0.00	$33,663	$3,669,2671
Non-Instructional Aides	6.00	29.78	$33,663	($800,544)
SPED Aides	0.00	0.00	$33,663	0
Librarians	8.84	9.00	$82,181	($13,149)

School Computer Technicians	0.00	11.45	$33,663	($385,479)
Library Paraprofessionals	5.90	5.47	$33,663	$14,512
Secretaries / Clerks	17.65	29.78	$50,265	($609,770)
Total Staff Resource Gap				($5,317,752)
Discretionary Funds				
Professional Development	$254,250	$790,250		($536,000)
Technology	$337,500	$1,580,500		($1,243,000)
Inst. materials / Assessments	$559,125	$1,359,230		($800,105)
Gifted and Talented	$404,280	$252,880		$151,400
Total Discretionary Gap	$1,555,155	$3,982,860		($2,427,705)
Total Revenue Gap				($7,745,457)
Average Total Revenue Gap Per Pupil**				($1,225)

* Totals may differ due to rounding.
** 6,322 students included in the Calculation Tool.

education teachers (a decrease of 20 teachers) but would provide 41 academic extra help positions (Tier 2), an increase of 15 positions over that provided by Butler. Butler and the EB model provide a similar level of extended day and summer school staff (both also Tier 2). Thus, the EB model and Butler provide close to a similar level of extra resources for students needing extra academic help, with Butler actually providing modestly more staffing for these students, including students with mild and moderate disabilities.

The EB model would increase non-academic pupil support staff, such as guidance counselors, social workers, psychologists, family liaisons, etc. The EB approach would increase these staff from a current level of 15 to a new total of 44, allowing schools to provide significantly more counseling and related services.

In terms of paraprofessionals, Butler funded 109 instructional aides while the EB model would provide none. This is one area Butler could consider for reallocating current resources.

Overall, the resources identified through the EB model would require an additional $10 million, or a hike of $1,225 per pupil in Butler. This amounts to a 16 percent increase over the current budget categories reviewed by the EB Model.

The key takeaways from this analysis suggest that the EB model would:

- Strengthen core instruction by reducing class size to 15 in elementary grades K-3
- Further strengthen core instruction by enhancing professional development through increased resources for training and providing many more instructional coaches, as well as providing supervisory aides to free teachers from lunch, bus, hallway and bus duties so they have more pupil-free time to engage in daily teacher collaborative work,

- Increase resources for more current curriculum and computer and related technology materials,
- Provide about the same number of staff for the range of extra help services provided to struggling students, ELL students and students with mild and moderate disabilities, and
- Increase counseling and related pupil support services.

The Community meeting generally supported the allocations of the EB model. The proportion voting “about right” was 76% for core teachers, 63% for non-academic pupil support, 70% for instructional materials and technology, 67% for professional development, and 74% for the overall increase. On the other hand, about 70% percent of the community felt that the EB number of instructional aides was either too low or much too low.

Chambersburg Area School District

Chambersburg Area School District is located in south-central Pennsylvania about 30 miles north of Gettysburg. It is an "urban-rural" community, with a rising Latino population. Many of the new immigrants work on the farms surrounding the city as well as in temporary day jobs in urban areas within commuting distance, such as Harrisburg. It has had a relatively stable student population that totaled 9,330 in 2016-17. In that year, it spent $14,675 per student on total expenses, including capital and other expenditures. This study analyzed only the portion of the budget related to the instructional expenses included in the EB model, which in 2017-18 totaled $7,786 per student.[6]

In terms of demographics, the student body is approximately 65 percent white, 8 percent African-American and 19 percent Latino. About 53 percent of students are in poverty, 7 percent English Language Learners (ELL) and 12 percent have been identified as having disabilities that require an IEP.

Table 4.2 provides summary data on the key findings from the Schools That Work Calculation Tool. The first finding is that the EB model would provide more school administration, providing four additional principals and one less assistant principal. The district actually staffs several schools with head-teachers who teach close to a full load and receive a stipend for their administrative work. The EB model would provide those schools with principals. The model would also increase the number of school secretaries from 37 to 43 and increase the number of school computer technicians from 6 to 17.

The EB model would provide several additional resources for Tier 1, core instruction:

- The EB model would increase the number of core teachers by about 35 positions. Specifically, the EB model would increase core teachers for elementary schools, keep them about the same for middle schools, and decrease them for the high schools. The result would be that EB class sizes would average 17 in the district's elementary schools, compared to the current average of about 23; 25 in the middle schools; and 25 in the high schools compared to the current average of closer to 20 in the middle and high schools.
- The EB model would nearly double elective teachers in elementary schools, cut them by two-thirds in middle schools, and decrease them by a third in the high schools. This shift would allow for more art, music and physical education classes in elementary schools as well as more pupil-free time for teachers to facilitate organizing teachers into collaborative work teams during the school day. The reduction in elective teachers in the secondary schools would still allow the district to provide sufficient electives but would reduce the wide range now provided and in costly smaller class sizes.
- In terms of professional development, the EB model would dramatically enhance instructional coaches and expenditures for training. The number of instructional coaches

[6] For Chambersburg Area School District, 9,249 students were included in the EB Calculation Tool. As discussed above, the EB model does not analyze expenditures related to capital costs, operation and maintenance, transportation, student activities, central office, or the costs associated with preschool or students requiring high cost special education services.

would rise from 25 to 41, and dollars for the training aspect of professional development would increase from $94,000 to $1.16 million.

- The EB model increases supervisory aides (for lunch, hall, recess and bus duties) from 15 to nearly 43, a staffing addition which could free teachers from any "duty periods" and allow them to engage in collaborative work with other teachers.
- The EB model would increase funds for instructional materials and technology by a third, from about $3 to $4 million.

Table 4.2
Current versus EB Staff and Revenues
Chambersburg Summary: Current Versus EB

Title	Current	EB	Position Cost	Revenue Gap: Current – EB*
District Totals				
Principals	13.00	17.00	$134,911	($539,645)
Assistant Principals, deans, etc.	10.00	9.18	$109,535	$89,819
Instructional Coaches	24.90	40.73	$85,163	($1,348,130)
Core Teachers	412.00	447.46	$85,163	($3,019,961)
Specialist/elective Teachers	136.00	103.17	$85,163	$2,796,026
SPED Teachers	58.00	65.51	$85,163	($639,628)
ESL Teachers	23.83	6.25	$85,163	$1,497,166
Academic Extra Help Staff	23.27	60.07	$85,163	($3,133,904)
Non-Academic Pupil Support	12.00	61.97	$85,163	($4,255,917)
Nurses	20.00	12.32	$85,163	$654,392
Extended Day / Summer School Staff	0.00	34.20	$85,163	($2,912,575)
Instructional Aides	41.00	0.00	$23,657	$969,937
Non-Instructional Aides	15.00	42.55	$23,657	($651,777)
SPED Aides	47.00	0.00	$23,657	$1,111,879
Librarians	11.99	17.00	$85,163	($426,667)
School Computer Technicians	6.00	17.28	$23,657	($265,241)
Library Paraprofessionals	14.90	6.18	$23,657	$205,619
Secretaries / Clerks	37.00	42.55	$34,577	($191,941)
Staff Resource Gap				($10,060,570)
Discretionary Funds				
Professional Development	$94,132	$1,156,125		($1,061,993)
Technology	$0	$2,312,250		($2,312,250)

Inst. materials / Assessments	$3,132,466	$1,988,535		$1,143,931
Gifted and Talented	$241,230	$369,960		($128,730)
Total Discretionary	$3,467,828	$5,826,870		($2,359,042)
Total Revenue Gap				($12,419,611)
Average Total Revenue Gap Per Pupil**				($1,343)

* Totals may differ due to rounding.
** 9,249 students included in the Calculation Tool.

In sum, the model would allow the district to strengthen core, Tier 1 instruction in multiple ways. The Tool suggests differences in Tier 2 and 3 supports as well.

It is best to view the special education, academic extra help staff, summer school, extended day staff and ELL staff together. Chambersburg provides 58 teachers for special education service, 23 academic extra help staff, 24 ELL staff, and no extended day and summer school staff. The EB model would increase all those numbers except ELL: 65 special education teachers (an increase of 7 teachers), 60 academic extra help positions (an increase of 37 positions) and increase extended day and summer school staff resources (an increase from none to 34). Thus, the EB model would increase total staff for mild and moderate special education, ELL services, academic extra help, extended day and summer school from 105 to 165 positions, an increase of 60 positions, which the district could allocate as it deems best.

The EB model provides fewer instructional and special education paraprofessional/aide resources, dropping the current total of 88 to zero. The EB model has a built-in preference for certified teachers to provide instructional services, so the decrease in paraprofessional staff is partially offset by the increase in staff for more instructional resources. However, as noted above, the EB model increases the number of supervisory/duty aides to free teachers to engage in collaborative work with other teachers rather than perform those non-academic duties.

The EB model would also increase non-academic pupil support staff, such as guidance counselors, social workers, psychologists, family liaisons, etc. The EB approach would increase these staff from a current 12 to 62, allowing schools to provide significantly more counseling and related services.

Overall, these additional resources would require an additional $12.4 million, or an increase of $1,343 per pupil, which is a 17.2 percent increase over the portion of the district's budget analyzed by the EB Model.

The key takeaways from this analysis suggest that in the Chambersburg Area School District the EB model would:

- Strengthen core instruction by:

    - reducing class size to 15 students in elementary grades K-3, partially paid for by increasing class sizes in high schools, and decreasing elective teachers in middle and high schools
    - dramatically enhancing professional development by increasing funds for training and more instructional coaches, as well as increasing the number of supervisory aides to free teachers from hall, lunch, recess and bus duties, thus giving teachers more pupil-free time to allow for collaborative work during pupil free periods
    - increasing resources for more current curriculum and computer and related technology materials
- Increase resources to provide extra academic services to struggling students, ELL students and students with mild disabilities, and having those services provided by licensed teachers rather than paraprofessional aides, and
- Increase counseling and related pupil support services.

The Community meeting in Chambersburg reflected mixed support for the allocations of the EB model. The share voting “about right” for core teachers for grades K-3 was 77 percent. However, the bulk of those present felt the EB model provided too few teachers for grades 4-12, 54 percent voting that the EB model was too low for that staffing element. Though the community generally supported the EB model’s professional development resources, it voted in strong numbers for more paraprofessional staff and even more for instructional materials and technology. In terms of the overall increase of $12.4 million, only half those at the meeting voted “about right,” with the other half voting that more money was needed.

Upper Darby

Upper Darby School District is an inner ring suburban district just west of Philadelphia. It is a modestly growing school district, with an increasing African-American and Latino population. The student population totaled 12,395 in 2016-17. In that year, it spent $15,103 per student on total expenses, including capital and other expenditures. This study analyzed only the portion of the budget related to the instructional expenses included in the EB model, which in 2017-18 totaled $9,608 per student.[7]

In terms of demographics, the student body is approximately 47 percent African-American, 28 percent white and nearly 8 percent Latino. About 65 percent of students are in poverty, 7 percent English Language Learners (ELL) and 15 percent with disabilities. Over the past several years, poverty, ELL and minority concentrations have increased.

Table 4.3 provides summary data on the key findings from the Schools That Work Calculation Tool. The first finding is that the EB model would provide modestly more school administration, providing three and a third additional principals. The model also would increase the number of school secretaries, from 38 to 57, an increase of 19 positions, as well as boost the number of school computer technicians from 10 to 23.

The second finding is that the EB model would enhance staffing and funds for core, tier one instruction across several areas. The model would:

- Increase core teachers by 104 positions, from 489 to 593, with the increases occurring largely in the elementary K-3 grades
- Increase elective teachers by 5 positions
- Increase supervisory aides to free teachers from duty periods, and thus allow the district to organize teachers into collaborate work teams during pupil free times during the regular school day
- Expand professional development by increasing instructional coaches from 14 to 53, a hike of 39 positions, and boost funds for the training element of professional development by over $1.2 million, and
- Boost spending for updated curriculum materials and technology by nearly $3 million.

In sum, the EB model would allow the district to enhance all key elements of core instruction as the prime way to boost student achievement and reduce demographic achievement gaps.

In terms of extra (Tier 2 and 3) resources for students struggling to meet rigorous academic standards, the community and district were more at odds with the approach of the EB model. Though the EB model increased licensed staff to provide extra instructional help for struggling students from 46 to 113 and increased extended day and summer school staff from zero to 73 positions, it also reduced the number of special education teachers from 148 to 87 and the

---

[7] For the Upper Darby School District 12,289 students were included in the EB Calculation Tool. As discussed above, the EB model does not analyze expenditures related to capital costs, operation and maintenance, transportation, student activities, central office, or the costs associated with preschool or students requiring high cost special education services.

number of ESL staff from 27 to 10, a reduction of 17 positions. Overall, for all these services, the EB model would provide 63 additional staff positions but arrayed differently. The concept behind the EB model is to provide extra help to struggling students before they are provided an IEP and identified as a student with a disability, and to serve ELL students in sheltered-English classes, rather than pull out classes.

Table 4.3
Current versus EB Staff and Revenues
Upper Darby Summary: Current Versus EB

Title	Current	EB	Position Cost	Revenue Gap: Current – EB*
District Totals				
Principals	14.00	14.00	$179,838	$0
Assistant Principals, deans, etc.	10.00	13.31	$158,358	($523,637)
Instructional Coaches	13.89	59.22	$104,177	($4,722,088)
Core Teachers	488.50	592.92	$104,177	($10,878,174)
Specialist/elective Teachers	132.47	137.51	$104,177	($525,261)
SPED Teachers	147.84	87.16	$104,177	$6,321,881
ESL Teachers	27.00	10.01	$104,177	$1,769,969
Academic Extra Help Staff	45.98	112.78	$104,177	($6,958,684)
Non-Academic Pupil Support	61.00	108.77	$104,177	($4,976,657)
Nurses	17.00	16.39	$104,177	$64,034
Extended Day / Summer School Staff	0.00	72.91	$104,177	($7,595,380)
Instructional Aides	8.00	0.00	$34,772	$278,173
Non-Instructional Aides	296.00	56.64	$24,786	$5,932,859
SPED Aides	61.00	0.00	$34,772	$2,121,066
Librarians	12.50	14.00	$104,177	($156,266)
School Computer Technicians	9.94	22.88	$34,772	($450,089)
Library Paraprofessionals	12.00	12.31	$34,772	($10,663)
Secretaries / Clerks	38.00	56.64	$52,655	($981,482)
Total Staff Resources Gap				($21,290,441)
Discretionary Funds				
Professional Development	$288,521	$1,536,125		($1,247,604)
Technology	$1,328,569	$3,072,250		($1,743,681)
Inst. materials / Assessments	$1,287,715	$2,642,135		($1,354,420)

Gifted and Talented	$1,926	$491,560		($489,634)
Total Discretionary	$2,906,732	$7,742,070		($4,835,338)
Total Revenue Gap				($26,125,779)
Average Total Revenue Gap Per Pupil				($2,126)

* Totals may differ due to rounding.
** 12,289 students included in the Calculation Tool.

Further, the EB model provides resources for licensed staff to provide these extra help services rather than paraprofessional aides. And Upper Darby had many such aides. As a result, the EB model reduced the number of special education aides in this district from 61 to zero, and the number of "personal care assistants (PCA)," individuals who work 1-1 with students largely on behavioral issues, by close to 250 positions. As could be expected, these changes were not supported by the community, which felt that their use of paraprofessional aides and PCAs were necessary.

In terms of non-academic pupil support (guidance counselors, social workers, etc.), the EB model would increase the number of those positions by 48 staff, from 61 to 109 positions. However, more than half of the community felt that even more were needed.

Net, these additional EB resources would require an additional $26.1 million, or an increase of $2,126 per pupil, which is a 22.1 percent increase over the portion of the current budget that was reviewed under this analysis.

The key takeaways for Upper Darby are that the EB model would:

- Strengthen core instruction by:
    - increasing the number of core teachers, as well as reducing class size in elementary grades K-3 to 15
    - dramatically enhance professional development by increasing funds for training and more instructional coaches
    - increasing the number of supervisory aides to free teachers from hall, lunch, recess and bus duties, thus giving teachers more pupil-free time to allow for collaborative work during pupil free periods,
    - increasing resources for more current curriculum and computer and related technology materials,
- Provide more certified staff resources for struggling students, ELL students and students with mild disabilities, and having those services provided by licensed teachers rather than paraprofessional aides, and
- Increase counseling and related pupil support services.

The community generally supported the EB model additions to core instruction. About 68 percent supported the increase in core teachers, with the remaining believing that even more core teachers were needed. The enhanced professional development resources were also generally supported by the bulk of the community members present at the meeting. Fully 72 percent supported the EB levels for instructional materials and technology. But, as noted, the community did not support the EB model's restructuring of the approach to Tier 1 and Tier 3 staffing, with fully 96 percent voting that the EB model's allocation of special education aides and personal care assistants was either way too low or too low. Finally, though the community agreed with the EB model that more resources were needed, the majority expressed that even more was needed than the EB provided and that the EB reductions were not supported, especially the reductions in paraprofessionals.

Summary Comments

For all three districts, the EB model would enhance core, Tier 1 instruction by decreasing class sizes in elementary grades, increasing funding for the training aspect of professional development together with increasing the number of instructional coaches, the latter being crucial to having the training result in improved instructional practices. These resources alone should provide a student achievement bump for all three districts. The EB model also would increase funding for textbooks, curriculum materials and school-based computer technologies in all districts.

The EB model would also expand the Tier 2 staff providing extra instructional help for students struggling to meet rigorous academic standards. These additional resources could be reasonably expected to provide an additional increase in overall student achievement as well as reduction in achievement gaps linked demographics.

Additionally, the EB model would enhance the counseling, social work, nurse and other non-academic supports for students, reflecting these greater needs by a student population bringing greater social, behavioral, health and family issues to schools.

Interestingly, the EB model would modestly increase administrative staffing in all three districts. In most other states where the EB model has been reviewed by educations, the consistent recommendation has been to increase the EB school administration staffing. Given these facts, it seems that current school administration in these three districts is on the "leaner" rather than "fatter" side.

The major difference between what the EB model would provide centers around paraprofessionals: the districts and their communities prefer to use a much larger number of instructional aides, while the EB model provides no instructional aides even for special education and provides only non-instructional aides to strengthen core, Tier 1 instruction by removing teachers from lunch, hall, recess and bus duties and thus freeing them up for collaborative teamwork instead, the latter being one of the hallmarks of schools that work.

Table 4.4
Three District Summary

School District	Current Revenue (Portion Analyzed)	Revenue Required for EB Model	Recommended Percent Increase	Recommended Per Pupil Increase
Butler Area	$48,340,089	$56,087,311	16%	$1,225

Chambersburg Area	$72,014,307	$84,434,873	17.2%	$1,343
Upper Darby	$118,077,950	$144,205,579	22.1%	$2,126

Finally, in every district the EB found that more resources were needed, averaging over an 18 percent increase over current spending in the portions of the budgets analyzed by the EB Model. The increases were largely in the core instruction (Tier 1) and extra instructional services (Tier 2) areas. If such funds were provided and used as the EB model indicates, the state could reasonably expect significant overall improvements in student achievement and reductions in the achievement gaps linked to student demographics.

References

Blankstein, A. (2010). *Failure Is Not An Option, 2nd Edition*. Thousand Oaks: Corwin Press.

Blankstein, A. (2011). *The Answer is in the Room: How Effective Schools Scale Up Student Success*. Thousand Oaks: Corwin Press.

Chenoweth, K. (2007). *It's Being Done: Academic Success in Unexpected Schools*. Cambridge, MA: Harvard Education Press

Chenoweth, K. (2009). *How It's Being Done: Urgent Lessons from Unexpected Schools.* Cambridge, MA: Harvard Education Press.

Chenoweth, K. (2017). *Schools that Succeed*. Cambridge, MA: Harvard Education Press.

Duncan, G. J. & Murnane, R.J. (2014). *Restoring Opportunity: The Crisis of Inequality and the Challenge for American Education*. Cambridge, MA: Harvard Education Press.

Jimenez-Castellanos, O. & Topper, A. M. (2012). The cost of providing an adequate education to English language learners: A review of the literature. *Review of Educational Research*, 82(2), 179-232.

Odden, A. (2009). *Ten strategies for doubling student performance*. Thousand Oaks, CA: Corwin Press.

Odden, A. (2012). *Improving student learning when budgets are tight*. Thousand Oaks, CA: Corwin Press.

Odden, A. & Archibald, S. (2009). *Doubling Student Performance and Finding the Resources to Do It.* Thousand Oaks, CA: Corwin Press.

Odden, A., & Picus, L. O. (2014). *School Finance: A Policy Perspective, 5th edition*. New York: McGraw-Hill.

Odden, A. & Picus, L.O. (2015b). Using the Evidence-Based Method to Identify a Base Spending Level and Pupil Weights for the Maryland School System. Denver, CO: Augenblick Palaich and Associates.

Odden, A. & Picus, L.O. (2015a). Using the Evidence-Based Method to Identify Adequate Spending Levels for Vermont Schools. Downloaded from www.picusodden.com from the Resources and State Studies tabs.

Odden, A., Picus, L.O., & Goetz, M. (2010). A 50 State Strategy to Achieve School Finance Adequacy. Educational Policy. 24(4), 628-654.

Picus, L. O. & Odden, A. (2018). *An Evidence-Based Approach to School Finance Adequacy in Michigan*. Downloaded from www.picusodden.com from the Resources and State Studies tabs.

Picus, L. O., Odden, A., Goetz, M., Griffith, M., Glenn, W., Hirshberg, D., & Aportela, A. (2013). *An Independent Review of Maine's Essential Programs and Services Funding Act: Part 1*. Downloaded from www.picusodden.com from the Resources and State Studies tabs.

Appendix A

2018 CORE EB RECOMMENDATIONS FOR ALL ELEMENTS

Model Element	2016 Evidence-Based Recommendation
Staffing for Core Programs	
1a. PreSchool	Full day preschool for children aged 3 and 4. One teacher and one aide in classes of 15. This element is not part of the Pennsylvania study.
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system.
2. Elementary Core Teachers/ Class Size	Grades K-3: 15 Grades 4-5/6: 25. (Average class size of 17.3)
3. Secondary Core Teachers/ Class Size	Grades 6-12: 25. Average class size of 25
4. Elective/ Specialist Teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 1/3% of core high school teachers
5. Instructional Facilitators/ Coaches	1.0 Instructional coach position for every 200 students
6. Core Tutors/ Tier 2 Intervention	One tutor position for every 450 elementary and middle school students and for every 600 high school students (Additional tutors are enabled through poverty and ELL pupil counts in Elements 22 and 26)
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)
8. Core Pupil Support Staff, Core Guidance Counselors, and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 750 students. (Additional student support resources are provided on the basis of poverty and ELL students in Element 23)
9. Supervisory and Instructional Aides	1 for every 225 elementary and middle school students 1 for every 200 high school students
10. Library Media Specialist	1.0 library media specialist position for every school, and
10.1 School Computer Technicians	1.0 school computer technician for every 600 students
10.2 Library Paraprofessionals	1.0 paraprofessional for every 450 elementary and middle school students after the first 450, and for every 600 high school students after the first 600

Model Element	2016 Evidence-Based Recommendation
11. Principals and Assistant Principals	1.0 principal for the first 450-students in elementary and middle school, and 1 assistant principal for every additional 450 students 1.0 principal and 1.0 assistant principal for the first 600-student high schools and 1 assistant principal for each additional 600 students
12. School Site Secretarial and Clerical Staff	1.0 secretary position for every 225 elementary and middle school students 1.0 secretary position for every 200 high school students
Dollar Per Student Resources	
13. Gifted and Talented Students	$40 per *every* pupil, not just gifted and talented pupils
14. Intensive Professional Development	10 days of student-free time for training built into teacher contract year, by adding five days to the average teacher salary $125 per pupil for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per pupil for instructional and library materials $50 per pupil for each extra help program triggered by poverty and ELL students as well as special education
16. Short Cycle/ Interim Assessments	$25 per pupil for short cycle, interim and formative assessments
17. Technology and Equipment	$250 per pupil for school computer and technology equipment
18. CTE Equipment/ Materials	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds/Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12 $50 per preschool student
Central Office Functions (not included in Pennsylvania study)	
20. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers, and $305 per pupil for utilities
21. Central Office Personnel/ Non-Personnel Resources	A dollar per student figure for a prototypical 3,900 student Central office based on the number of FTE positions generated – 8 professional and 15 classified positions – and the salary and benefit levels for those positions. The per pupil figure also includes $300 per pupil for misc. items such as Board support, insurance, legal services, etc.
Resources for Struggling Students	
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students.

Model Element	2016 Evidence-Based Recommendation
23. Additional Pupil Support Staff	1.0 pupil support position for every 125 ELL students and one tutor position for every 125 non-ELL poverty students.
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
26. ELL staff for English Language Learner (ELL) Students	As described above: 1.0 tutor position for every 100 ELL students 1.0 pupil support position for every 125 ELL students 1.0 extended day position for every 120 ELL students 1.0 summer teacher position for every 120 ELL students, In addition, 1.0 ESL teacher position for every 100 ELL students.
27. Alternative Schools	One assistant principal position and one teacher position for every 7 ALE students in an ALE program. One teacher position for every 7 Welcome Center eligible ELL students.
28. Special Education	8.1 teacher positions per 1,000 students, which includes: 7.1 teacher positions per 1,000 students for services for students with mild and moderate disabilities and the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students. **Plus** 1.0 psychologist per 1,000 students to oversee IEP development and ongoing review, included in the central office calculation. This provides 3.9 psychologist positions in the central office. **In addition** Full state funding for students with severe disabilities, and state-placed students, and Federal Title VIB, with a cap on the number covered at 2% of all students.

24

Organization Science
Vol. 17, No. 2, March–April 2006, pp. 298–307
ISSN 1047-7039 | EISSN 1526-5455 | 06 | 1702 | 0298

DOI 10.1287/orsc.1050.0172

Power to the Principals: Decentralization in Three Large School Districts

William G. Ouchi
Anderson School of Management, University of California, Los Angeles, 110 Westwood Plaza, Suite B523, Los Angeles, California 90095-1481, william.ouchi@anderson.ucla.edu

School districts have made several attempts at decentralizing. However, decentralization in school districts can mean so many different things that the term has nearly lost its meaning.

This paper reports a study of three large urban school districts that, over almost 30 years, adopted nearly identical approaches to decentralizing, granting control to principals and expanding freedom of choice for families. In all three cases, the goal of improving student achievement was achieved, although with a very small sample.

These three districts are compared to the three largest public districts in North America. The comparisons reveal that the three decentralized districts attained a high level of principal control over school budgets, staffing, schedule, and teaching methods.

Key words: organization design; organization structure; organization theory; organizational control; decentralization; organizational economics; schools; K–12 school systems; school management

1. Learning from a Design Intervention

In 1976, a school district of 80,000 students in Edmonton, Alberta, Canada pioneered a new form of decentralization led by a superintendent, Mike Strembitsky, who served for 22 years. Twenty years later, superintendents in Houston and Seattle visited Strembitsky and implemented his decentralization in their own districts. Although these superintendents served for only three years each, the reforms have taken root in their cities as well. Since 2000, this innovation has been transplanted to Cincinnati (Miles and Roza 2004), St. Paul, San Francisco, and Oakland, (Honig 2003). In 2005 it is being implemented statewide in Hawaii (State of Hawaii 2004), and pilot programs are underway in Boston, Chicago, and New York City. Other school districts and states are considering similar changes.

Not all forms of decentralization are equal, nor does decentralization by itself produce meaningful change. In all three of the reforms studied, decentralization was accompanied by enhanced public school choice, thus creating a competitive market for education. The districts also undertook other important changes, such as an increased emphasis on both student performance and on training of principals. Although these multiple changes confound the attribution of observed effects solely to changes in decentralization, the results are consistent with the literature on decentralization of large businesses. This paper evaluates the goals of each of the three innovative decentralization interventions, the actions that the designers took, and the consequences of these actions.

2. The Impetus for Decentralization in Edmonton, Seattle, and Houston

In each of the three cases, change was fostered by widespread public dissatisfaction. Let us consider in more detail the conditions precedent to the interventions in each city.

Edmonton: The Goal Was to Empower Principals

Our interviews with current and former school district executives confirm that the Edmonton reform sought to reduce friction between the district central office and individual schools (Tucker and Codding 1998, pp. 220–230). Through decentralization, the central office was focused on setting standards and auditing performance, while each school made its own operating decisions. What had been constant friction was resolved into a cooperative relationship that continues to this day.

Seattle and Houston: The Goal Was to Improve Student Achievement

In the Houston Independent School District (HISD), public dissatisfaction with low student test scores led to the election in 1989 of several reform-oriented candidates to the school board (McAdams 2000, p. 1) and to the adoption of a *Declaration of Beliefs and Visions*, which declared that "HISD must decentralize" (McAdams 2000, p. 8).

In Seattle, public dissatisfaction with the schools had grown to the point that the Washington State House of Representatives (1990) had severely criticized the failures of the public schools. Enrollment in Seattle public schools had declined from nearly 100,000 students in

1970 to about 39,000 by 1990, by which time about 47% of all students were enrolled in private schools. A coalition of community leaders pressured the school board to find new leadership in Retired Army Major General John Stanford, who became Superintendent in 1995 and subsequently implemented the Edmonton decentralization plan.

3. What Actions Did the Designers Take to Implement Decentralization?

To explain the idea of decentralization in these districts, let us first review some of the organizational literature on decentralization. Next, we will review the approaches to decentralization that have been implemented in other school systems.

The Literature of Decentralization in Businesses and in School Systems

The study of decentralization has developed in response to the growth of very large business and governmental organizations. Scholars have established that increasing size (measured in total revenues and total number of employees) yields several organizational effects that result in decreased effectiveness (Terrien and Mills 1955, Blau and Schoenherr 1971). The antidote to large size is greater decentralization of decision-making authority (March and Simon 1958, Blau and Schoenherr 1971, Chapman 1973).

Decentralization as a Property of Organizational Structure

Studies of decentralization in schools cover so many approaches that comparing them requires caution. For example, school decentralization from the national to the state level (Fiske and Ladd 2000, Walberg et al. 2000, Van Langen and Dekkers 2001) and from the state to local school districts (Corcoran and Christman 2002, O'Day 2002) have not yielded consistent effects on student achievement. Scholars have argued that research has not found consistent results because of unmeasured nuances in relations between district offices and individual schools (Honig 2004, Stein et al. 2004). Hannaway (1996) has also noted some of the diverse meanings of decentralization in the study of school systems; and Walberg et al. (2000), in a review of international studies of decentralization of education systems, note that,

> ...neither policymakers nor scholars agree on the meaning of the terms "centralization" and "decentralization" or their advisability.... (p. 1)

However, Walberg et al. (2000) making a crucial distinction, note that while moving decisions from the national to the state or district level is not important, decentralization to the level of the individual school *does* make a difference:

> Decision making...made at the school level was associated with higher science achievement. These findings remind us of some modern business theories, which hold that central boards and officers set profit or other targets while lower operating units set their own means of organizing their work to attain the targets. (p. 6)

Much the same point has also been made by Ferris (1992, p. 338), who identifies budgets, curriculum, and personnel as the three major spheres of decision making, and by Sizer (1992, p. 57).

The emphasis of these studies on the critical importance of delegation of instructional decisions to the individual school fits very well with recent studies of business decentralization through the creation of semiautonomous subunits. This structural concept of decentralization is drawn from the work of Williamson (1975), Chandler (1977), and Williamson and Ouchi (1981), who have described the decentralized structure as the multidivisional, or M-form structure. Within this analytical framework, the U-form (unitary or functional organization) is inherently centralized, while the M-form (multidivisional) is decentralized. The critical feature of the M-form is that each subunit is sufficiently (but not completely) self-contained that it can be assessed with respect to performance (Williamson 1975, pp. 132–154). Because each subunit can be accurately evaluated, each can be granted decision authority. This structure is found in medium-sized companies as well as in large ones, and it is also common among large government organizations such as the U.S. Army, Navy, and Air Force, each of which has an M-form structure.

Among school districts, the traditional structure is U-form, with all curriculum design decisions made by one centralized department, all professional development decisions made by another central staff, all special education decisions formed by yet another department, and so on (see Hannaway 1993, p. 149). Segal (2004, pp. 46–49) has created organization charts of the New York City, Los Angeles, and Chicago school districts that depict all three districts as having U-form structures.

The study districts of Edmonton, Seattle, and Houston all qualify as M-form, or decentralized districts. This means that each school in these districts controls most of its instructional decisions. Each school must attract its own students—no students are "assigned" to any school. However, certain important functions, such as administrative computing, auditing of schools, bus transportation, food preparation, payroll and pension, and new school construction, are carried out by the central office. Let us consider some examples of the latitude that principals have in a decentralized district.

In a strongly decentralized district, an individual school may choose on its own, without permission, to vary the mixture of types of teachers, the proportion of full-time, part-time, paraprofessional, and outsourced teachers, as well as to choose whether to use part-time or full-time tutors, to hire librarians, to add or to subtract attendance clerks, cooks, custodians, and any other staff category. Decentralization also means that a principal is free to set a daily school schedule of six periods of equal length, or four periods of equal or of unequal length, or to have a different schedule on each day. Each school is free to hire its own internal staff to perform specialized functions, to buy those services from the central office, or to secure them from vendors of its choosing. Decentralization also means that each school is free to choose its own teaching methods; that is, to group teachers into various kinds of teams or not, to reorganize a large school into several smaller academies, and to purchase teaching materials and provide teacher training of its own choosing.

Scholars have often relied on local budget authority as a central feature of school decentralization. Odden and Busch argue that ... the most effective strategy ... has been to ... decentralize power and authority ... a key part of this strategy includes providing teams with power over their budget (1998, pp. 26–27). Beck and Murphy (1996), Joyce and Calhoun (1996), and Wohlstetter et al. (1997) all reach a similar conclusion.

However, several scholars have argued that decentralization in school systems is ineffective. As we inspect some examples of "failed decentralization," let us ask whether they meet our tests.

Earlier Decentralization Interventions

Among the many waves of school reform, only a few represent attempts at organizational or structural decentralization, and none of these meet the test of the M-form structure. Some of the better-known reforms have been those of New York City, Chicago, and the national adoption of school site-based management. Let us look more closely at these three.

New York City: Decentralization from Chancellor to Superintendents, and Back Again

Ravitch (1974) has detailed the history of reform attempts in the New York City schools from 1805 until the 1970s as a process that has alternated centralization and decentralization between the chancellor and local area superintendents, but that has never delegated control to the individual schools. Ravitch concludes:

> Neither centralization nor local control has solved the problems of the school system. Each has its advantages and disadvantages, which cause a pendulum movement over the years from one form to the other. (1974, p. 401)

One New York City principal in our study described his lack of local discretion:

> The union contract says no more than 34 students to a classroom, so I get 250 units (one unit is one teacher). I cannot reallocate priorities across categories. As a result, I have discretion over about 2 units, or 1 percent of my budget.

Chicago: "The Worst School District in America"

In 1988, U.S. Secretary of Education William Bennett visited the city of Chicago and declared that its public schools were the worst in the nation (Ouchi and Segal 2003, p. 3). This bombshell followed closely on the heels of other local reports that had revealed shockingly low graduation rates and achievement test scores (Bryk et al. 1998, pp. 17–18). The response was for the state legislature to pass a law that created parent-majority local school councils to be elected in each school and to be granted limited power over a portion of the school's budget. In practice, according to the study by Bryk et al., this law did not give principals enough autonomy to make substantial local adjustments. Goertz and Hess (1998, p. 4) quote one principal who claimed to have control over only 12% of his school's budget. Overall, the authors said, "We were surprised by the limited amount of discretion that schools have over their budgets"... (Goertz and Hess 1998, p. 8). The result of this limited attempt at decentralization was continued deterioration in student performance. Bryk et al. summed it up thus:

> ... fundamental change is needed in school governance arrangements. Absent this, ineffective school performance is likely to continue. (1998, p. 11)

Following the election of Mayor Daley, the state legislature passed another new law in 1995, granting the mayor full control over the school district budget, effectively ending the decentralization experiment but leaving the school councils in place. A principal in Chicago put it this way:

> There is a veneer or a façade of decentralization, and people use the rhetoric of decentralization at central office sometimes, but the reality is very tight central control over the budget and finances. (Ouchi and Segal 2003, p. 72)

School-Based Management Across America

Several studies have evaluated the widespread adoption of school site–based management (SBM), a movement that Chubb and Moe date to the 1970s (1990, p. 199). Typically, this approach includes the election or appointment of a committee of teachers, parents, and community members at each school, but usually in an advisory rather than a decision-making capacity (Mohrman and Wohlstetter 1994). Malen (1994) notes that these committees typically control only a "modest" allocation of funds at the school site, meaning at most a few thousand dollars. Van Langen and Dekkers observe that the SBM approach, having reached 60% of districts with 50,000 or more students by the early 1980s, had declined to

31% of districts by 1988 (2001, p. 367). Perhaps SBM faded because site committees soon learned that they could discuss and plan all they wanted, but they did not have the budget control that they needed to implement their ideas.

These failed attempts at "decentralization" did not meet the tests of a decentralized M-form structure. Control over budgets and decision-making authority did not pass to individual schools. Let us turn now to a description of research methods, and then on to the actions that the designers took in Edmonton, Houston, and Seattle, and the results of those actions.

Research Methods

In each of the nine school systems in the study, the field research team of nine people carried out extensive interviews with most of the district senior staff, as well as with middle managers and analysts. We visited each school district on four or more separate occasions.

Data collection focused on three elements. First, we obtained from each district data on standardized tests for at least the most recent four years. Second, we interviewed central office staffs in order to classify the structure as U- or M-form. Third, we interviewed at least 5% of the principals in each district (66 principals in New York City public schools, 42 principals in the Los Angeles public schools, 31 principals in the Chicago public school system, 16 principals in Edmonton, 16 principals in Houston, and 17 principals in Seattle), and went through the school budget with each one in order to determine how much of that budget was under local school control. We also interviewed each principal about the performance of students, the management of the school, and the relationship between the school and the district central office. In cities that had regional offices, we interviewed some of the local assistant superintendents. In each city, we also interviewed local academic and other school district experts. The research team was in the field nearly continuously for about 18 months.

4. What Actions Did the Designers Take in Edmonton, Seattle, and Houston?

Edmonton

In 1973 Mike Strembitsky was appointed superintendent of Edmonton public schools. Strembitsky went through the entire budget of the Edmonton system and, piece by piece, gave control to the principals, beginning with a pilot program in 1976 that reached all schools within three years. He also put into place an accountability system (Strembitsky 1997) that measured test scores and budget performance. School employees, students, and parents rated their school and the leadership provided by their principal each year on brief questionnaires, with response rates typically above 90%. Principals, in a similar questionnaire, rated the superintendent and the school board. All of these results were made public. Strembitsky also initiated an "open schools" choice plan under which each family simply tells their school of choice that their child will enroll there. Today, more than 50% of all Edmonton Public students attend out-of-zone schools. Students receive subsidized bus passes, and a student who cannot afford a pass is typically provided with help by the receiving school.

A senior official of the union that represents teachers and principals, interviewed in 2001, offered this assessment of the decentralized approach in Edmonton:

> As far as I am concerned, decentralization is a wonderful thing, because it gave teachers the opportunity to be empowered and to have a role in making decisions about their schools... It used to be that someone else, somewhere at central, would decide what books I should be using and send them to me. It would be a surprise to me when the books arrived! Under decentralization, they send the money to the school, and now the teachers have decisions to make for themselves. (Ouchi and Segal 2003, p. 27)

One of the distinctive features of the Edmonton approach is a funding mechanism that assigns a weight to each student based on such characteristics as the family's income level, whether the student is a native English speaker, is gifted and talented, or has learning disabilities. Under this weighted student formula (WSF), the "maximum" weighted student receives nearly five times as much money per year as the "minimum" weighted student, and each takes their money to the public school of their choice (Ouchi and Segal 2003, pp. 87–90; Petko 2005). This funding approach provides that money intended by the state or province to help students of various need levels is actually attached to those students. WSF is now beginning to achieve recognition as a practical way to redress past inequities in funding the public education of students who are low income, poor, and either gifted or challenged (Miles et al. 2003, Roza and Hill 2004).

Houston

The Houston Independent School District (HISD) elected a reform-oriented school board and began decentralization in the early 1990s (McAdams 2000). They implemented the Edmonton model in 1999, after several visits to Edmonton.

The HISD differs from Edmonton because Edmonton has an exceptionally strong union, while collective bargaining is prohibited by law in Texas. The HISD also dictates the books that teachers must use in the primary grades, while Edmonton does not.

Houston principals were enjoying their new autonomy when we studied them. One commented:

> I have control over whether I want ten custodians or eight custodians, whether I want an additional assistant

principal or a business manager, whether I want to hire another math teacher or another history teacher. I don't need any approvals from anyone above to make these decisions. I do have to spend X amount on special education kids and Y on limited-English-proficiency kids, I have guidelines for how much I can spend on furniture, and approved vendors I'm supposed to use....

Seattle

In Seattle, businesses formed a coalition with community organizations and sponsored reform candidates for the school board. The new school board hired a nontraditional superintendent, retired Army Major General John Stanford, who visited Edmonton and then implemented the approach the following autumn (Stanford 1999). General Stanford died of leukemia during his third year as superintendent and was succeeded in that office by Joseph Olchefske, who continued to press the decentralization until he left office in 2003.

In the Seattle implementation of WSF, each school first receives a block allocation (approximately $195,000 to each elementary school, $418,000 to each middle school, and $529,000 to each high school in 2001–2002) and then its per-student funds. Weights in Seattle ranged from a minimum of 1.0 to a maximum of 9.2, with the student's weight multiplied by the basic allocation of $2,616 (for 2001–2002) to arrive at the weighted student funds for each student, which can range from $2,616 to $24,067 (Seattle Public Schools 2001). That amount follows the student to the public school of his or her choice, as in both Edmonton and Houston.

The design interventions in Edmonton, Houston, and Seattle were remarkably true to the original Edmonton formulation. We turn now to an examination of the consequences of these actions by the designers.

5. What Were the Consequences of These Actions?

Variety in Schools

One striking consequence of decentralization in all three districts was the development of a great variety of very unique schools, where previously all schools had been very similar. Consider the variation among three elementary schools in Seattle, among them the John Hay Elementary School (K–6) in an upper-middle-class neighborhood. At John Hay, the principal controlled approximately $25,000 before the change to decentralization and now controls about $2,000,000 per year, which is virtually the entire school budget. After the change, the principal, in consultation with her teachers, decided to throw out the standard schedule of six periods per day, and instead adopted an innovative schedule that made more efficient use of teacher time. The principal also used her new freedom to hire 12 part-time reading and math coaches and set up a tutoring station outside of every classroom with another station in a wide hallway for "turbo-tutoring" the gifted children. Now reading in that school is taught in groups of five to seven students, while other classes are in larger sections, and every student who is behind grade level receives one-on-one tutoring. Over a four-year period following the change, the school's standardized math scores rose from the 36th percentile to the 62nd, and reading scores rose from the 72nd percentile to the 76th. In third grade, black and white students now have identical reading scores, and all of them are at or above grade level.

In Seattle's Skid Row, the Bailey Gatzert Elementary School (K–6) serves a student population, about 30% of which are homeless, while 100% are low income and of color. These children all carry high weights, with the result that the school has enough money to hire the many specialists these children need. Teachers there have long tenure, which is unusual for such a school, and they reported that they stayed because WSF gave them the resources with which they could enable their students to succeed. As the study concluded, Bailey Gatzert School was preparing to shift from a traditional school year to one of 12 months, because the teachers unanimously believed it would better serve their unique group of students.

In the John Stanford Elementary School (K–6) in a section of Seattle near the University of Washington, the principal conducted a market survey. She found that her neighborhood predominantly included families of graduate students and young faculty, who were from all over the world. She thus designed a school in which every class is taught from a global perspective, and in which every first-grade student must choose a second language that is not their own and then receive half of their education in that second language in grades one through six. After one year of operation, the school had a waiting list of 170 families.

It is hard to imagine three elementary schools that are more different from one another than these three. These examples dramatize the way that decentralization permits each school to customize its staffing, schedule, materials, and teaching program to its unique constituency.

Basic Description of the Districts

The study compares the three innovative decentralized districts with three traditional districts that had attempted various forms of decentralization as described above, but that had remained centralized, never having attempted to move substantial budget control to local schools. Table 1 describes the six public school districts.

It is apparent that the three centralized public districts are much larger than any of the three decentralized public districts, although all 6 would be among the 100 largest districts were they all in the United States (Young 2002, p. 4). The resulting set is comprised of

Table 1 Description of the School Districts, 2001–2002

	Enrollment	Total operating budget	Per-pupil expenditure	Number of schools	Average school size
New York City Board of Education	1,105,045	$12.419 bill.	$11,823 per pupil	1,211	913
Los Angeles Unified School District	722,727	$6.966 bill.	$9,638 per pupil	789	916
Chicago Public Schools	435,470	$3.575 bill.	$8,210 per pupil	597	729
Houston Independent School District (WSF)	208,672	$1.160 bill.	$5,558 per pupil	288	725
Edmonton Public Schools (WSF)*	80,862	$0.465 bill.	$5,750 per pupil	209	387
Seattle Public Schools (WSF)	44,831	$0.435 bill.	$9,710 per pupil	94	477
Archdiocese of New York City	115,000	NA	NA	286	402
Archdiocese of Chicago	130,000	NA	NA	302	430
Archdiocese of Los Angeles	~100,000	NA	NA	269	372

*Edmonton data are in Canadian dollars.

the three largest U-form districts and the three largest M-form districts. Unfortunately, the small sample size made it impossible to control statistically for district size, political context, or to perform a statistical analysis of educational inputs versus outputs. A follow-on study now in progress with a larger sample will go further in this direction. There are also some missing data and some differences in financial reporting between districts. These, however, are not of great magnitude.

Decentralization of Decision Authority

The most critical indicator of the extent of decentralization was the proportion of school spending that is controlled by principals. Table 2 presents these results.

What is remarkable about the results in Table 2 is the consistency of local budget control in the three decentralized school districts. It should be noted that because these schools constitute the universe of districts that were using the Edmonton model (rather than a sample), statistical tests are not reported.

Administrative Ratio

We also measured the number of personnel who reported to the central office rather than to a principal. Table 3 presents these results.

Table 2 Percent of School Budget at Principal's Discretion, 2000–2001

		Principal's discretion		
Organization type (n)	Mean of principals (%)	District	Principal discretion (%)	Rank
1. U-form (3)	10.7	New York City	6.1	1
		Los Angeles	6.7	2
		Chicago	19.3	3
2. M-form (3)	76.5	Houston	58.6	5
		Seattle	79.3	7
		Edmonton	91.7	8
Mean (9) = 54.0%	Standard deviation = 35.1%			

We expected to find that districts that decentralize have fewer central office staff. Table 3 shows that the results generally support that expectation, but not unequivocally. In particular, both Houston and Seattle have larger central office staffs than we expected, perhaps because both are new at the M-form and are still shedding their formerly large central staffs.

In Edmonton, which has a very small central staff for its number of students, Superintendent Angus McBeath commented that,

> We have a small central staff. We can't afford more. All of the central maintenance staff have to sell their services to the schools. All of the consultation staff, plus the reading specialists, social workers, and psychologists.

Edmonton staff consistently reported that their practice of establishing a billing rate for central office services and permitting principals to buy services either from the central staff or from outside vendors had produced a notable improvement in the service orientation of the central staff employees.

School district officials typically feel that they are underfunded and thus cannot add enough teachers to reduce class size or to offer art, music, and sports instruction. Table 4 reveals that decentralized districts place far more of their money in the classroom than do centralized districts (according to accounting protocols established by Cooper and Associates 1994, and with Professor Cooper as consultant to our team).

Table 3 Central Office Staffs in Nine School Systems

Organizational type (n)	System	C.O. payroll FTEs	C.O. payroll FTEs per 100k students	Rank
1. U-form (3)	New York City	25,500	2,311	2
	Los Angeles	11,896	1,646	4
	Chicago	4,279	983	5
2. M-form (3)	Houston	3,730	1,787	3
	Edmonton*	437	540	6
	Seattle	1,613	3,401	1
Mean (9) = 1,234	Standard deviation = 1,169			

Table 4 Classroom Teacher Pay as a Percent of Total Budget

District	2001–2002 Operating budget (millions) ($)	Number of teachers	Avg. teacher salary ($)	Total teacher pay (millions) ($)	Pay as % of operating budget (%)	Mean (%)	Rank
New York City	13,236	79,156	47,763	3,781	28.6		1
Los Angeles	6,966	39,268	51,181	2,010	28.9		3
Chicago	3,575	26,348	50,411	1,328	37.2		4
U-form (3)						31.6	
Houston	1,160	13,060	43,070	562	48.5		5
Edmonton	465	4,382	55,000	241	51.8		6
Seattle	435	2,798	44,765	125	28.8		2
M-form (3)						43.0	
Grand mean (6)					37.3		

Again, Seattle is an outlier. Recall that Seattle had experienced a sharp drop in enrollment from about 100,000 students in 1970 to 39,000 by 1990. Seattle did not close schools as enrollment dropped (due to powerful neighborhood resistance to school closings), and the result is very small average per-school enrollment and relatively high administrative costs. This effect, combined with the previously mentioned large central staffs, has produced a low rate of classroom spending in Seattle compared to the other decentralized districts.

Student Performance

Perhaps the most important question was whether decentralization produces improved student performance. The analysis of test scores that follows should be viewed within the context of our interviews. Consider the opinions of Edmonton Superintendent Angus McBeath:

> Under centralization when somebody at the...board level asked how come kids in this school aren't doing better in mathematics...the principal would say, don't blame me. You guys select the staff, you decide how many I have, you pick the textbooks, you pick the methodology, and what am I in charge of?

A senior official of the teachers' union argued that decentralization has been the major cause of Edmonton's success:

> During the past twenty years, since we have become decentralized, we have become much more desirable as a district. People think that our schools are wonderful.

In Houston, a senior official commented on what is important about decentralization to principals: "You have to fly our flag, but you can decide how to run your school." One high school principal evaluated the new system as follows: "We have pretty much free rein to do whatever we need to, to improve the academic achievement of our students." An elementary school principal commented on her new situation:

> We can do practically anything we need to make this school successful.... We've started Saturday tutorials, mandatory for fourth graders by my decision, and optional for grades three, five, and six...to fund the tutorials, we are using extra "materials and supplies" money.

In Seattle, a senior official explained that,

> We had a one page staffing standard: every school gets one principal, one librarian, and one teacher for every twenty-eight kids. This plan decided the allocation of $200 million out of our budget of about $300 million. We were counting adults, not kids...we decided that we're in the student business, not the school business.... In a district that was viewed as incompetent, the core of our incompetence was the way that we spent money.... On curriculum, embedded in all this freedom is the idea that each school should pick its own way. It's not a one size fits all world.

The principal of a school in a wealthier neighborhood described her challenge:

> Having a pretty firm understanding that money accompanies the child, we know that viable enrollment will mean a viable school, so we pretty early on began thinking about recruitment. In this particular neighborhood, my focus had to be on looking at maintaining the parent group that we had that was middle class and more affluent, and pulling more of those parents in...public school can keep up with private school in terms of its academic rigor...we started looking at who is available to teach reading besides first grade teachers.... We said let's put some money together and hire a full time reading specialist to do nothing but teach us how to teach reading better and to take a small group. Largely we were able to start thinking that way because the weighted student formula came into place...we never got more money, by the way, out of WSF, we came out about even...we were just able to think about redistributing it.

A parent volunteer at the same school reacted this way:

> We really would not be able to do things through this partnership [between parents and teachers] if it wasn't for that site-based management or the autonomy. We would still be subject to what the district would be putting forth.

My observer's notes on one classroom included this selection:

> This is a first grade class and they are now doing literacy...half of the class has been pulled out and is with the reading specialist so that each can have a smaller group. The teacher has divided her remaining students into two subgroups, one of six students and another of

five. The group that is doing *Amelia Bedelia* is working at a higher level than the other team. One team is working on comprehension and analysis of an entire book and writing out full sentences to lay out their analysis. The other group is working on recognizing words like could, should, and reinforcing their ability to deal with words like me, my, home, and map.

With respect to student achievement, we were able to make only limited comparisons. Each state is free to use any standardized test of its choice, and several such tests are in use. However, Houston and the Los Angeles Unified School District (LAUSD) used the Stanford Achievement Test—Ninth Edition, or SAT 9. Seattle and Chicago used the Iowa Test of Basic Skills, or ITBS. Edmonton uses a provincial Alberta test and a local test. In every case we obtained achievement score results for every tested grade level for each year analyzed. We performed our own analysis and did not rely on the district to provide us with their computations of year-to-year comparisons, district averages, or comparisons between ethnic groups.

The most compelling comparison is between Houston and Los Angeles, because both are among the 10 largest U.S. districts, and both are about 90% minority in their student enrollment, with 80% from low-income neighborhoods. Table 5 displays the SAT 9 scores in reading and math for the comparison of students in Houston with those of the Los Angeles Unified School District.

Given the complexity of measuring student achievement, the results in Table 5 cannot be considered to be other than suggestive. Given that these two districts have nearly identical student demographics, however, the higher performance of the Houston schools might be attributable to decentralized management. The Texas Education Agency rates every public school in the state as exemplary, recognized, acceptable, or low performing. In 1993, Houston had no exemplary schools, four recognized, 186 acceptable, and 55 low-performing schools. By 2001, the distribution had changed to 35 exemplary schools, 88 recognized, 137 acceptable, and two low performing. The Houston district has been the subject of criticism by the national press for alleged misreporting of graduation rates and test scores, and surely Houston is not immune from these problems, which afflict nearly every public school district in the nation. However, our review of the evidence convinces us that the district has made real and dramatic improvements in student achievement.

We also have some limited longitudinal data on the ethnic achievement gap in these two cities. White and Asian students typically attain higher scores on standardized tests than do African-Americans or Hispanics (Tyack and Cuban 1995, pp. 22–28). If each of these groups will learn best under a different teaching approach, then decentralization should result in a smaller ethnic achievement gap, as McNeil (1999, pp. 209–216 and 2000, p. 270) and Oakes et al. (2000) have argued. We evaluated the ethnic achievement gap in Los Angeles and Houston, which had comparable ethnic composition, and both of which used the same standardized test. Table 6 presents the data. The achievement gap was reduced by a greater amount in Houston than in Los Angeles. These results for Houston are confirmed in a longitudinal study by Snipes et al. (2002, p. 91).

Although they are quite different in student demographics, we can also compare the districts that use the Iowa Test of Basic Skills: Chicago and Seattle. The Seattle students outscored their Chicago counterparts by 59 to 40 in reading, and by 65 to 44 in math, in 2001. These are very large differences, but Seattle has barely half the proportion of low-income students that Chicago does—and Seattle has 41% white students—compared to 10% in Chicago. In every grade level and on every test, Seattle students performed above the Washington state averages in 2001, despite the fact that Seattle is the most urban school district in the state. From 1990 to 2002, Seattle increased its enrollment from 39,087 to 44,831 and regained eight market share points from the Seattle private schools.

In Canada, school districts permit only aboriginal students to self-identify their ethnicity and do not record any measure of poverty for individual students, but do use neighborhood statistics for that purpose to classify some schools as "high needs" or "high transiency." Edmonton Public Schools estimates that 10% of its students are aboriginal. In Edmonton, 30.6% of households had incomes of less than $30,000 (Canadian) in

Table 5 Systemwide Scores for Three Districts

	1999	2001
SAT-9 systemwide reading scores (national percentile)		
LAUSD	28	33
Houston	38	42
SAT-9 systemwide math scores (national percentile)		
LAUSD	36	42
Houston	42	49

Table 6 The Ethnic Achievement Gap

Systemwide national percentile difference of whites/Asians vs. blacks/Hispanics

	1998	1999	2000	2001
Reading gap				
Los Angeles*	35	35	36	35
Houston		40	35	36
Math gap				
Los Angeles*	36	38	37	36
Houston		34	30	29

*Los Angeles scores only reflect students that take the test two years in a row and are therefore not directly comparable to other improvement scores.

2001, compared to 25.8% for the province of Alberta as a whole. Twenty-three percent of Edmonton children lived in single-parent households, compared to 17% for the province. Edmonton is a large, urban, mostly middle and low-income city. For all five years 1999–2003, Edmonton Public Schools achieved higher scores than predicted by prior achievement in all comparisons performed by the province, the only district in the province to have done so. The three-year high school completion rate for the tenth grade cohort rose from 51.1% in 1996 to 57.2% in 2000 and is predicted to rise to 63% for the 2004 cohort. Greene (2001, p. 16) reports that among the 50 largest U.S. districts, Chicago had a graduation rate of 47% in 1998, with Houston at 52%, New York City at 55%, and the LAUSD at 56%. Seattle was not among the 50 largest districts. Finally, virtually no private schools remain in Edmonton, with three of the largest remaining private schools and all of the charter schools having voluntarily become part of Edmonton Public within the past five years.

Although the comparisons between centralized and decentralized districts on student achievement are fragmentary and the number of districts is small, the pattern is consistent. The evidence supports the view that decentralized districts outperform centralized districts both in overall student performance and in reducing achievement gaps between racial groups. Decentralization is also attractive to teachers. A Lou Harris poll (2004) found that by a margin of four-to-one, California teachers (almost all of them unionized) would support adoption of the Edmonton model.

6. What Can We Learn from These Design Efforts?

The practical implications of this research are three: first, that effective decentralization must grant to each school autonomy over staffing, scheduling, and teaching methods. It is not enough for a superintendent to establish school-site advisory committees that have no control over the essential elements of an instructional plan, nor is it meaningful to declare that schools have control over their budgets and then have the state or district central office dictate a staffing formula, teaching methods, or schedules. Second, district central offices and state and federal education agencies should set standards and then audit performance. If a state dictates through categorical funds or detailed instructional rules what schools should do, or if a superintendent micromanages principals, they then have a conflict of interest if they attempt to audit or hold principals accountable. In effect, the superintendent (or the state education agency) is then auditing its own decisions. Instead, central offices should leave instructional decisions to the schools and then audit them carefully. Third, the public should have clear information on school performance. When families know just how much money their child's school has and how their school and school district compare to others, they will apply pressure for better performance.

If we take a step back, we might observe that the study of organizations is well served when the student closely observes not only organizations at rest, but also organizations as they undergo change, especially when they are the subjects of intentional design intervention. Natural change often moves an organization gently in roughly the direction that it was already going, while a designed intervention almost by definition seeks to take it in a new direction. When that happens, routines will be disrupted and much furniture broken, but perhaps the beating heart of the complex and subtle being will be revealed in new ways.

Acknowledgments

This research was funded through grants from the National Science Foundation (Grant # 0115559), Dr. Peter Bing, the John M. Olin Foundation, the Frank and Kathy Baxter Family Foundation, and the Thomas B. Fordham Foundation. The author wishes to acknowledge the work done on this project by Bruce S. Cooper, Lydia G. Segal, Carolyn Brown, Jennifer Carvallo, Timothy DeRoche, Elizabeth Galvin, John Gabree, Ning Chen, Bernice Tsai, James Mirocha, Stephanie Kagimoto, Kristina Tipton, and Jennifer Riss. The author also received helpful suggestions on early drafts from Fred Ali, Christine Beckman, Tom Boysen, Gloria Chalmers, Beverly Donohue, the late Harry Handler, Guilbert Hentschke, Tom Hofstedt, Sanford Jacoby, Dan Katzir, Barbara Lawrence, Paul Lawrence, David Lewin, Randy Moore, Allan Odden, Janice Riddell, Randy Ross, Morton Schapiro, Dorothy Siegel, Olav Sorenson, Deborah Stipek, Kaye Stripling, Joseph Viteritti, and Oliver Williamson, for which he is grateful. Bill Starbuck put as much of his thought and energy into the revisions as the author did into the first draft, and the author thanks him for his help.

References

Beck, L., J. Murphy. 1996. *The Four Imperatives of a Successful School*. Corwin Press, Thousand Oaks, CA.

Blau, P. M., R. Schoenherr. 1971. *The Structure of Organizations*. Basic Books, New York.

Bryk, A. S., P. Bender Sebring, D. Kerbow, S. Rollow, J. Q. Easton. 1998. *Charting Chicago School Reform: Democratic Localism as a Lever for Chang*. Westview, Boulder, CO.

Chandler, A. D., Jr. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Belknap Press, Cambridge, MA.

Chapman, R. 1973. Decentralization: Another perspective. *Comparative Ed.* **9**(Oct) 127–134.

Chubb, J. E., T. M. Moe. 1990. *Politics, Markets, and America's Schools*. The Brookings Institution, Washington, D.C.

Cooper, B. S., Assoc. 1994. Making money matter in education: A micro-financial model for determining school-level allocations, efficiency, and productivity. *J. Ed. Finance* **20**(Summer) 66–87.

Corcoran, T., J. B. Christman. 2002. The limits and contradictions of reform: The Philadelphia story. Report, Consortium for Policy Research in Education, Philadelphia, PA (Nov).

Ferris, J. M. 1992. School-based decision making: A principal-agent perspective. *Ed. Evaluation Policy Anal.* **14**(4) 333–346.

Fiske, E. B., H. F. Ladd. 2000. *When Schools Compete: A Cautionary Tale*. Brookings, Washington, D.C.

Goertz, M. E., G. A. Hess, Jr. 1998. Processes and power in school budgeting across four large urban school districts. *J. Ed. Finance* **23**(4) 490–506.

Greene, J. P. 2001. High school graduation rates in the United States. Manhattan Institute for Policy Research, New York (Nov).

Hannaway, J. 1993. Decentralization in two school districts: Challenging the standard paradigm. J. Hannaway, M. Carnoy, eds. *Decentralization and School Improvement*. Jossey-Bass, San Francisco, CA, 135–162.

Hannaway, J. 1996. Management decentralization and performance-based incentives: Theoretical considerations for schools. E. A. Hanushek, D. W. Jorgenson, eds. *Improving America's Schools: The Role of Incentives*. National Academy Press, Washington, D.C., 97–109.

Harris, L. 2004. Report on the status of public school education in California 2004: With special emphasis on the status of equality in public school education. William and Flora Hewlett Foundation, Palo Alto, CA, 7–9.

Honig, M. 2003. The view from the edge: The progress of Oakland unified school district's central office in the implementation of site-based decision-making and new small autonomous schools. College of Education, University of Maryland, College Park, MD, 26.

Honig, M. I. 2004. District central office-community partnerships: From contracts to collaboration to control. *Educational Administration, Policy, and Reform: Research and Measurement*. Information Age Publishing, Greenwich, CT, 59–90.

Joyce, B., E. Calhoun, eds. *Learning Experiences in School Renewal: An Exploration of Five Successful Programs*. ERIC Clearinghouse on Educational Management, Eugene, OR.

Malen, B. 1994. Enacting site-based management: A political utilities analysis. *Ed. Evaluation Political Anal.* **16**(3) 249–267.

March, J. G., H. A. Simon. 1958. *Organizations*. Wiley, New York.

McAdams, D. R. 2000. *Fighting to Save Our Urban Schools... and Winning!* Teachers College, New York.

McNeil, L. M. 1999. *Contradictions of Control: School Structure and School Knowledge*. Routledge, New York, 234.

McNeil, L. M. 2000. *Contradictions of School Reform: Educational Costs of Standardized Testing*. Routledge, New York, 304.

Miles, K. Hawley, M. Roza. 2004. Understanding student-based budgeting as a means to greater school resource equity. Working paper.

Miles, K. Hawley, M. Roza, K. Ware. 2003. Leveling the playing field: Creating funding equity through student-based budgeting. *Phi Delta Kappan* **85**(2) 114–119.

Mohrman, S. A., P. Wohlstetter, & Assoc. 1994. *School-Based Management: Organizing for High Performance*. Jossey-Bass, San Francisco, CA.

Oakes, J., K. Hunter Quartz, S. Ryan, M. Lipton. 2000. *Becoming Good American Schools: The Struggle for Civic Virtue in Education Reform*. Jossey-Bass, San Francisco, CA, 385.

O'Day, J. A. 2002. Complexity, accountability, and school improvement. *Harvard Ed. Rev.* **72**(3) 1–31.

Odden, A., C. Busch. 1998. *Financing Schools for High Performance*. Jossey-Bass, San Francisco, CA.

Ouchi, W. G., L. G. Segal. 2003. *Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need*. Simon and Schuster, New York.

Petko, Mike. 2005. *Weighted Student Formula (WSF): What is it and How Does it Impact Educational Programs in Large Urban Districts?* National Education Association, Washington, D.C.

Ravitch, D. 1974. *The Great School Wars: A History of the New York City Public Schools*. Johns Hopkins University Press, Baltimore, MD.

Roza, M., P. Hill. 2004. How within district spending inequities help some schools to fail. D. Ravitch, ed. *Brookings Papers on Education Policy*. Brookings Institution Press, Washington, D.C.

Seattle Public Schools. 2001. *Budget Allocations to the Seattle Schools for the 2001–2002 School Year*. Seattle Public Schools, Seattle, WA.

Segal, L. 2004. *Battling Corruption in America's Public Schools*. Northeastern University Press, Boston, MA.

Sizer, T. R. 1992. *Horace's School: Redesigning the American High School*. Houghton Mifflin, New York.

Snipes, J., F. Doolittle, C. Herlihy. 2002. Foundations for success: Case studies of how urban school systems improve student achievement. Report, Council of the Great City Schools, Washington, D.C. (Sep).

Stanford, J. 1999. *Victory In Our Schools*. Bantam, New York.

State of Hawaii. 2004. Twenty-Second Legislature. *Act 51* (May) 84.

Stein, M. K., L. Hubbard, H. Mehan. 2004. Reform ideas that travel far afield: The two cultures of reform in New York City's district #2 and San Diego. *J. Ed. Change* **5** 161–197.

Strembitsky, M. A. 1997. Accountability: Perception versus reality. *School Bus. Affairs* **63**(11) 3–5.

Terrien, F. C., D. C. Mills. 1955. The effects of changing size upon the internal structure of an organization. *Amer. Soc. Rev.* **20**(Feb) 11–13.

Tucker, M. S., J. B. Codding. 1998. *Standards for Our Schools*. Jossey-Bass, San Francisco, CA.

Tyack, D., L. Cuban. 1995. *Tinkering Toward Utopia: A Century of Public School Reform*. Harvard University Press, Cambridge, MA.

Van Langen, A., H. Dekkers. 2001. Decentralization and combating educational exclusion. *Comparative Ed.* **37**(3) 367–384.

Walberg, H. J., S. J. Paik, A. Komukai, K. Freeman. 2000. Decentralization: An international perspective. *Ed. Horizons* **78**(3) 153–164.

Washington State House of Representatives. 1990. Report of an evaluation of the Seattle public schools. Washington State (Nov).

Williamson, O. E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press, New York.

Williamson, O. E., W. G. Ouchi. 1981. The markets and hierarchies and visible hand perspectives. A. H. Van de Ven, W. E. Joyce, eds. *Perspectives on Organization Design and Behavior*. Wiley, New York, 347–370.

Wohlstetter, P., A. Van Kirk, P. J. Robertson, S. A. Mohrman. 1997. *Successful School-Based Management: A Report with Cases*. Association for Supervision and Curriculum Development, Alexandria, VA.

Young, B. Aronstamm. 2002. Characteristics of the 100 largest public elementary and secondary school districts in the United States: 2000–01. National Center for Education Statistics, Washington, D.C.

25

NEA RESEARCH

April 2005

Weighted Student Formula (WSF)

What Is It and How Does It Impact Educational Programs in Large Urban Districts?

NATIONAL EDUCATION ASSOCIATION
nea.org
Great Public Schools for Every Child

NEA RESEARCH

April 2005

Weighted Student Formula (WSF)

What Is It and How Does It Impact Educational Programs in Large Urban Districts?

Mike Petko
NEA Research

Prepared by passage of and in accordance with New Business Item 2004-18.
NEA will conduct an analysis of "weighted student formula," also known as "student-based budgeting," and how it impacts the educational programs in large urban districts. This information will be published in an issue of NEA Today, *made available on the NEA Web site, and will appear in other publications.*

NATIONAL EDUCATION ASSOCIATION
www.nea.org
Great Public Schools for Every Child

The National Education Association is the nation's largest professional employee organization, representing 2.7 million elementary and secondary teachers, higher education faculty, education support professionals, school administrators, retired educators, and students preparing to become teachers.

Complimentary copies of this publication are available in limited numbers from NEA Research for NEA state and local associations and UniServ staff. Call 202-822-7400. This publication may also be downloaded from www.nea.org.

Published April 2005

Contents

Forward

What is "weighted student formula," you ask? After reading *Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need* (published in 2003 by William Ouchi, University of California–Los Angeles Professor of Management, and Lydia Segal, John Jay College Associate Professor of Criminal Law and Public Administration), I had the good fortune of being invited to Edmonton, Alberta, Canada, to meet with its school district leaders. For those of you who don't know, "weighted student formula" was born in Edmonton thirty years ago, the brainchild of former superintendent Mike Strembitsky.

Currently, a Google search of "weighted student formula" yields nearly 2,000 different Web pages. And they all say something different.

"Weighted student formula" represents a major shift in the ways district monies are allocated. Money would be put directly into the hands of principals, decentralizing a district's budgeting system. Principals would be allowed the autonomy of allocating funds at the school level. Per-pupil dollars would be determined by the type of students in a particular school. It is foreseeable that principals might opt to hire inexperienced teachers as a cost cutting measure. Administrators might view experienced and higher-salaried teachers as a liability. Money would follow students as they change schools, and the system could theoretically empower parents to choose schools that would best suit their children's needs.

Well, I have some questions about all this.

Can we really expect our principals to be able to handle this, especially given their lack of experience and the high turnover rates in some of our neediest schools?

Can we assume that parents are going to just up and leave, taking their children clear across town, given the fact that many families have serious transportation issues?

Will we experience the misrepresentation of students' needs and the deleterious mislabeling that goes with it by those in pursuit of real dollars?

Will we get the appropriate and ongoing training necessary in our schools with high turnover rates of administrators, teachers and support staff, and parents?

NEA: We need to clarify, address, and remain eternally vigilant toward some of these very big issues.

Thank you.

Manny Lopez
California Teachers Association Delegate
Speaking at the 2004
NEA Representative Assembly in Washington D.C.

Executive Summary

This paper partially fulfills the charge set out by New Business Item (NBI) 18, passed at the 2004 NEA Representative Assembly, requiring that—

NEA will conduct an analysis of "weighted student formula" also known as "student-based budgeting," and how it impacts the educational programs in large urban districts. This information will be published in an issue of NEA Today*, made available on the NEA Web site, and will appear in other publications.*

The funding system known as "weighted student formula" (WSF) is a method for allocating resources to schools. It is becoming increasingly popular among urban school districts that want to improve the equitable distribution of limited resources. But, there is a misunderstanding about WSF's impact on public schools and their programs because WSF is often confused with school-based management (SBM).

Both WSF and SBM are part of the broader reform effort known as "decentralization." Many of the studies researched for this paper put a positive spin on WSF, but they fail to place WSF in the context of this broader decentralization effort. This failure makes analyzing WSF's impact on public schools—especially on large urban schools—difficult at best. This paper addresses this failure by first placing WSF in the context of decentralization efforts and then analyzing its impact on schools and on school programs.

Since *A Nation at Risk: The Imperative for Educational Reform* (National Commission on Excellence in Education 1983) was published, public schools have been on the defensive, in some cases trying to justify their very existence. Large urban school districts have had to defend against a half-century's worth of rapid and profound changes, including the onslaught of the baby boom generation, rapid growth, and changing demographics due to suburban migration. Along with population changes, funding changes have also put pressure on urban school districts. Although the Individuals with Disabilities Education Act (IDEA) and the Elementary and Secondary Education Act (ESEA) were created to provide federal funds for education, they have in fact proved limiting.

One benefit of *A Nation at Risk* and the passage of IDEA and ESEA has been to create a large body of literature dedicated to studying diversity in schools. Along with increased diversity in schools have come increased challenges to the teaching profession. Yet, many of the funding programs tied to IDEA and ESEA have effectively conjoined school districts, serving to establish a one-size-fits-all education system. This appears to be counterproductive to the Acts' intended purposes. Also, post-1960s education finance litigation has highlighted the lack of funding for students with special needs. The challenges such issues raise identify the root of the problem as being education funding. Funding levels have never been sufficient to meet the increased demands presented by *A Nation at Risk*, IDEA, and ESEA.

Faced with increasing challenges, schools, districts, and states have sought to create reform methods to address school funding shortages. Weighted student formula is one such method, and it is gaining in popularity. WSF is a school funding method where funds follow students. Most states fund students based on a formula, where special needs are given additional funding above a base funding level. Through WSF, funding is not averaged across districts but, rather, follows students into—and out of—whichever schools they attend.

Great Britain has used WSF for decades, but only recently has WSF made inroads to North American school districts. The Edmonton school district in Alberta, Canada, has used WSF since the early 1980s. Several U.S. urban school districts—Houston, Seattle, Los Angeles, Chicago, Denver, and Milwaukee—have implemented WSF. Most also use an SBM system for administering WSF funds.

The main reason given for using WSF is that funds follow students into the school, which means schools have more funds to meet students' individual needs. Other reasons given include increased autonomy, improved equity, and increased accountability.

While WSF and SBM are both part of the broader decentralization effort, WSF is a method for allocating revenues *to* programs and SBM is a method for managing revenues *and* programs. While both need not necessarily coexist in a district, most research indicates that using both in tandem with one another reaps the greatest benefit for WSF. The WSF research tends to exacerbate the confusion. Most of the research literature includes SBM in any discussion of WSF without identifying the fact that SBM and WSF are not synonymous. As a result, weighted student formula is often confused with school-based management. *Weighted student formula and school-based management are not the same thing.*

WSF radically changes the funding system of a school and school district. The funding change per student can be as radical as a 10-to-1 differential. Proponents of WSF point to its positive impacts, stating that dollars will follow students and create needed funds in those schools where individual programs should be created, rather than district-wide. The rationale is that schools using WSF and SBM will become more efficient.

The underlying motivator behind WSF is decentralization. As noted, both WSF and SBM are part of a broader decentralization effort. As a result, research focusing on WSF's benefits is really supporting decentralization. It becomes problematic, then, for lay readers to differentiate between specific impacts of a particular WSF program and broader impacts of decentralization efforts. To date, no study itemizes the impact of WSF on school performance. Most studies focus on schools and districts with a full decentralization plan in place. Because such plans combine WSF and SBM, the two systems' individual impacts become merged.

Available research does not address funding adequacy very well. Among this research is an implied understanding that WSF demonstrates that current district funding levels are adequate. This implies that the problem lies with districts' organizational structures. The question, therefore, gets reframed as one of efficiency rather than of adequacy. What decentralization proponents seem to be assuming is that decentralization automatically creates more efficient schools. If schools are more efficient, goes the argument, then they will provide students with improved educational opportunities. Some preliminary studies of decentralization's overall impact in this regard do appear favorable, but questions about research methodology remain.

Quality research requires collecting data over time to demonstrate impacts. To date, there are not enough empirical data to warrant a wholehearted acceptance of either WSF or decentralization. Preliminary studies demonstrate *some* positive impacts, but a note of caution must be raised. Public education funding and budgeting do not fit neatly into business models of administration and efficiency because public education is politically driven, not profit driven. What must be remembered is that one of the primary goals of public education is to promote the development of good citizens, not line the pockets of special interest groups. Thus, the position of research should be one of cautious support for investigating any implementation of decentralization, which can include both WSF and SBM. There are some initial positive findings within the currently available research suggesting that decentralization—but not necessarily WSF or SBM—may work well for certain types of districts.

Full Report

Large urban school districts have faced budget problems since the onslaught of the baby boom generation. Rapid growth has been a primary factor, but as the urban setting changed and the population characteristics changed financing problems also changed. Early problems dealt with space and personnel issues. There never seemed to be enough of anything when an urban school district experienced significant population growth. When the population demographics changed, and urban sprawl created the suburban movement, inner-city schools faced an unprecedented challenge.

Changing demographics moved funds from cities to suburban areas, a change that redirected the tax base for funding urban schools. As the tax base dwindled, urban school districts faced an increasing problem of servicing a student population that was becoming increasingly poorer. Yet the cost of providing educational services continued to increase, especially with the advent of the Individuals with Disabilities Education Act (IDEA) and the Elementary and Secondary Education Act (ESEA).

Both IDEA and ESEA created new expenditure programs for education. The student population was viewed as diverse with diverse needs. But diversity was not the problem. The problem was that the increased awareness of student diversity revealed an increased need for additional funds to address the new areas of instruction created to handle the required needs of certain student populations. At first the federal government promised that IDEA and ESEA would provide the necessary funding, but neither program has ever been fully funded to meet student needs or to maintain pace with inflation. Thus, the increased funding has fallen more on state budgets and the rising cost of providing special education programs has outpaced that of other education expenditures, which has placed an additional burden on urban school districts.

The obvious solution is to provide schools with the funding they need to service increased federal requirements. However, this obvious solution is currently politically charged and elusive. The traditional method of funding government programs through taxation has become a hot potato as, more and more, taxes are viewed as a "burden." The link between taxes and government services has not been endorsed by politicians from either side of the aisle, and society as a whole has abdicated its responsibility to provide for the benefit of all involved.

The problem, however, remains. How to provide funding for struggling schools is still a major issue facing state budgets. Coupled with this funding problem is the problem of equity. Equity in school funding relates to the concept of equal treatment of equals. How do school districts ensure that each student's need is met and that funding dollars are allocated appropriately? Current research in the area of urban school funding has focused on resource allocation practices. There is a growing body of research that supports the implementation of a relatively new system of allocating resources within a school district based on individual student needs. The system shows promise in creating equity within a district, but it cannot be viewed as a panacea for every state's budget woes. The system is known as "weighted student formula," or WSF.

What is WSF?

A WSF program is known by various names—student-based budgeting, school-based financing, and student-weighted budgeting. Although WSF is a relatively young budget method, it is already being implemented in a limited number of urban school districts across the United States. The basics of WSF relate to the method of allocating resources to the schools within a district based on certain characteristics of the student population and not on the traditional method based on the number of students and/or personnel. It decentralizes funding from the district level to the school level. Resources for the school are not determined by the traditional full-time equivalent (FTE) count but by the actual demographic characteristics of the students within the school.

Although WSF has been used in Great Britain for many years, its exposure in North America is limited to only a handful of large urban school districts (see Appendix B, page 19). The Edmonton, Alberta, Canada, school district implemented WSF in 1980–81, and provides approximately 80 percent of the total district's budget for WSF with 100 percent of school-level funds managed at the school level. Districts in the United States apply anywhere from 38.34 percent (Denver) to 95 percent (Milwaukee) of their total district budget for WSF. The percentage of WSF funds managed by the schools makes up as little as 20 percent of total funds (Oakland) to as high as 100 percent of total funds (Chicago, Denver, Los Angeles, and Seattle).

There are a number of reasons for implementing a WSF program. The National Association of State Boards of Education (2003) provides four factors for implementing a WSF—

1. *Efficiency.* WSF creates a system that provides a common sense groundwork for budgeting where decisions are made based on the particulars of individual students. Also, personnel assume a greater role and have a higher level of commitment to the process.
2. *Adequacy and equity.* By making the funding follow the student, equity among schools is improved because funds for extra needs are attached to the student and not to the school. Basically, if a student moves from one school to another school within a district, the student's needs don't depend on two independent school budgets.
3. *Element of competition.* The WSF system creates a motivation for schools within a district to retain students by offering the best possible programs.
4. *Linking funding to overall school improvement efforts.* WSF can be implemented with SBM to enhance the distribution of resources within a school.

The greatest benefit put forward by WSF proponents is that the funding follows the student directly into the school and that the funding is not determined by an arbitrary formula, a formula that may or may not provide the school with adequate funds to meet a student's needs. Equity for school funding is viewed from the perspective of equity based on the student's needs and not on the composite needs of the entire student body. From this perspective, if students of similar ability each retain the same level of funding no matter what school within a district they attend, then the system is equitable.

Funding through WSF does create a system where resources are distributed more equitably. All students are not equal in ability and need, and WSF reflects that diversity in its method of allocation. Further, a school's ability to develop curricula and hire personnel is improved with a WSF system over a traditional staff-based system.

How do FTE and WSF differ?

Traditionally, school districts are funded according to FTE status, and funds are passed through the districts to the schools through a formula based on staffing needs. The formula is very simple:

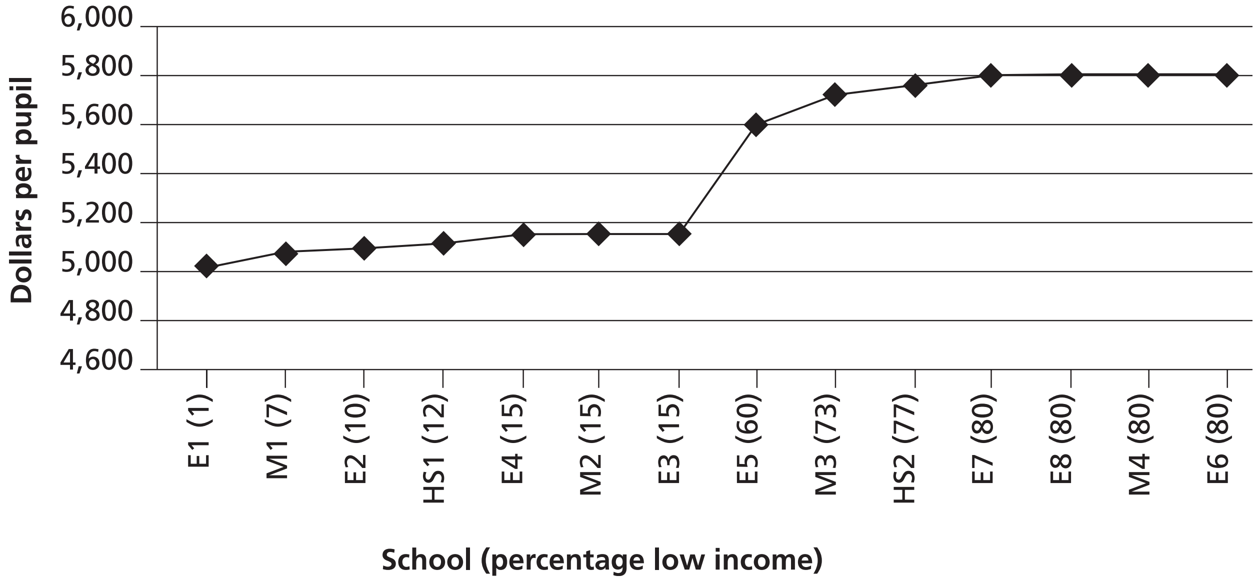
Enrollment/Approved staffing ratio = Staffing needs

If a district had 1,500 first-grade students with a required staffing ratio of 20:1, the number of staff needed for the school would be determined by the formula:

1,500/20:1 ratio = 75 staff positions

The number of staff positions becomes more difficult to translate into the individual school. If a school had only 100 first-grade students, then it would be given five staff positions. If the school had 65 first-grade students, then it would be given three staff positions. The remaining students would be counted as one-quarter of a staff position, making it difficult to hire an additional teacher unless the principal could make up the difference by finding additional one-quarter staff positions among other grades. However, the newly created makeshift staff position would require that teacher to teach multiple preps for the same pay as other teachers.

FIGURE 1 Impact of WSF on Funding Based on Percentage of Low-income Students



With WSF, the student brings the funds into the school and the principal bases staffing on the number of students, which could actually reduce the teacher-student ratio within that school. If the school had only 65 first-grade students, the principal could split all 65 among four teachers, with all classes under the 20:1 ratio.

Appendix A (page 15) provides a comparison analysis of the impact of funding from FTE and WSF at a hypothetical school district. In a traditional FTE funding system, each school within a district would receive equal funding for each student based on the district's aggregate student demographics. Even with a weighted system for special needs, if an FTE funding system were used staffing would be based on the number of students within the school. Under an FTE system, schools in well-to-do neighborhoods with a low population of special-needs students would receive the same level of funding per student.

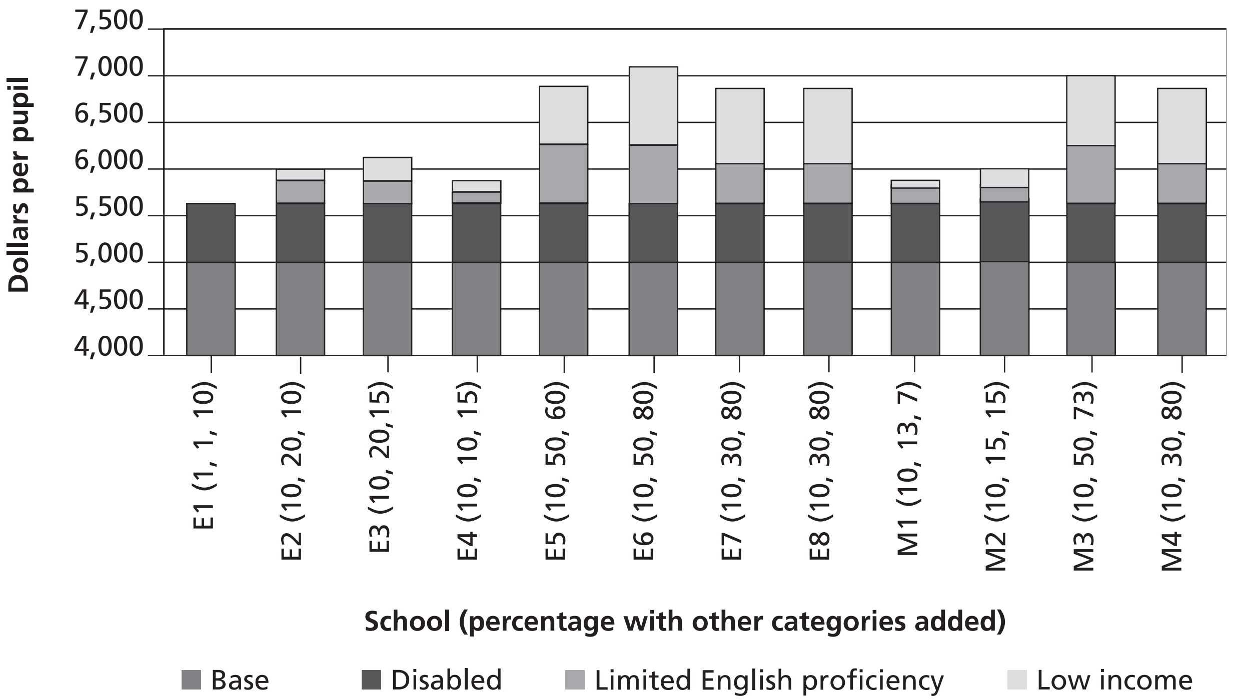
As Appendix A illustrates, the FTE method generates $6,636 of funding per student. However, when a WSF system is used, schools with more special-needs students receive more funding per student than schools with more traditional students. In Appendix A, the range in funding per student can be as low as $5,763 to as high as $7,075. This difference reflects the differences in the student population within each school. Although individual schools may have more funds to use, the theory of weighting according to student need would require additional funds for additional services for those students. Schools with a higher concentration of low-income students, for example, would receive additional funds to provide tutoring and counseling services. FIGURE 1 illustrates the impact WSF has on a school's per-student funding based on the percentage of low-income students.

In FIGURE 1, schools are labeled E (elementary), M (middle), and HS (high school). The number in parentheses next to the school label represents the percentage of low-income students within that school. Of the fourteen schools represented (taken from Appendix A's hypothetical district), those with a higher concentration of low-income students receive higher funding per student. The highest level reached is $5,800 for an 80 percent concentration. Funding levels would also change if the weights for each child were to change.

Itemizing these numbers further reveals that the funding per student for various other categories creates a level unique to an individual school's student population characteristics. FIGURE 2 shows the variation in per-student funding for the same schools in FIGURE 1, except that disability and limited English proficiency have been added. The more varied an individual school's individual student population characteristics, the more varied the per-student funding for that school.

FIGURE 2 illustrates that all schools receive the same amount of base funding per student, and because all the schools have a 10 percent special education population each receives an additional share per student of equal funds. In FIGURE 2, the difference comes for those schools that have higher percentages of limited English proficiency and low-

FIGURE 2 Variation in Funding When Other Categories are Added



income students. Schools with the highest percentages of those students receive the highest funding per student.

Because of the mixture within the student population, school E6 in FIGURE 2 has the highest level of per-student funding ($7,075) among the schools in the hypothetical district. The implication for reallocating resources in this manner is that school E6 would now have a funding level adequate for providing the level of services appropriate for students with additional needs.

One difficulty with this assumption, however, is that there is confusion in the research literature between WSF and SBM. Implementing WSF does not necessarily lead to an efficient management system. Thus, proponents of WSF also promote implementing an SBM system to complement the decentralized resources (Deroche et al. 2004). Current research often mingles both WSF and SBM together, as though they were one and the same. They are, in fact, two distinct methods derived from an overall decentralization theory.

This would probably be more evident to lay readers if the research literature focused primarily on decentralization and its impact on school programs. But, because both WSF and SBM often get mentioned in a paper's title, readers tend to interpret results as though there were a direct connection between the two. Such a misunderstanding would be eliminated if more research focused on decentralization's organizational aspects and impacts rather than on only one of decentralization's many components, namely WSF. Some research does attempt to focus on decentralization's organizational aspects and on its impact on schools and school programs (Ouchi et al. 2002, Ouchi et al. 2003, Ouchi 2004). But, again, the findings of this research are very positive, describing how decentralization has helped schools organize programs to better meet student needs. Edmonton's public schools, for example, are cited as having improved so much that a majority of Edmonton's citizens prefer them over private schools (Ouchi et al. 2002).

WSF is not SBM

As has been mentioned, WSF is a method of decentralizing the resource allocation for a school. Instead of aggregating FTEs and weighted FTEs for a district and then dividing by the number of FTEs per school, the WSF method calculates resources based on the individual school's FTEs and weighted FTEs. This shifts the resources into those schools with higher concentrations of special-needs students. This process, however, is often confused with the method used for budgeting, or managing, those resources. The method of budgeting, SBM, is a system for managing resources once they are already in the school.

An SBM system decentralizes the budgeting process to give the school more control over managing its resources. The idea is similar to WSF, in that SBM decentralizes control. But the methods, first of distributing resources and then of managing resources, are *two distinct processes.* Therefore, using WSF does not necessarily lead to using SBM. Appendix B, which compares WSF among ten North American urban school districts, illustrates that some of the districts that use WSF do not allow for all the funds to be managed at the school level. However, most of the school districts using WSF also allow school sites to manage some or all of the funds. Oakland, for example, allows schools to manage only 20 percent of WSF funds. Philadelphia and Milwaukee allow 67.3 and 70 percent, respectively.

WSF and SBM do not necessarily have to coexist within a district that uses WSF. But using SBM does complement a WSF system. Using SBM with WSF requires a strong, well-designed training program, and such a program can help school principals navigate budget process complexities (Ouchi et al. 2002). Within a district, principal training usually includes more personnel training than budget training. But, if WSF and SBM are to be used together successfully, principals must be given the necessary training to handle the complexities of budgeting as well as of personnel administration. The need for additional training may be more than some districts are prepared for, but a smooth transition will come with proper preplanning and development.

The confusion is exacerbated by the research literature. To date, most research studies incorporate a discussion of SBM within a discussion of WSF (see, for example, Fermanich et al. 2000, Miles and Roza 2004). This makes it difficult to separate out and isolate the true impact of WSF. Any measured WSF impact is colored by the presence of SBM. Since some districts using WSF also use SBM, determining the impact of WSF by itself is difficult. However, there is evidence that using both WSF and SBM does lead to improved student achievement (Archibald 2001, Ouchi 2004).

How does WSF impact schools and school programs?

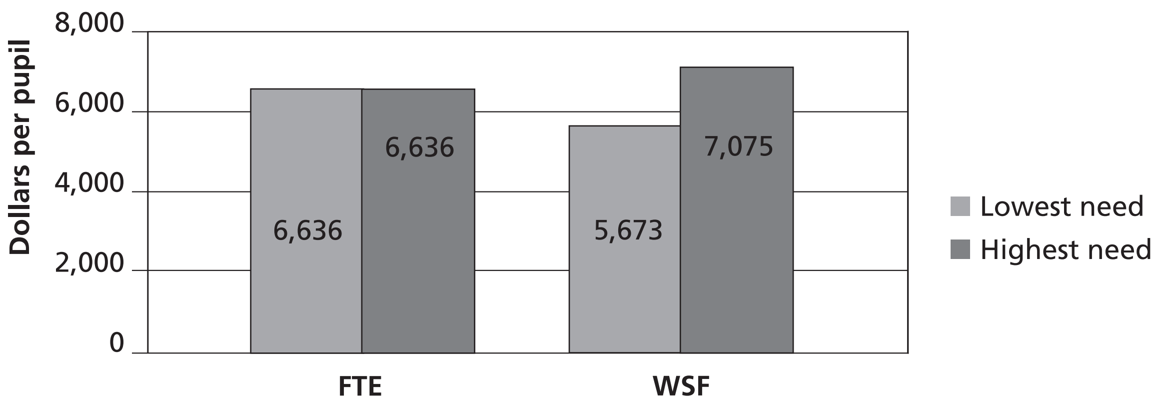
There has been some research on the impact of decentralization on school efficiency (Stiefel et al. 1999). But concluding that a WSF system will enhance efficiency would be premature based on the paucity of research in this area. "Efficiency" is a term applied to the method of distributing and using funds, capital, and personnel. The business community prizes the strong relationship between efficiency and productivity, and this may explain the involvement of such business luminaries as William Ouchi in WSF study and promotion. The more efficient the system the more profitable it is for business. In an effort to reform school productivity, economists and business researchers have used efficiency rhetoric and methodology in an attempt to define and improve school effectiveness. The intent is to modify a business efficiency model and apply it to education to make education more "effective" and, therefore, more "productive." The theory is that improved functionality will lead to improved productivity (i.e., test scores).

As has been mentioned, WSF and SBM are not the same thing. Does allocating resources weighted on a per-student basis actually help an individual school? And how does WSF affect school programs? Schools are politically driven, not profit driven. Since schools, children, and the political environments in which they exist are diverse, the answers to these questions are not simply "yes" or "no." If a district's intention is to provide student funding so services can be provided at the school level, then WSF makes sense because WSF allows individual schools to provide staffing services that meet the needs of the immediate student population. The influx of money to the individual school seems to make sense. However, the change in resources may have a negative impact on schools, and it is this potential that should be considered when determining if WSF makes sense.

The current report does not question the need for some sort of change in the method of funding schools. What it does question is whether WSF is an effective program for improving schools. The need for more funds in schools is supported by research and by 30-plus years of court rulings. Recent school funding litigation cases have focused on funding adequacy rather than on funding equity. WSF is a method that improves funding equity, but it does not address whether funding is adequate. Simply put, adequacy means there are enough funds flowing into schools to create education environments where learning can occur that enables students to meet state standards. There is little in the research literature to support a contention that WSF provides adequate funding (Archibald 2001).

Rather, the issue of adequacy is implied by most research studies, which tend to assume that using WSF will provide adequate resources to individual schools. The theory is that if a school has additional funds for students

FIGURE 3 Comparing FTE and WSF Based on Funding



with special needs then it can develop additional programs to meet those needs. The theory, however, confuses WSF with SBM. Most of the studies that illustrate positive impacts on school programs focus attention on curriculum reforms rather than on funding levels. This creates an implied impact of the funding scheme that is not, in fact, measured by the studies. However, the difficulty of proving conclusively that WSF increases adequacy should not deter from the positive results that are being reported with the combined usage of WSF and SBM.

For example, a study conducted by the Consortium for Policy Research in Education (Archibald 2001) illustrates the positive impact a combined WSF/SBM program had on student achievement. The study reports that the district had changed its funding program to WSF where funding followed the student. Although the results indicate that student achievement improved (especially since the high school in the study was previously closed due to poor performance), the results cannot be attributed solely to the use of WSF. There were dramatic changes to the school's entire program, and the addition of basic restructuring techniques—reduced class size, reduced teacher loads, block scheduling, and so forth—may have had more to do with improvements than implementing WSF.

Impact on schools. FIGURE 3 illustrates the change in the level of per-student funding between FTE and WSF for two different schools within Appendix A's hypothetical district.

The two schools represented in FIGURE 3 are elementary schools E1 and E6. If the traditional FTE funding method were used, then both schools receive equal per-student funding. When a WSF funding method is used, the school with the highest-need students receives the highest level of funding per student. In this scenario, the lowest-need school will see a significant drop in its per-student funding. School E1's per-student funding will drop $963, from $6,636 to $5,673, a 15 percent decrease. The highest-need school, E6, will see its per-student funding increase $439, from $6,636 to $7,075, a 7 percent increase.

The difference in funding between the two hypothetical schools is obvious. The higher-need school is the larger of the two, so increases in funding are spread out because of economies of scale. The impact of funding changes using a WSF system will definitely have a higher impact on smaller schools. (For a demonstration of such positive and/or negative impacts, see TABLE A2 on page 17.)

Some research on decentralization has found that changes in funding can have dramatic impacts (Ouchi et al. 2003). In Seattle, for example, a normal allocation for a student in the year 2001 was $2,600, while the most needy student (i.e., multiple learning disabilities, low income, English language learner) was allocated as much as $23,920. The infusion and/or loss of such a large amount of funding can have a dramatic impact on the types of programs and/or staff a school is able to fund. Just two special-needs students of this type would be enough to fund a complete teaching position.

The fact that the larger schools experience the least impact on funding levels indicates that WSF would be easier to implement among larger schools and school districts that benefit from economies of scale. Also, the majority of research that illustrates the positive impacts of WSF focuses on large urban school districts (Archibald 2001, Fermanich et al. 2000, Odden 2000, Miles and Roza 2004). Before assessing WSF's effectiveness as a budgeting tool for an overall statewide program, more research will be needed. Even the current research demonstrates that positive changes do not occur overnight, but occur over a period longer than four years after WSF is first implemented (Miles and Roza 2004).

One cause of the delayed benefit of WSF is the complexity of the budgets that make up school funding. This complexity comes not only from allocation formulas but from previous expenditure patterns that cannot be easily changed. Thus, implementing a WSF system does not guarantee instant success in achieving equity. The overall consensus of the research indicates that implementing a WSF system requires increased flexibility at the school district and school site levels. Also, there appears to be a consensus that a successful WSF system is enhanced by the degree of SBM allowed within the district.

Other complexities within school spending patterns include the methods used to determine expenses per school. For example, evidence from current research does illustrate that calculating personnel expenditures per school based on an average salary for the district greatly distorts the expenses per school. Many school districts allow experienced teachers to transfer within a district based on seniority. Thus, schools with percentages of higher-need students could have the least experienced teachers while having the lowest personnel payroll. However, such schools would receive the highest amount of funding. Although this problem can be addressed using an SBM system, there are issues regarding the quality of teaching that need to be considered and that a WSF system does not necessarily address.

Impact on school programs. This question is by far the hardest to answer. One difficulty arises from the relationship of WSF to SBM. On its Web site, the Cincinnati Public Schools (2001) provides an illustration of information pertaining to the proposed funding impact on school programs during the 2001–02 school year. Its list comprises 77 schools ranging from 181 students to 1,951 students per school. Out of the 77 schools listed, 32 (42 percent) of them will lose revenues due to the shift toward WSF. The hardest hit schools (as a percentage change) are the smallest, with one school (194 students) losing $574,646 (30.8 percent of 2001–02 revenues). Losing almost a third of its budget is going to have a dramatic impact on a school's organizational and programmatic function. The potential for this kind of impact is one reason WSF proponents advocate using SBM with WSF and implementing a program slowly over a period of years, with some components—such as teacher compensation—implemented over a ten-year period (Deroche et al. 2004). One study (Archibald 2001) notes that small, negatively impacted schools received additional funds to offset the negative impact.

Another impact on school programs relates indirectly to the control principals have over their individual budgets. Effectiveness becomes an issue with this variable, and most research concludes that the more decentralized a system is the more efficient the schools become. This level of efficiency translates into more funds reaching classrooms and also lower teacher/student ratios (Ouchi and Segal 2003). The amount of funds per classroom is one of the variables used to measure adequacy. The preliminary research results seem to conclude that shifting resources using WSF does provide an increase in funding that is directed toward specific areas of need, which enhances student achievement.

Questions about WSF

Are there problems? Caution should be applied at this point. Most of the research showing improvement in student performance admits that the results require more time and analysis. Thus, the findings that WSF and SBM improve student performance are preliminary. There is also the question as to whether the amount of funding can be sustained on a long-term basis. The preliminary data do support the contention that funding for special needs should be increased, but the question should be whether the current funding levels in districts will increase over time, whether they will fall prey to political forces trying to drain public education of dollars, or whether current levels are adequate. Again, preliminary data do show some improvem in student performance, with standardized tests used as the benchmark for performance. However, even the research literature raises questions about the veracity of such findings because of the variety in testing procedures, which makes uniform analysis of the findings difficult to achieve.

Would it place additional burdens on staff? The answer to this question is that the evidence is unclear. Any transition will require some smoothing, and the move from a centralized to a decentralized process will require major changes in the method of administering personnel and budgets. Such a shift in responsibility places additional burdens on already overwhelmed professionals. If additional responsibilities are added without adding additional incentives, school personnel may begin to feel overburdened, overused, and underappreciated.

One study (Apodaca-Tucker and Slate 2002) describes the impact of SBM on principals. However, it is focused narrowly on the implementation of SBM and does not address the principals' impressions of the overall program. Also, no mention is made of whether the SBM also included WSF.

Would it create transportation problems if school choice were included? One difficulty in answering this question is that no study has been conducted to address it. Does this make the question moot? The immediate answer is: not at all. School choice within districts is available in many states. Florida, for example, allows parents to send children to other schools within a district if space is available. Different states use different transportation methods. Some transport students using city bus routes. Others require parents to provide transportation. Magnet schools and special education schools are available in many states, and transportation is often provided by the districts.

Implementing a WSF program does not necessarily lead to school choice, and school choice does not necessarily lead to transportation problems. However, if choice is available, then transportation should be addressed. Parents without the means should not be penalized because they want their child to attend school across town.

Would it create incentive to mislabel students? Currently, there is no connection between WSF (or SBM, for that matter) and the increase of special education funding within a school. The potential to seek additional funds through alternative labeling practices is possible. However, without direct statistical evidence or thorough research addressing such a potential connection, the answer remains elusive. There is anecdotal evidence suggesting that the possibility of schools practicing such a tactic exists. Apocryphal stories, however, are not reliable research data and should not be used for policy decisions.

This does not mean that states, districts, and education associations should not be diligent in monitoring such a potentiality. Even though labeling a student as a "special education student" does not carry the stigma it once did—and society's move toward diversity and inclusiveness has provided increased acceptance of special education students—some sort of control should be established to prevent abuse. However, monitoring such activity becomes problematic at the national level and remains an action requiring local effort and monitoring.

Would it increase staff training costs? Current research does not focus on this issue. Just because researchers do not focus on it, though, does not mean that increased cost would not be created by increased need. In schools with high staff turnover rates, for example, the need for additional and ongoing training is obvious.

The solution, then, to a potential increase in costs is to lower turnover rates. Implementing WSF does not immediately reduce high turnover; the problem is systemic and not related to the type of budget or resource allocation method used. There are other concerns and reforms that need to be implemented in order to reduce high turnover. In fact, a change toward a WSF or SBM system may actually cause more problems for a school that experiences high turnover. Increased training needs, for example, could pull resources away from other categories.

Does it provide adequate funding? Surprisingly, this question is not addressed directly within the research literature. WSF is a budgeting method for reallocating resources that already exist within a district. It is not a system for increasing funding of educational services. The concepts of adequacy and equity are related to one another, but they are not identical. Equity in school funding explains how funding is provided to students at equal levels of need—parity among equals. Adequacy, on the other hand, addresses sufficiency in the level of funding for educational services. Adequacy, then, is the provision of a sufficient level of resources. WSF does not address whether a funding level is sufficient to meet the educational needs of students.

To date, no costing-out study in any state has concluded that the level of resources within a state meets an acceptable standard of adequacy. The budgeting method known as WSF only provides that the current level of funding for educational services follows the student. It does not address the question of need.

However, research should address the questions of efficiency and sufficiency. Does WSF create a resource allocation system where funds are used efficiently? Being able to measure efficiency would provide additional data for measuring adequacy. Some anecdotal evidence does not support the notion that WSF positively impacts student test scores (Archer 2005). Even the Edmonton school district, which has used WSF and SBM since 1980–81, has not seen a dramatic rise in student test scores.

Conclusions

The budget system known as WSF shows promise in helping large urban school districts provide funding equity to schools. It focuses attention on the individual student and not on the "average" student. Thus, resources are allocated to a school based on the student characteristics of the school's student population. This is a program that should find support within schools that have traditionally struggled with staffing problems due to budgeting systems that view a school district's macro characteristics rather than a school site's micro characteristics.

There are some concerns about WSF that do not seem to be addressed in the current research literature. One major concern involves the level of funding, or adequacy. Adequacy is a different concept than equity. Adequacy addresses whether funding is sufficient to meet educational objectives. Currently, WSF does not address this issue. However, WSF may address the issue of efficiency, and the research suggests a tenuous link between efficiency and adequacy. Within the research literature, this link has not been developed well, and the question of how much money is needed to meet certain educational objectives remains unanswered.

Other concerns center around the issue of capacity. Are there enough resources to provide the level of training necessary for successfully implementing WSF? Will implementation create strain on already overworked professionals? To date, there is no research that addresses these questions. Most of the research focuses on the question of equity, and WSF does produce a more equitable system. Equity questions are sociological—they address quality. The questions above address capacity.

Whether or not WSF creates transportation problems for poor students is a question not directly related to whether or not a district implements a WSF program. Transportation issues relate to the school choice issue. If a district allows school choice, transportation could become an issue. But, most districts that do incorporate a level of choice also provide some system of student transportation. There are districts that do not, of course, but the majority of them do. Transportation is not a nonissue, however; costs charged to a school could become a concern for schools that use WSF.

Weighted student formula will require time to prove effective or ineffective for large urban schools. Preliminary data show that there is some positive impact, but only when WSF is used as part of a larger decentralization program. The use of WSF for small schools or rural schools does not appear beneficial because of the impact on the smaller schools. Further, WSF appears to be a beneficial system for improving the efficiency of resource allocation. No research currently addresses the connection between resources and output (i.e., student achievement). If WSF is to become the method of budgeting funds for large urban schools, then more analysis of its impact on system efficiency and student achievement must take place.

Appendix A
Comparing FTE and WSF at a Hypothetical District

TABLE A1 Number of Students by Percentage of Weighted Enrollment Per School

	Number of students	Percentage enrolled: Disabled	LEP	Low income
Elementary				
E1	100	10	1	1
E2	200	10	20	10
E3	200	10	20	15
E4	200	10	10	15
E5	300	10	50	60
E6	500	10	50	80
E7	500	10	30	80
E8	500	10	30	80
Middle				
M1	300	10	13	7
M2	400	10	15	15
M3	800	10	50	73
M4	1,000	10	30	80
High school				
HS1	700	10	14	12
HS2	1,800	10	39	77
Total students	7,500			

This hypothetical district is created to allow the elementary schools to feed students into the middle schools, which in turn feed students into the high schools. Elementary schools E1 and E2 feed into middle school M1, and so forth. Middle schools M1 and M2 feed into HS1, and M3 and M4 feed into HS2. The demographics of the students within the schools are listed in the other columns for disabled, limited English proficiency, and low income. Each elementary school is given a hypothetical number. Elementary schools E1 and E2 are sited in affluent areas within the district. Elementary schools E3, E4, and E5 are sited in middle- to upper-middle-income areas, and elementary schools E6, E7, and E8 are sited in low-income areas. The purpose of this hypothetical scenario is to illustrate the impact a WSF funding method would have if certain conditions were present.

Base funding for this hypothetical district is set at $5,000. Weighted funding is based on the scale—

Weighted Funding Scale

Student category	Weight
Disabled	1.30
Limited English proficiency	0.25
Low income	0.20

TABLE A2 Comparing overall Funding from FTE and WSF

	Number of students	Funding ($)		Percentage change
		FTE	SWF	
Elementary				
E1	100	663,613	567,250	-15
E2	200	1,327,227	1,200,000	-10
E3	200	1,327,227	1,210,000	-9
E4	200	1,327,227	1,185,000	-11
E5	300	1,990,840	2,062,500	+4
E6	500	3,318,067	3,537,500	+7
E7	500	3,318,067	3,412,500	+3
E8	500	3,318,067	3,412,500	+3
Middle				
M1	300	1,990,840	1,764,750	-11
M2	400	2,654,453	2,395,000	-10
M3	800	5,308,907	5,604,000	+6
M4	1,000	6,636,133	6,825,000	+3
High school				
HS1	700	4,645,293	4,161,500	-10
HS2	1,800	11,945,040	12,433,500	+4
Total students	7,500			

As the funding level changes from a traditional FTE method to a WSF method, schools with a higher concentration of students receive more funds.

Table A3 Comparing Per-student Funding from FTE and WSF

	Number of students	Funding ($) FTE	Funding ($) SWF
Elementary			
E1	100	6,636	5,673
E2	200	6,636	6,000
E3	200	6,636	6,050
E4	200	6,636	5,925
E5	300	6,636	6,875
E6	500	6,636	7,075
E7	500	6,636	6,825
E8	500	6,636	6,825
Middle			
M1	300	6,636	5,883
M2	400	6,636	5,988
M3	800	6,636	7,005
M4	1,000	6,636	6,825
High school			
HS1	700	6,636	5,945
HS2	1,800	6,636	6,908
Total students	7,500		

As funding is changed from FTE to WSF, the funding patterns per school also change accordingly. Per-student funding does not appear equalized, but equity is based on need and not on dollars. With WSF, funding for all students within a district who are disabled, LEP, or low income receive equal resources. Under FTE, those students do not necessarily receive equal resources.

Appendix B
Comparing WSF among Urban School Districts

TABLE B1 WSF in 10 North American Cities*

	Edmonton	Baltimore	Chicago	Denver	Los Angeles	Milwaukee	New York	Oakland	Philadelphia	Seattle
Approximate total budget for all funds	$545 million	$881 million	$4.4 billion	$910 million	$9.8 billion	$1 billion	$12.5 billion	$600 million	$1.9 billion	$453.3 million
Approximate percentage of total budget for weighted-student formula	80	46	52	38.34	88	95	63.1	53	77	56
Approximate percentage of school-level budget applied to decision-making	100	93	100	100	100	70	unknown	20	67.3	100
Number of students (K–12)	81,400	101,338	435,000	67,665	732,974	103,400	1,130,580	54,000	213,842	44,300
Number of schools	205	183	597	134	929	165	1,198	93	284	97
Number of schools decentralized	205	183	567	134	705	165	233-HS 691-E and M	5	264	97

* Modified from data found on the Cross City Campaign for Urban School Reform web site at http://www.crosscity.org/downloads/10city2001.pdf, retrieved March 28, 2005.

References

Apodaca-Tucker, M. T., and J. R. Slate. 2002. "School-Based Management: Views from Public and Private Elementary School Principals." *Education Policy Analysis Archives* 10(23). Retrieved March 24, 2005, from http://epaa.asu.edu/epaa/v10n23.html

Archer, J. 2004. "'Weighted' funding of schools gains favor." *EdWeek.org* November 3. Retrieved March 24, 2005, from http://www.edweek.org/ew/articles/2004/11/03/10weighted.h24.html

Archer, J. 2005. "An Edmonton Journey." *EdWeek.org* January 26. Retrieved March 24, 2005, from http://www.edweek.org/ew/articles/2005/01/26/20edmonton.h24.html

Archibald, S. 2001. *A Case Study of Dramatic Resource Reallocation to Improve Student Achievement: Harrison Place High School.* Madison: University of Wisconsin, Consortium for Policy Research in Education. Retrieved March 24, 2005, from http://www.wcer.wisc.edu/cpre/papers/pdf/Harrison%20SF%205-01.pdf

Cincinnati Public Schools Board of Education. 2001. "School-Based Budgeting per Pupil." Retrieved March 28, 2005 from http://www.cpsboe.k12.oh.us/general/reform/sbbdgtng/PerPupil12_3.pdf

Cross City Campaign for Urban School Reform. n.d. "Advocacy & Action: School-Based Budgeting." Retrieved March 24, 2005, from http://www.crosscity.org/advocacy_action/advocacy_budget_weight.html

Deroche, T. R., B. S. Cooper, W. G. Ouchi and L. Segal 2004."When Dollars Follow Students: The Political Viability, Equity, and Workability of Weighted Funding Formulas." *The School Administrator Web Edition* August. Retrieved March 28, 2005, from http://www.aasa.org/publications/sa/2004_08/deroche.htm

EdSource. 2004 "'Weighted Student Formula' Concept Enlivens School Finance Debate." *EdSource Issue Brief* May. Retrieved March 24, 2005, from http://www.edsource.org/pdf/WeightedStuForm04.pdf

Fermanich, M., A. Odden, and S. Archibald. 2000. *A Case Study of District Decentralization and Site-based Budgeting: Cordel Place School District.* Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education.

Griggs, F. 1999. "School money now to follow the student." *The Cincinnati Post* January 7. Retrieved March 24, 2005, from http://www.cincypost.com/news/1999/skl-bud010799.html

Hawai'i Educational Policy Center. 2003. *Adoption of a Student Weighted Formula for Funding Hawai'i's Public Schools: Policy Issues.* Honolulu: Author. Retrieved March 24, 2005, from http://www.hawaii.edu/hepc/pdf/Reports/StudentWeightedFormula.pdf

Miles, K. H., and M. Roza. 2004. *Understanding Student based Budgeting as a Means to Greater School Resource Equity.* Seattle: University of Washington, Center on Reinventing Public Education. Retrieved March 24, 2005, from http://www.crpe.org/workingpapers/pdf/SBB_MilesRoza.pdf

Miles, K. H., K. Ware, and M. Roza. 2003. "Leveling the Playing Field: Creating Funding Equity through Student-Based Budgeting." *Phi Delta Kappan* 85(2): 114–119. Retrieved March 24, 2005, from http://www.pdkintl.org/kappan/k0310mil.htm

National Association of State Boards of Education. 2003. "School-Based Financing." *Policy Update* 11(7). Retrieved March 28, 2005, from http://www.nasbe.org/Educational_Issues/Policy_Updates/11_7.html

National Commission on Excellence in Education. 1983. *A Nation at Risk: The Imperative for Educational Reform.* Washington, DC: U.S. Government Printing Office.

Odden, A. 2000. "The New School Finance: Providing dequacy and Improving Equity. *Journal of Education Finance* 25(Spring): 467–488.

Ouchi, W. G. 2004. *The Implementation of a Decentralized Organization Design in Three Large Public School Districts: Edmonton, Seattle, and Houston.* Los Angeles: University of California, Anderson School of Management. Retrieved March 24, 2005, from http://www.anderson.ucla.edu/documents/areas/fac/hrob/Decentralized.pdf

Ouchi, W. G., and L. G. Segal. 2003. *Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need.* New York: Simon & Shuster.

Ouchi W. G., B. S. Cooper, and L. G. Segal. 2002. *The Organization of Primary and Secondary Schools.* Los Angeles: University of California, Anderson School of Management. Retrieved March 24, 2005, from http://www.williamouchi.com/docs/lessons_for_california.pdf

Ouchi, W. G., B. S. Cooper, L. G. Segal, T. DeRoche, C. Brown, and E. Galvin. 2003. *Organizational Configuration and Performance: The Case of Primary and Secondary School Systems.* Los Angeles: University of California, Anderson School of Management. Retrieved March 24, 2005, from http://www.williamouchi.com/docs/primary_secondary.pdf

Roza, M., and K. H. Miles. 2002. *Assessing Inequities in School Funding within Districts: A Tool to Prepare for Student-Based Budgeting.* Providence: Annenberg Institute for School Reform at Brown University. Retrieved March 24, 2005, from http://schoolcommunities.org/images/SBB_Tool.pdf

Roza, M., and K. H. Miles. 2002. *Moving toward Equity in School Funding within Districts.* Providence: Annenberg Institute for School Reform at Brown University. Retrieved March 24, 2005, from http://schoolcommunities.org/images/Presentation.pdf

Shapiro, T. 2005. "School board tries to put a value on each student." Honolulu Advertiser.com January 14. Retrieved March 24, 2005, from http://the.honoluluadvertiser.com/article/2005/Jan/14/ln/ln15p.html

Stiefel, L., A. E. Schwartz, and R. H. Rubenstein. 1999. "Measuring School Efficiency Using School-level Data: Theory and Practice." In M. E. Goertz and A. Odden, eds., *School-Based Financing.* Thousand Oaks, CA: Corwin Press.

Ucelli, M., E. Foley, T. Emdon, and C. Bond. 2002. *First Steps to a Level Playing Field: An Introduction to Student-based Budgeting.* Providence: Annenberg Institute for School Reform at Brown University. Retrieved March 24, 2005, from http://schoolcommunities.org/images/SBB.pdf

NATIONAL EDUCATION ASSOCIATION
nea.org
Great Public Schools
for Every Child

Research
1201 16th St., N.W. | Washington, DC 20036-3290
202-822-7400

26

Variation is the Norm: A Landscape Analysis of Weighted Student Funding Implementation

MARGUERITE ROZA, KATHERINE HAGAN, AND LAURA ANDERSON

School districts increasingly rely on weighted student funding (WSF), yet there is little research on this allocation model. This study collects more than 70 measures on each of 19 districts using WSF in 2018 for a landscape analysis of formula features and implementation practices. While districts report common reasons for adopting WSF (equity, flexibility, and transparency), we find no standard WSF model. Homegrown formulas and nonformula features and exemptions reflecting local context are the norms, resulting in substantial differences. Nearly all districts continue to budget with average salaries (likely limiting equity) but grant principals flexibility on staffing, stipends, and contracts.

INTRODUCTION

Over the last two decades, some of the nation's largest districts have shifted from deploying resources to schools based on staffing formulas to instead allocating *funds* to schools based on the mix of students in the building. This allocation strategy is known as weighted student funding (WSF) or student-based allocation (SBA). Rather than apportion staff or other purchased inputs to schools, districts using WSF deploy a fixed dollar amount to schools for each student type with larger increments for student types identified as having greater needs. A student type can include English language learners (ELL), students with disabilities, or students in families living in poverty, for example. Today, roughly three dozen large, predominantly urban districts (including those in New

Marguerite Roza is a Director, Edunomics Lab, Research Professor, Georgetown University, 2341 Eastlake Ave. E, Suite 350, Seattle, WA 98102. He can be reached at *mr1170@georgetown.edu*.
Katherine Hagan is Research Associate at Edunomics Lab, 2341 Eastlake Ave. E, Suite 350, Seattle, WA 98102.
Laura Anderson is Associate Director, Edunomics Lab, 2341 Eastlake Ave. E, Suite 350, Seattle, WA 98102.

York City, Boston, Denver, Houston, and Chicago) purport to use WSF or are cited in the literature as using WSF to distribute some portion of their total budget (Koteskey 2016). Yet even as WSF systems continue to expand, now serving millions of K-12 students, research has focused on a single objective of WSF in one district or a small group of districts rather than comprehensively documenting the range of active WSF formulas and relevant implementation details across multiple districts and states in a given year.

APPLICATIONS FOR PRACTICE

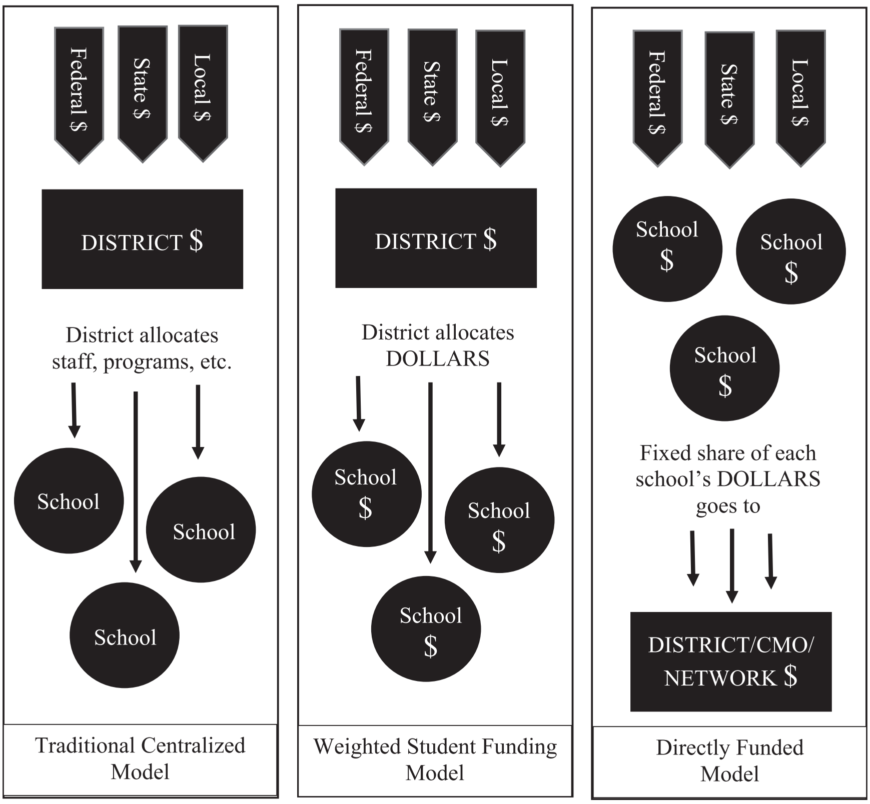
- School districts currently using weighted student funding models can explore how peer districts have implemented WSF, the formulas they use, and the flexibilities they allow as they consider changes to their own formula.
- School districts considering weighted student funding models can understand why other districts made the shift and how a district can tailor implementation to its own context.
- Where there is limited curriculum on school-level allocation methods, faculty in colleges of education and education policy programs—as well as other professional development providers—can use the visualization (Figure 1) to describe and explain the three major allocation methods that describe how different districts allocate funds to schools.

This landscape analysis attempts to fill that void by documenting WSF formulas and implementation features across districts where evidence confirms the usage of WSF in the 2017-18 school year. The analysis builds a newly created database of more than 70 data points. We identify the study districts' reported rationales for implementing WSF and collect and analyze a wide range of formula details and nonformula features that impact allocations to schools.

Consistent with the literature, we find the most commonly cited reasons for implementing WSF are equity, transparency, and school-level spending flexibility. But while districts might have common reasons for using WSF, our analysis finds that there is no standard or "off-the-shelf" formula and districts are implementing WSF quite differently. While district formulas do tend to provide increments to higher-needs students (in categories typically defined by states and the federal government), no two formulas look the same. WSF district formulas differed in how they defined the base, the magnitude of the weights, whether student needs were defined by cost or student characteristics, as well as what districts include or exclude in their formulas. Such variation is perhaps unsurprising, given that districts appear to build "homegrown" approaches to WSF rooted in their own policy and fiscal contexts. And such variation may be desirable, enabling the WSF model to be customized to local district and community needs. Our exploration of implementation in this paper includes the nature of the allocation formulas and factors related to transparency and flexibility. Our subsequent research will investigate whether (or the extent to which) these allocations have the intended effect of improving equity and their effects (if any) on achievement gaps.

To our knowledge, the database for this landscape analysis represents the most comprehensive cross-district comparison to date on WSF formula designs, details, and implementation features. Interest in WSF is growing, as more state and federal policy proposals promote WSF, and as large districts increasingly adopt the strategy. Because this analysis gathers data from the landscape of all districts operating WSF systems as of the 2017-2018 school year, it adds timely analysis to the literature in that it advances understanding of WSF as it is currently practiced in 19 districts.

FIGURE 1
How Schools Receive Resources: Three Allocation Approaches.



BACKGROUND

WSF describes a method by which schools receive resources and can be described as one of three general approaches to how schools are resourced, as shown in Figure 1. In a traditional centralized model, the host district deploys resources to schools in the form of staff, programs, and services. In the directly funded model, dollars are delivered directly to schools from the funding sources, an approach most commonly observed with charter schools. In this model, schools may still affiliate with a managing entity, such as a district or charter management organization, by directing a portion of their funding to that entity in exchange for receiving shared services, such as financial services and human resources, among others.

In the decentralized WSF model, the district receives the funding, but then directs a portion of those funds to schools—in the form of dollars, not staff—based on the number and type of students in each school. Rather than receive fixed staff positions, schools in a WSF model receive a dollar allocation for every student. Students with characteristics that are linked to a need for greater resources are then "weighted" above the given base to generate additional dollars (Ladd 2008; Miles and Roza 2006; Petko 2005).

Generally, the WSF model has been defined as schools receiving a fixed-dollar amount for each student, for example, $6,000 per pupil, with additional increments of, say, $1,000 if the student is ELL, and those dollars are distributed to schools based on the actual students they enroll. Typically, WSF models permit school leaders some flexibility to purchase staff and other resources; dollars are allocated to schools based on their counts of students and student types.

Some reports indicate that systems move to a WSF model to address equity (Ladd 2008; Miles and Roza 2006). Indeed, the literature suggests that traditional staffing-based models may not deploy funds equitably across schools for reasons such as school size factors, special program allocations, nonformulaic allocations, and uneven staff salaries (Miles and Roza 2006; Rose and Weston 2013; Roza and Hill 2004). Other reasons cited for the shift to WSF are to improve transparency in school funding and permit school-level flexibility in resource use (Levin et al. 2013; Miles 2013; Miles and Roza 2006).

Several concerns around the potential impacts of WSF have been raised in the literature. Some concerns center on schools' or specialized programs' possible loss of resources in a WSF reallocation (Mandell 2016; McCoy 2016). Other concerns center on the risk that principals granted spending flexibility will direct funds in ways that benefit some chosen few (Before It's News 2016). To date, the lack of research on WSF implementation has made it difficult to evaluate the pervasiveness of the conditions and practices that underlie such concerns.

WSF is generally credited as originating in Edmonton, Canada, in 1976 (Brewer and Picus 2014). Implementation of WSF originated in the U.S. with Seattle Public Schools in 1997 (Cooper et al. 2006). As of 2018, a total of 27 U.S. districts use WSF (Levin et al. 2019), with three more now added to that list.[1] WSF districts and those considering the model are some of our nation's largest districts,[2] serving approximately 10 percent of U.S. K-12 students. As the number of districts using WSF continues to grow,[3] understanding how these districts are using this allocation mechanism is important to examine how systems can address pressing education challenges, such as equity and improved outcomes.

Despite increasing attention to and more than two decades of growth in the WSF model, we know little about both the formula details and how many WSF districts are using this allocation mechanism (Birdsall 2017). Most research in this area has focused on a single objective of WSF in one district or a small group of districts. Equity studies by Miles and Roza (2006) and Chambers et al. (2008) each studied two WSF districts, and Baker (2012) examined one WSF district and four non-WSF districts in Texas. Ouchi (2006) compared outcomes for six districts (only three used WSF), Baker and Elmer (2009) examined outcomes in two WSF districts, and

---

[1]See list in Levin et al. plus districts in New Orleans, Puerto Rico and Clark County, Nevada.

[2]As of this drafting, our Student-Based Allocation Network comprises 45 districts using or considering WSF.

[3]In 1997 there was one WSF district serving 47,629 students; in 2000, three WSF districts serving 356,254 students; in 2010, 13 districts serving 1.8 million students; and in 2020, over 30 districts serving 5.1 million students.

Birdsall (2017) studied one WSF district (Houston ISD). Even research on school-level flexibilities focused on a small number of WSF districts. For instance, Vasudeva et al. (2009) studied Oakland USD; Levin et al. (2013) studied one state, Hawaii, and considered one district; and Cooper et al. (2006) studied three WSF districts. While these previous studies have yielded important findings for the field, including evidence of improved equity (Chambers et al. 2008; Miles and Roza 2006) and promising evidence on outcomes (Birdsall 2017; Ouchi 2006), their size and scope limit conclusions—or even generalizations—about the model.

Leaders implementing WSF or operating WSF districts may be hindered by the limited research about what constitutes "typical" WSF implementation or what peer districts are doing and what has been tried elsewhere. In fact, the field has not yet developed a common vocabulary about WSF implementation or the categories of features that may be present among districts. This lack of a universal lexicon complicates practitioner efforts toward collective learning and collaboration, as well as research.

This landscape study is designed as a first step in a broader research agenda that will attempt to explore the scope and range of WSF implementation in U.S. school districts in a single year, 2017-18. To begin the exploration of the potential benefits and drawbacks of WSF, this study documents and analyzes implementation variations across existing WSF sites, particularly as they relate to fundamental areas, such as equity, transparency, and flexibility. Beyond building the research base on WSF, the study is designed to inform policymaker and practitioner understanding of WSF *as practiced* in U.S. school districts, particularly those currently engaged in, or considering, WSF.

RESEARCH DESIGN

To explore how WSF is implemented in districts, we investigate in this paper four research questions around implementation features and how they compare across systems:

1. What do districts publicly report as the rationales for implementing WSF?
2. What are the WSF formula details, including the share of district dollars driven through the WSF formula as well as the types, magnitudes, and dollar amounts of base allocations and student weights?
3. What are the nonformula features that affect the allocation, including formula exemptions and special considerations, such as the use of actual versus average salaries?
4. To what extent does implementation align with two of the commonly cited rationales for adopting WSF: transparency (in district-to-school allocation) and flexibility (including school control of staffing, salaries, and other financial decisions)?

STUDY DISTRICTS AND DATA COLLECTION/ANALYSIS

This study is designed as a snapshot in time to capture <u>all</u> qualifying districts using WSF in the 2017-18 school year. Identifying the full landscape of districts using WSF was an enormous challenge, as no reliable tracking of district allocation models exists anywhere. We began with a review of the literature and public documentation that surfaced an initial set of 38 school districts that self-identified or had been cited in the literature or by peers as using WSF at any point in time (Koteskey 2016; Koteskey and Snell 2017). District materials used various terms to describe their allocation approaches, such as "Weighted Student Funding," "Weighted Student Formula," "Student-Based Allocation," "Student-Based Budgeting," "School-Based Budgeting," "Per Pupil Formula," and "Fair Student Funding." To be considered for inclusion in this study, districts had to have been using WSF in the 2017-2018 school year using a common definition of WSF. To establish a common definition, we drew on work from Miles and Roza (2006) and Ladd (2008) to identify two essential criteria for consideration as a WSF study district:

1. Some portion of district funds are allocated to schools on a per-pupil basis and must include funds for staffing, and
2. The funding formula expends different per-student amounts based on weighted student-identified characteristics.

This is not a universally accepted definition of WSF. We have seen districts cited as WSF that do not meet these criteria, such as in the Brookings Institution's 2016 Education Choice and Competition Index (which does not offer a specific definition used). The lack of a common definition around what constitutes WSF highlights the difficulty of comparing WSF systems.

After examination of district financial documents and follow-up phone calls, 19 districts, shown in Table 1 below, were determined to have met the study eligibility criteria.[4]

Two unusual cases include the Springfield Empowerment Zone (representing an autonomous district running 11 schools that are a subset of the Springfield, Massachusetts, school system) and Hawaii (which is considered both an LEA and a state agency). Both met the criteria established here and are included in the study.[5]

Data collection began with the exploration of all publicly available district materials, including district websites, expenditure reports, external district communications, press releases, school board meeting minutes and supporting materials, district officials' media statements, state financial data files, and strategic plans. In addition, we initiated email or phone exchanges with study district finance officials, as needed, to fill any gaps in data and/or obtain qualitative information. Unless otherwise specified, all financial data are from the fiscal year 2018. All

[4]Districts excluded were those in Oakland, Hartford, Cincinnati, and Seattle (because they no longer used WSF as of 2017-18); New Haven, Los Angeles, Philadelphia, Rochester, and St. Paul (where leaders had considered or piloted WSF at one point but did not implement it); Atlanta and Shelby Co. (where WSF was adopted the year after 2017-18); Hamilton, Adams 12, Clark Co., Lawrence, and Stockton (where document review did not find evidence of use in 2017-18 or application to funds for staffing); Falcon 49 (where the formula is used to disseminate funds to regions of the district, but not to schools); and Poudre and Santa Fe (because leaders were nonresponsive to efforts to determine if WSF was use in 2017-18).

[5]While study districts were not selected for demographic comparability, all are considered by NCES as "city: large" or "suburban: large." See also: Hawaii State Data Center (2013).

TABLE 1
19 Study Sites, Year of Initial Implementation, and District Size FY2018

Baltimore City Public Schools (Baltimore, MD)	2008	80,592
Boston Public Schools (Boston, MA)	2012	55,594
Chicago Public Schools (Chicago, IL)	2014	361,314
Cleveland Metropolitan School District (Cleveland, OH)	2014	39,111
Denver Public Schools (Denver, CO)	2008	92,331
Douglas County School District (Castle Rock, CO)	2009	64,513
Hawaii	2006	169,537
Houston Independent School District (Houston, TX)	2000	214,175
Indianapolis Public Schools (Indianapolis, IN)	2017	25,608
Jefferson County Public Schools (Golden, CO)	2015	81,180
Metro Nashville Public Schools (Nashville, TN)	2014	85,598
Milwaukee Public Schools (Milwaukee, WI)	2001	77,746
New York City Department of Education (New York City, NY)	2007	1,135,334
Newark Public Schools (Newark, NJ)	2011	52,160
Norwalk Public Schools (Norwalk, CT)	2016	11,467
Orleans Parish (New Orleans, LA)	2017	26,800
Prince George's County Public Schools (Upper Marlboro, MD)	2013	132,322
San Francisco Unified School District (San Francisco, CA)	2002	54,340
Springfield Empowerment Zone (Springfield, MA)	2016	5,300

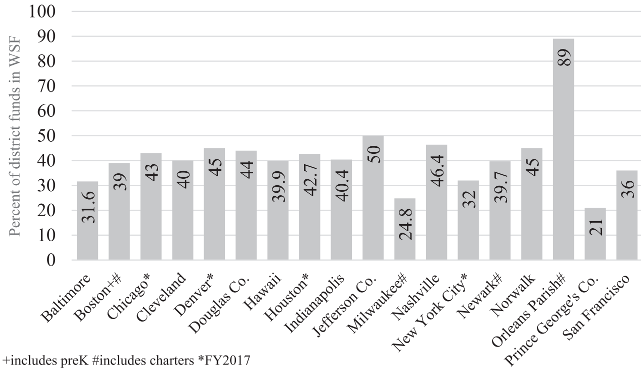
figures are rounded to the nearest hundredth. A comprehensive list of all data points collected, including all weights and tiers for each study district, can be provided by the author on request.

STUDY RELIES ON USE OF EXISTING METRICS OR STANDARDIZED FIGURES AND DESCRIPTIVE ANALYSIS

In all, we collected more than 70 data points across the 19 WSF study districts. We used these data to develop descriptive summaries and to compute two key metrics to enable accurate comparison of WSF formula features and implementation across sites. The first metric, %SBA, captures the portion of total district funds included in the weighted student formula (Roza and Edmonds 2014).[6] The second metric standardizes each site's figures to a base of 1.0 (representing the lowest possible allocation per pupil in a given district), by taking the lowest dollar allocation possible across all grades and student types and making that the base. Weights are then standardized to that newly defined base allocation (1.0). This standardization involved

[6]We only include expenditures for pre-K programs and charter schools in a district's %SBA if those programs and schools received funds under the WSF formula. See Figure 2 for whether charters and pre-K programs are included in the WSF formula. As is commonly accepted practice for defining current district expenditures (and consistent with NCES practice), excluded from %SBA analysis are district expenditures on long-term projects not directly related to annual current operating expenses, including debt service, capital projects, transfers, community service funds, and adult education. We did not create a comparable %SBA metric or base amount as a percent of PPE for Springfield Empowerment Zone as it is a subset of district schools.

FIGURE 2
Just One District Allocates More Than 50 Percent of Total District Funds Via WSF.



+includes preK #includes charters *FY2017

subtracting the base from any defined student allocation and dividing that difference by the base to establish a standardized weight above that lowest possible base.

This standardization is needed because there are no universal definitions for myriad formula features across sites. For example, some districts report a single base for all students; others use a variety of *bases* by grade level, which we convert in this analysis into a grade-level *weight*. Some establish a base, but then only fund portions of that base (say, 80 percent). Additionally, some report weights as a coefficient or percentage of the base (e.g., 0.20 or 20 percent) while others report in dollar amounts (e.g., $325).

Further, sites also use different vernacular to define their student types (e.g., “at-risk” versus “low performing”). In each case, we categorize the weight according to a specific characteristic used to identify the students. For example, because both Boston and Baltimore define “at-risk” in relation to low academic performance, we include that “at-risk” category in our analysis of low academic performance rather than as a separate and unique student type. In Houston, we characterize as a poverty weight the district's “poverty/at-risk” category, which includes a complex set of qualifiers related to both poverty and other “at-risk” attributes, several of which are related to poverty. Once we categorize weights within each study district, we then summarize the types and ranges of student weights across study districts.

We use descriptive analysis to investigate other common nonformula features, such as the use of salary-averaging, where each school's allocation is adjusted so it is not affected by the school's actual salaries that deviate from the district average (Miles and Roza 2006). Another common nonformula feature documented in this analysis is study districts’ use of *school-based* weights (weights allocated not on the basis of student characteristics but rather on the basis of school characteristics).

We also use descriptive analysis to explore the extent to which site implementation reflects two commonly cited rationales for implementing WSF: transparency and flexibility. Here, we group districts by common features, such as the public online reporting of formulas and commonly identified school-level flexibilities. Districts were deemed “transparent” if they posted online documentation on (i) the base allocation; (ii) which students were weighted; and (iii) by how much students were weighted.

The literature does not cite “typical” school leader spending flexibilities in WSF. Therefore, we select a range of school leader spending flexibilities that align with common elements in school spending, such as those around labor. These flexibilities include leaders’ authority to hire positions flexibly; give bonuses/stipends; opt-out of centralized functions; carry over funds across school years; and contract with outside providers.

FINDINGS

MOST-CITED RATIONALES FOR IMPLEMENTING WSF ARE “EQUITY” AND “FLEXIBILITY”

We find that “equity” (cited by 17 of 19 districts, or 89 percent) and “flexibility” (cited by 15 of 19 districts, or 79 percent) are study districts’ most frequently cited rationales for implementing WSF, confirming prior research (Chambers et al. 2008). “Transparency” was cited by 9 of 19 districts (47 percent). Other cited rationales include “community engagement” and “school empowerment.” No study district cited school “choice” as a rationale for implementation.

DISTRICTS TEND TO ALLOCATE LESS THAN HALF OF THEIR TOTAL DOLLARS THROUGH THEIR WSF FORMULAS

Although all 19 WSF study districts are defined as “weighted-student formula districts,” all but one allot 50 percent or fewer of their total district dollars via the weighted student formula, as shown in Figure 2. The range runs from a low of 21 percent in Prince George's County (just one-fifth of total district resources) to a high of 89 percent in Orleans Parish. Most systems allot between 30 and 50 percent of their total district funds through the formula. This suggests that many districts are utilizing a hybrid of the centralized and decentralized student-based approaches described in Figure 1, where a substantial portion of funds remain under district control and are not included in the weighted student formula.

Some districts include charter school students and related dollars in the WSF formula; others do not. The district in Orleans Parish, for its part, is an outlier system when it comes to charter schools. In 2005, in the wake of Hurricane Katrina, the primary mode of education in Orleans Parish became charter schools (O'Neil and Thukral 2010). Due to recent governance changes, Orleans Parish School Board now oversees many of the charter schools (which far outnumber traditional public schools) and allocates funds to the charter schools for which it serves as the LEA via the same formula employed with the traditional public schools.

VARIATION IS THE NORM IN IMPLEMENTATION AND FORMULA DETAILS ACROSS WSF DISTRICTS

While we find some minimal consistency in *what* districts choose to weight, *how much weight* each characteristic is given varies widely across study districts. Additionally, while study districts may choose to weight the same student types, they vary in how they define those types. Figure 3 illustrates this variation in the types and number of weights used. Variation in formulas and implementation patterns, it seems, is the norm.

More than half of the 19 study districts include weights for grade level (89 percent), ELL and special education students (63 percent), and students in families living in poverty (57 percent). Six of the 19 districts (32 percent) weight students with low academic performance; only two (11 percent) weight for high academic performance. Additionally, five of the 19 districts (26 percent) weight students identified as gifted. Together with the high-performance weight, this suggests that seven of the 19 districts (37 percent) allocated additional increments to highly capable students.

Weights used less frequently include those for vocational students (weighted by four of the 19 districts, or 21 percent), students with interrupted formal education (weighted by three of the 19 districts, or 16 percent), and students who are homeless (weighted by one of the 19 districts, or 5 percent).

After norming all study districts' formulas to a base allocation weight and dollar amount, we find formula *base* amounts vary by district from \$3,300 to more than \$7,000, as shown in Table 2. Base amounts are allocated for every student, regardless of student characteristics and/or related weights. At a minimum, every school receives the base amount for each student enrolled; additional dollars are added on top of the base according to the associated formula weight.

Districts vary substantially in not only the dollar value of their base but in its share of total per-pupil expenditure (PPE). The lowest dollar-value base and lowest percentage share of total PPE is in the Prince George's County district, where the base is 20 percent of total PPE. The highest dollar-value base and highest percentage share of total PPE is in the Orleans Parish district, where the base is 69 percent of total PPE.

Fundamentally, in attempting to allocate dollars based on student needs, districts face a practical choice: Enrich their base or create an explicit weight. For example, Baltimore officials report that poverty is so widespread that the district has chosen to boost its base, driving increased allocations systemwide. Additionally, districts that do not weight a certain student type, such as students who are ELL, may fund services for such students in other ways outside the formula altogether.

Interestingly, while all but two districts employ grade-level weights, districts are not consistent in their choices of *which* grades need boosting. As Table 3 shows, seven districts give their highest grade-level weight to elementary students, four give their highest weight to middle schoolers, and four give their highest weight to high schoolers, with the remaining districts using a uniform weight across some combination of grade bands. Boston is the only district with a weight for pre-K students. At 0.50, this pre-K weight is the highest weight given to any grade across all study districts. The differing choices about which school level to weight the highest seems to suggest that districts view student need by grade level quite differently.

As shown in Figure 4, weighting ELL students (also referred to as English learners or EL students or English-as-a-second-language or ESL students) is also common, with 12 of 19 districts (63 percent), including ELL students in their formulas. Of the 12 study districts, seven

FIGURE 3
Weighted Student Funding Formulas Vary Across Districts in Both the Types and Number of Weights Used.

	Grade level	English language learner	Special education	Poverty	Low academic performance	Gifted	Vocational	Interrupted formal education	High academic performance	Homeless	Refugee
Baltimore			●		●				●		
Boston	●	●	●	●	●		●	●			
Chicago	●		●								
Cleveland	●	●	●		●			●	●		
Denver		●		●		●					
Douglas Co.	●			●	●	●					
Hawaii	●	●		●		●					
Houston	●	●	●	●		●	●			●	●
Indianapolis	●		●	●							
Jefferson Co.	●			●							
Milwaukee	●										
Nashville	●	●	●	●	●						
New York City	●	●	●	●	●		●	●			
Newark	●	●	●								
Norwalk	●										
Orleans Parish	●	●	●			●					
Prince George's Co.	●	●									
San Francisco	●	●	●	●							
Springfield Emp. Zn.	●	●	●	●			●				
Total Number of Districts Using	17	12	12	11	6	5	4	3	2	1	1
Percent of Districts Using	89	63	63	57	32	26	21	16	11	5	5

(58 percent) employ a multilevel weight of two or more "tiers" to allocate higher increments to students considered to have more significant needs. The tiers are based on a student's level of English proficiency; the lower the level, the higher the weight. Additionally, in districts such as those in Boston, Cleveland, and New York City, grade levels are factored into the tiers.

TABLE 2
Base Dollar Amounts Range From $3,300 Per Pupil to as High as $7,495 Per Pupil

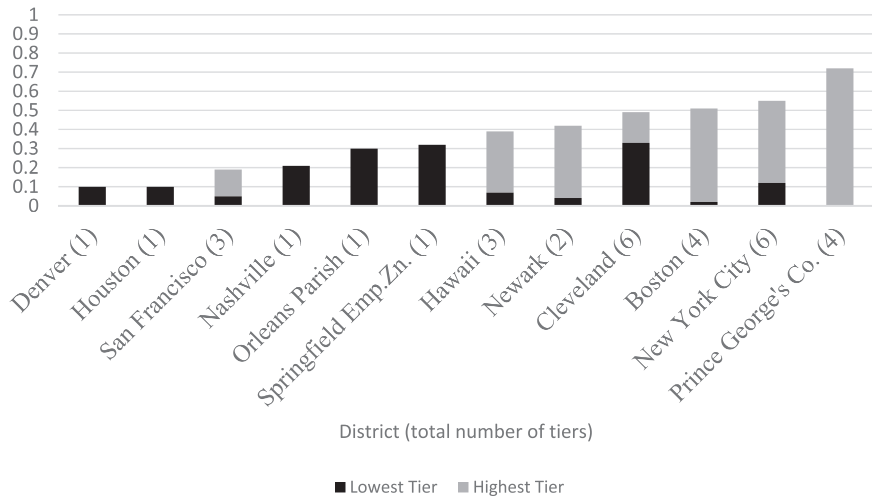
	Base dollar amount	Percent of total per pupil expenditure
Baltimore City Public Schools	5,416	28
Boston Public Schools	4,920	24
Chicago Public Schools	4,290	30
Cleveland Metropolitan School District	4,860	26
Denver Public Schools	4,051	40
Douglas County School District	3,700	42
Hawaii	4,130	35
Houston Independent School District	3,522	41
Indianapolis Public Schools	3,758	36
Jefferson County Public Schools	4,515	44
Milwaukee Public Schools	3,312	23
Metro Nashville Public Schools	4,425	37
New York City Department of Education	4,084	23
Newark Public Schools	4,601	30
Norwalk Public Schools	6,218	40
Orleans Parish	7,495	69
Prince George's County Public Schools	3,300	20
San Francisco Unified School District	3,663	26
Springfield Empowerment Zone	–	–
Average:	4,459	34

This tiered approach contributes to the wide range of ELL weights. The lowest tier weight is in Boston, where students with relatively high English proficiency levels are weighted at 0.02, or $98.40. The highest tier weight is in Prince George's County at 0.72, or $2,376. This top-range weight represents 36 times the lowest weight.

TABLE 3
Districts Do Not Agree on Which Grades Need the Most Boosting

Highest grade-level weights for students grades pre-K-5	Highest grade-level weights for students grades 6-8	Highest grade-level weights for students grades 9-12
Boston	Douglas Co.	Chicago
Cleveland	Jefferson Co.	Houston
Hawaii	New York City	Orleans Parish
Nashville	Norwalk	Springfield Emp. Zn.
Newark		
Prince George's Co.		
San Francisco		

FIGURE 4
English Language Learners Weights Range from 0.02 to 0.72: Highest Tier Is 36 Times the Lowest Tier.



Of the 12 of 19 districts (63 percent) that weight special education, nine use a multilevel weight of two or more “tiers” to allocate larger increments for students considered to have more significant needs. Districts base their tiers on a variety of factors. Some, like San Francisco, weight students on the severity of their disability, regardless of what disability they have. Others, such as Newark and Boston, attach weights to specific disability types (such as autism) in addition to disability severity. Both the Newark and Boston districts grant their highest weight to students with severe developmental delays.

Because of this tiered approach, as with the ELL tiers cited above, the range of special education weights is very large. As shown in Table 4, the lowest weight is in San Francisco, where every special education student is given a minimum weight of 0.01, or $36.63. The highest weight is in Newark, where students with severe developmental delays are given a weight of 9.64, or $44,353.64. This top-range weight represents 964 times the lowest weight.

The 11 of 19 districts (57 percent) that weight for students in families living in poverty relies on more consistent (and generally modest) weights when compared with those for special education and ELL. Only two of these 11 districts (18 percent) use a tier for their poverty weights.

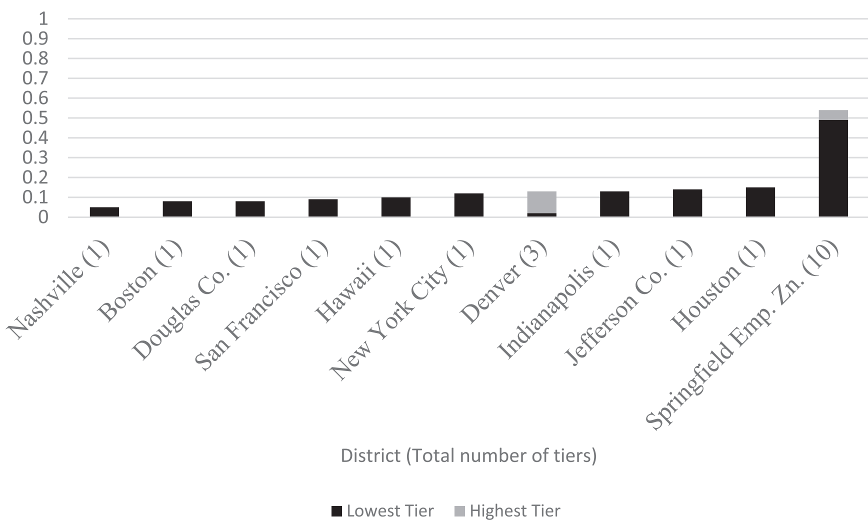
As shown in Figure 5, weights vary from 0.02 to 0.54. The lowest poverty weight, in Denver, is just 0.02 or $81.02 per student in poverty. The highest poverty weight, in Springfield Empowerment Zone, is 0.54 or $3,992.22. This highest rate is 27 times the lowest rate.

TABLE 4
Special Education Weights Range From 0.01 to 9.64: Highest Tier Is 964 Times the Lowest Tier

	Weight Range	Number of Tiers
Baltimore	.12	1
Boston	.83–5.58	15
Chicago	.40–.87	4
Cleveland	.15–1.63	5
Houston	.15	1
Indianapolis	.23	1
Nashville	.50–7.24	8
New York City	.12–2.09	5
Newark	.73–9.64	16
Orleans Parish	.20–3.00	5
San Francisco	.01–.03	2
Springfield Emp. Zn.	2.56–2.71	2

Districts generally qualify students for the poverty weight as those participating in the federal free or reduced-price lunch (FRL) program, though this method of identification is becoming less standardized as direct certification expands (Chingos 2016). Denver weights students in families living in poverty in two ways: students who qualify for FRL via direct certification (which carries a 0.02 weight), and all FRL students (which carries a 0.12–0.13 weight, depending on grade level).

FIGURE 5
Poverty Weights Range From 0.02 to 0.54: Highest Tier is 27 Times the Lowest Tier.



As mentioned earlier, while Baltimore is not among the 11 districts that weight for poverty, one Baltimore official reports that they chose to meet student needs related to widespread poverty by enriching their base rather than layering on funds with a poverty weight.

Some districts weight for academic performance. Six of 19 study districts (32 percent) include poor academic performance (based on prior-year assessment) as a student weight, with weights from 0.01 to 0.50. Two of the 19 districts (11 percent) weight for high academic performance (weight range between 0.15 and 0.31), such that the weight operates more as a reward than as a mechanism to drive more resources to higher-needs students. District criteria for these weights vary and may include a student's performance level on a test or other indicators of a student's below-grade-level performance.[7]

Beyond the previously discussed weights for grade level, ELL, special education, poverty, and academic performance, less commonly used student weights likely reflect districts' local context. Five of the 19 districts (26 percent) weight students identified as academically gifted (between 0.01 and 0.27); four of the 19 (21 percent) weight career and technical education students (between 0.05 and 1.0); three of the 19 (16 percent) weight students with interrupted formal education (between 0.12 and 0.94), with one district (Houston) weighting students who are homeless (0.05) and students who are refugees (0.05).

NONFORMULA FEATURES REFLECT DISTRICTS' PAST SPENDING HISTORY AND CONTEXT

Small school subsidies, magnet allocations, and foundation amounts are common examples of nonformula features used by several districts. While these allocations may create uneven per-pupil allocations across schools, 12 of the 19 districts in the study (63 percent) utilize some small school and/or foundational subsidy that is designed to cover the costs for a principal, clerk, or other per-school administrative costs. Some districts make additional allocations driven by school characteristics versus student characteristics. Some districts describe these allocations as "weights," despite being connected to characteristics of *schools* or *programs*, not students.

For example, Denver grants additional per-pupil funding based on overall *school* performance, as calculated in the district's "School Performance Framework" reports (Denver Public Schools 2017). These reports draw on each school's aggregated student performance on designated academic indicators, not by specific student type or characteristic. The total

[7]For example, in Baltimore, a student is weighted an additional 0.15 if he/she scores at a basic level on state assessments (low academic weight) or at an advanced level (high academic weight). A Baltimore student receives additional funding for scoring at a basic level on the state assessment (0.15 weight) *and* additional funding on top of that (0.10 weight) if that student is at risk of dropping out of high school. As noted in the methodology, while some districts use a weight for "at-risk" students, those weights are disaggregated into the appropriate specific student characteristics. Boston, for example, lists in its published formula a weight for students who are at risk. In practice, Boston allocates additional funds to students who are two years below grade level in math or English language arts (providing a 0.17 weight to such 9th grade students and a 0.04 weight to such 10th grade students).

school-performance dollars allocated to a school are based on that school's total enrollment, not its enrollment of specific student types.

All study districts exclude at least some schools from the WSF formula. Reasons vary, but excluded schools are most typically charter schools; schools that serve special populations of students (such as alternative education or schools for blind or deaf children); and early-childhood or pre-K centers.

In addition, most districts still rely on salary averaging, even after shifting to WSF. In this practice, schools are charged for their teaching staff based on average salaries, not the actual salaries of teachers in the building. In the year studied, 15 of 19 districts (79 percent) use a *districtwide* average salary for *all* schools for budgeting and recording school spending. One district, New York City, uses prior-year *schoolwide* average salaries.

The remaining three study districts use districtwide average salary for *most*, but not all, schools. Districts in Boston and Denver allow roughly one-third of their schools[8] to budget and account for spending based on actual salaries. In both districts, if actual salaries are below the districtwide average, school leaders may retain and use any remaining funds at their discretion. Similarly, where salaries exceed the districtwide average, the school must make financial tradeoffs to cover those actual costs. The district in Orleans Parish budgets on actual salaries for roughly one-quarter of its schools.

EXPLORING TRANSPARENCY AND FLEXIBILITY

Despite transparency being a commonly cited reason for implementing WSF, few districts post their complete formula online. Only 37 percent of WSF study districts (seven of 19) publish their formula base and weights (or comparable documentation thereof) online.[9] Some districts, such as those in Indianapolis and Boston, go beyond to provide school-level budget and districtwide calculations that include the number of students for each weighted student type/characteristic.

Interestingly, district interviews suggest that some districts view the audience for transparency as internal (within the district) rather than external (e.g., the community). These districts see themselves as transparent because their principals had access to formula information and allocations. Indeed, for some, the push for transparency may have come from those inside the district who questioned past allocations and/or budget practices.

As to flexibility, we find that districts do report some school-level flexibilities in staffing and other financial decisions, but that flexibility has limits (particularly around compensation) in all

[8]This flexibility is only authorized for a subset of more autonomous schools. This includes “innovation schools” in Boston and Denver that can seek autonomies in areas, including curriculum, instruction, and assessment; schedule and calendar; staffing; professional development; district and/or state policies and procedures (including governance, enrollment, or others); and budget, including use of actual salaries. In Boston, three other types of more autonomous schools are also allowed to budget on actual salaries: district-union partnership pilot schools, state-approved in-district charter schools (Horace Mann schools), and state-approved turnaround schools.

[9]At publication, this number had increased to 15 districts. It is possible that the sharing of early findings with study districts prompted greater transparency.

19 WSF study districts. As to staffing, many WSF districts are still subject to local or state-imposed staffing minimums, such as requiring each school to have a principal and/or that a set student/teacher ratio be met in each grade level or subject. But as Table 5 indicates, every study district affords school leaders some staffing flexibility once such minimums are met.

Also indicated in Table 5, base pay and benefits are regulated in all but one district, including those in right-to-work states.[9] (Five of the 19 study districts are in right-to-work states). That said, principals in 16 of the 19 districts (84 percent) have the flexibility to use their WSF funds to award stipends to staff who take on additional work. Principals in six of the 19 study districts (32 percent) can use WSF funds to award non-workload-related bonuses.

Interestingly, most districts allow school leaders to award contracts (14 of the 19 WSF study districts or 74 percent). Typically, school leaders in these 14 districts are permitted to contract with outside providers if a contract falls under a dollar maximum (such as the $25,000 limit in Douglas County and Hawaii) and if prescribed steps have been followed, such as using a competitive bid process. In Indianapolis, for example, principals are permitted to purchase instructional supplements from outside providers provided these items were listed in the school's approved budget.

Eight of the 19 study districts (42 percent) permit the carry over of funds from one school year to the next, but seven of the eight that allow the carry over still impose some restrictions. For example, districts in Houston, Hawaii, New York City, and Denver cap the carry over amount principals may retain. Douglas County and Indianapolis schools may not carry over funds earmarked for personnel.

Nine of the 19 districts (47 percent) allow at least some schools to opt-out of centralized services. Boston and Denver allow more autonomous schools to opt-out of some services and, in turn, receive funds back from the district for those services.

DISCUSSION

LACK OF A COMMON LEXICON MAY COMPLICATE RESEARCH AND SPREAD OF PRACTICE AROUND WSF

Undoubtedly, the data show enormous variation in implementation details. Which student types are weighted and by how much; how those student types are defined and how students are counted for allocation purposes; what share of total district funds are allocated through the WSF formula; whether (and the degree to which) schools are excluded from the formula; the degree to which districts are transparent about their formulas; and the types and degrees of flexibilities school leaders have in a WSF system all vary. In other words, we find that variability in WSF components and implementation is the norm among study districts.

Further, the lack of a common language to describe WSF components makes it more difficult to draw comparisons across districts. What constitutes even fundamental WSF elements like a “base” allocation or a “student weight” versus a “school weight” is, at present,

[9]Orleans Parish School Board does not require that charter schools follow the district salary schedule.

TABLE 5
School-Level Flexibility in WSF Districts

School leader flexibility	Number of districts	Percent of districts
Staffing-related flexibility		
Have some flexibility on the number of staff to hire	19	100
Have some flexibility on the type of staff to hire	19	100
Can shift funds between those for staff and other items/areas	19	100
Compensation-related flexibility		
Can choose base pay for hired teachers	1	5
Can choose benefits for hired teachers	1	5
Can pay stipends for additional workloads	16	84
Can provide non-workload-based bonuses	6	32
Other financial flexibility		
Can award contracts	14	74
Can carry over funds from one year to next	8	42
Can opt-out of centralized services (at least for some schools)	9	47

subject to local definition and practice. Common definitions for the broad goals that provide many districts a rationale for implementing WSF, such as flexibility and transparency, are also elusive. Ultimately, this absence of standard definitions complicates both research and practice around WSF, making it more difficult for researchers to connect the dots accurately across systems and inhibiting districts' efforts to learn from one another. It also complicates training, making it difficult to develop common, shareable curricula for the district and school leaders on these topics.

That said, this lack of a common lexicon is not surprising. Standard accounting and budgeting terminology, norms, and tools in education (e.g., chart of accounts, related software, and traditional federal reporting requirements) all have revolved around defining district spending by object and function. They are not designed around framing spending by student and school, as is the basis in WSF. The traditional finance apparatus that virtually all districts and their staff have used for years does not map neatly onto a newer WSF frame. As WSF grows, so will the need for a new set of budgeting and accounting norms and common terminology.

HYBRID, HOMEGROWN APPROACHES: A PRACTICAL TRANSITION FROM OLD TO NEW ALLOCATION STRATEGIES

Given that most districts have been steeped in traditional allocation approaches far longer than they have been in WSF, perhaps it is also unsurprising that most study districts are allocating more than half of their resources the way they always have. Most allot only one-third to one-half of their total district funds through their WSF formulas. Rather than a full WSF implementation, this pattern suggests these districts are essentially following a hybrid approach, whereby the district deploys a portion of funds to schools with flexibility while holding back a sizeable amount of funds for traditional, centralized district control.

In other words, most systems are cobbling together old and new allocation approaches. This could be interpreted as a practical transitional phase of sorts, bridging the move from old to new allocation strategies. As implemented, WSF appears to be a significant step, but still a half-step toward driving spending decisions to the school level.

Our interviews with study districts suggest that these formulas are largely homegrown, rooted in and shaped by local context, observed in the district-by-district variability in everything from the language used to express formula features to the way the formulas themselves work. Formula details reflect local leaders' choices and tradeoffs, replete with caveats and adjustments attuned to a locale's policy framework, politics, and historical allocation practices. This homegrown approach seems to include variable decisions around which student types are weighted, among other formula implementation details, and what offsets are needed to protect prior allocations in some schools. We can hypothesize that weights may differ due to the prevalence (or lack of prevalence) of certain student types in one study district versus another. For example, a district with proportionally few ELL students may choose to weight those students more or less than a district with high levels of ELL student enrollment.

Often, it appears formulas are more a reflection of historic allocations than any deliberate strategy for student learning, student performance, or other student-related priorities. Take, for instance, weights for grade bands, including elementary, middle, and high school. We might expect to see some consistency across locales in judgments about which grade band requires more funding or has higher student need. Yet, interestingly, study districts are roughly evenly divided among allocating their highest grade-level weight to elementary, middle, and high school grades. In other words, the homegrown nature of districts' WSF formulas is reflected even in something as basic as prioritizing grade levels for extra funding.

As with the variability in WSF definitions, this homegrown approach seems unsurprising when we consider the mismatch between WSF and districts' historical ways of accounting and conceptualizing spending. An approach informed by local context is especially unsurprising given an initial finding from our forthcoming research: Many of the very people charged with implementing WSF in districts report that they have not received any training in WSF.

Given that for the time period studied, the pool of districts using WSF included only 19 sites, it was difficult to confirm trends that corresponded to contextual differences across the set. That said, an "eye-ball" approach offers some places to look for patterns going forward. For instance, districts with higher per-pupil revenues appeared to have more (or more nuanced) weights, possibly suggesting that the additional funding allowed for more allocation differentiation. And, again while not definitive in any way, those districts where leaders emphasized "equity" as the primary driver of WSF appeared to put a higher portion of their funds into their formula. Finally, we observe some regional influences that might play out going forward. For instance, while 75 percent of WSF districts outside Colorado used weights for students with disabilities, none of the three Colorado districts did. Hopefully, future research will better understand the relationship between contextual factors and the nuance of different implementation models.

Taken as a whole, this evolutionary, incremental approach reflects both the rootedness of the system that predated WSF implementation and the existing barriers that can inhibit a more wholesale shift in district allocation practices, such as provisions in collectively bargained labor contracts or historic program and/or school allocations protected by stakeholders in those programs or schools.

WSF DISTRICTS PURSUING EQUITY, FLEXIBILITY, AND TRANSPARENCY (VERSUS CHOICE)

As prior research suggests, school districts implement WSF for several reasons, the most prominent of which are equity, site-level flexibility in exchange for accountability, and transparency (Chambers et al. 2008). Notably, while WSF recently has been connected to school choice by some policymakers and in the media, we find no evidence of a study district citing school choice as a rationale for implementing WSF (Klein 2018).

SHIFT FROM AVERAGE TO ACTUAL SALARIES PROVES ESPECIALLY CHALLENGING

While it is beyond the scope of this study to examine whether equity was achieved in study district formulas and implementation, it appears that certain aspects of the WSF formulas, as implemented, ultimately could challenge equitable allocation. (Our forthcoming research will explore equity in allocations across schools more comprehensively). Our finding in this paper around the predominant use of average versus actual salaries to drive allocation of funds for staff is enough to state that equity gains will be constrained should this pattern continue. Average salaries tend to not accurately reflect the actual cost of labor inside a school building. Prior research has shown that the most senior, experienced, and highest-paid teachers tend to be clustered in more affluent schools with the smallest portion of poor or minority students (Lankford, Loeb, and Wyckoff 2002). The least experienced, lowest-paid teachers tend to be assigned to struggling, generally poorer, schools (Clotfelter, Ladd, and Vigdor 2005). Thus, using average salaries can inhibit attempts to remedy spending inequities among poorer and wealthier schools.

Boston, one of our 19 WSF study districts, offers an example of how this can unfold in practice. More autonomous Boston schools have the choice to use average or actual salaries. A Boston district official described to us that school leaders understand if and how they can benefit from using actual versus average salaries. In other words, those who stand to collect more funds by switching to actual salaries tend to do so. Schools with higher-salary teachers (where the school's average salary is *higher* than the district's) choose to continue operating their budgets on *average* salaries because the district effectively subsidizes their more-costly teaching force. Schools with lower-salary teachers (where the school's average salary is *lower* than the district's) tend to switch to *actual* salaries. By budgeting on *actual* salaries, the school can keep the "savings" it earns by employing lower-paid teachers than the district average.

ARE ENTRENCHED PRACTICES SLOWING THE SHIFT TO WSF?

Study districts seem to overlay their weighted formula on top of ingrained, historic allocations —such as subsidies for small schools, foundational subsidies, and the like. This suggests the magnitude of the challenge involved in significantly shifting dollars among schools. Districts appear to struggle with shifting dollars from one school to another and thus create formula workarounds to protect some allocations.

Additionally, our findings suggest that while districts are granting schools new flexibilities in resource use, they are also bumping up against longstanding arrangements for things like base compensation, even in right-to-work states where such issues (at least theoretically) would be expected to be less fixed than in places where collectively bargained labor contracts are the norm. Further, district arrangements for centrally managed services limit the portion of dollars given over to schools. Ultimately, these conditions impact the total level of flexibility school leaders gain when switching to use a WSF formula.

To be clear, we find that WSF implementation does signal a fundamental shift in that WSF study districts are allocating dollars in terms of *students*—regardless of what percentage of their systems' total dollars are allocated as such. Weighted student formulas are still relatively new. Despite billions of dollars flowing through these formulas, we observe that there is no standard blueprint for implementing this new allocation model.

CONCLUSION AND NEXT STEPS

OPPORTUNITIES FOR FUTURE RESEARCH AND PRACTICAL USE OF INFORMATION

We find significant variation in WSF formula design and implementation features and patterns across the 19 WSF study districts, making it difficult to analyze WSF as a single "model." This points to the need for more universal definitions across myriad implementation features (from what constitutes "actual" salaries to what constitutes "base" allocations) to support both research and practice. Having a common lexicon, materials, and training for WSF features and practices could enable understanding across school system leaders, many of whom make decisions each year around revising their formulas and implementation. This common lexicon would enable district leaders to draw on collective learning and comparisons from peer districts rather than leaving each system to iterate in isolation.

This landscape analysis begins to fill a research gap in understanding WSF implementation and provides a solid foundation for future research. But many questions outside the scope of this study are important for future research to investigate. While we can see that context is affecting how WSF is implemented, understanding how context works and what patterns it produces are areas warranting additional study. Further research should also include a deeper analysis of the extent to which WSF is helping systems meet commonly cited core goals of equity, flexibility, and transparency. Our ongoing research will examine whether WSF districts are indeed making progress on their goal of more equitable allocations across schools.

ACKNOWLEDGMENTS

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A170348 to Georgetown University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

REFERENCES

Baker, Bruce and Douglas R. Elmer. 2009. "The Politics of Off-the-Shelf School Finance Reform." *Educational Policy*. 23 (1): 66–105.

Baker, Bruce. 2012. "Re-arranging deck chairs in Dallas: Contextual constraints on within district resource allocation in large urban Texas school districts." *Journal of Education Finance*. 37 (3): 287–315.

Before It's News. 2016. "Indianapolis Looks to Student-Based Budgeting to Fix School Funding Gaps." *Before Its News*. May 23. (https://beforeitsnews.com/v3/libertarian/2016/2643421.html). Accessed 11/16/2016.

Birdsall, Chris. 2017. "The Synthetic Control Method for Comparative Case Studies: An Application Estimating the Effect of Managerial Discretion Under Performance Management." *International Public Management Journal*. 20 (1): 49–77.

Brewer, Dominic J. and Lawrence O. Picus. 2014. *Encyclopedia of Education Economics and Finance*. Los Angeles, CA: SAGE Publications, Inc.

Brookings Institution. 2016. The Education Choice and Competition Index. Retrieved from https://www.brookings.edu/interactives/the-2016-education-choice-and-competition-index/

Chambers, Jay, Larisa Shambaugh, Jesse Levin, Mari Muraki, and Lindsay Poland. 2008. *A Tale of Two Districts: A Comparative Study of Student-Based Funding and School-Based Decision Making in San Francisco and Oakland Unified School Districts*. Washington, DC: American Institutes for Research.

Chingos, Matthew M. 2016. "No More Free Lunch for Education Policymakers and Researchers." *Evidence Speaks*. 1 (20): 1–3. https://www.brookings.edu/wp-content/uploads/2016/06/free-and-reduced-lunch3.pdf

Clotfelter, Charles T., Helen F. Ladd, and Jacob Vigdor. 2005. "Who Teaches Whom? Race and the Distribution of Novice Teachers." *Economics of Education Review*. 24 (4): 377–392.

Cooper, Bruce S., Timothy R. DeRoche, William G. Ouchi, Lydia G. Segal, and Carolyn Brown. 2006. "Weighted Student Formula: Putting Funds Where They Count in Education Reform." *Education Working Paper Archive*. Department of Education Reform, University of Arkansas.Retrieved from https://www.researchgate.net/publication/234604844_Weighted_Student_Formula_Putting_Funds_Where_They_Count_in_Education_Reform

Denver Public Schools Financial Services. 2017. *Denver Public Schools Budget Guidance Manual*. Denver, CO: Denver Public Schools.

Hawaii State Data Center Research and Economic Analysis Division Department of Business, Economic Development & Tourism, State of Hawaii. September 2013. "Urban and Rural Areas in the State of Hawaii, by County." (http://files.hawaii.gov/dbedt/census/Census_2010/Other/2010urban_rural_report.pdf). Accessed 8/7/2013.

Klein, Alyson. 2018. "Just One District Seeks ESSA's Weighted Student Funding Pilot for 2019-20." *Education Week*. August 8. (http://blogs.edweek.org/edweek/campaign-k-12/2018/08/weighted_student_funding_pilot_essa_arizona.html). Accessed 11/17/2018.

Koteskey, Tyler. 2016. "Weighted Student Formula Brings School Funding Into 21st Century." *Reason Foundation*. April 1. (http://reason.org/news/show/weighted-student-formula-brings-sch). Accessed 11/18/2016.

Koteskey, Tyler and Lisa Snell. 2017. "Trends in Student-Based Budgeting 2017." Presented at the Allovue Future of Education Finance Summit, Baltimore, MD, July.

Ladd, Helen F. 2008. "Reflections on Equity, Adequacy, and Weighted Student Funding." *Education Finance and Policy*. 3 (4): 402–423.

Lankford, Hamilton, Susanna Loeb, and James Wyckoff. 2002. "Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis." *Educational Evaluation and Policy Analysis*. 24 (1): 37–62.

Levin, Jesse, Karen Manship, Steve Hurlburt, Drew Atchison, Ryoko Yamaguchi, Adam Hall, and Stephanie Stullich. 2019. "Districts' Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings from a National Study." Office of Planning, Evaluation and Policy Development, US Department of Education.

Levin, Jesse, Jay Chambers, Diana Epstein, Nick Mills, Mahala Archer, Antonia Wang, and Kevin Lane. 2013. "Evaluation of Hawaii's Weighted Student Formula." *American Institutes for Research*. 144: 131–145.

Mandell, Joshua. 2016. "Budgeting for Conflict: Politics and Education Spending in New Haven." Unpublished. Used as case study in Edunomics Lab District SBA Meeting, July 26. (https://edunomicslab.org/sba-district-meeting/). Accessed 11//17/2016.

McCoy, Dylan Peers. 2016. "Which Schools Get the Most Money?" *Chalkbeat*. May 15. (https://www.chalkbeat.org/posts/in/2016/05/18/which-schools-get-the-most-money-indianapolis-public-schools-analysis-reveals-how-schools-compare/#.V4QVfK79FnQ). Accessed 11/18/2016.

Miles, Karen Hawley. 2013. "Budgeting for Equity." Education Resource Strategies Video Lessons. https://www.erstrategies.org/tap/video_lesson_budgeting_for_equity). Accessed 11/17/2013.

Miles, Karen Hawley and Marguerite Roza. 2006. "Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity." *Peabody Journal of Education*. 81 (3): 39–62.

O'Neil, Paul T. and Renita K. Thukral. 2010. "The Unique System of Charter Schools in New Orleans after Hurricane Katrina: Distinctive Structure, Familiar Challenges." *Loyola Journal of Public Interest Law*. 11 (2): 319–342.

Ouchi, William G. 2006. "Power to the Principals: Decentralization in Three Large School Districts." *Organization Science*. 17 (2): 298–307.

Petko, Mike. 2005. *Weighted Student Formula (WSF): What Is It and How Does It Impact Educational Programs in Large Urban Districts?* Washington, DC: National Education Association. Retrieved from http://www.nea.org/assets/docs/HE/formula.pdf

Rose, Heather and Margaret Weston. 2013. *California School District Revenue and Student Poverty: Moving Toward a Weighted Pupil Funding Formula*. San Francisco, CA: Public Policy Institute of California.

Roza, Marguerite and Paul T. Hill. 2004. "How Within-District Spending Inequities Help Some Schools to Fail." *Brookings Papers on Education Policy*. 7: 201–227.

Roza, Marguerite and Cory Edmonds. 2014. *What Portion of District Funds Follow Students?* Washington, DC: Edunomics Lab at Georgetown University.

Vasudeva, Ash, Linda Darling-Hammond, Stephen Newton, and Kenneth Montgomery. 2009. *Oakland Unified School District New Small Schools Initiative Evaluation*. Stanford, CA: School Redesign Network at Stanford University.

27

The Dismal Productivity Trend for K–12 Public Schools and How to Improve It

Benjamin Scafidi

Over the past decade, Richard Vedder has become widely known in academic, policy, and media circles for his work on productivity in higher education. In fact, however, Vedder (1996, 2000; Vedder and Hall 2000) studied issues in K–12 education before turning to higher education with his 2004 publication, *Going Broke By Degree: Why College Costs So Much*. This article highlights Vedder's contribution to debate on productivity in American public K–12 education and updates his findings with more recent data. It finds that the productivity problem in K–12 public education is actually worse than Vedder suggests is the case for higher education. This article also reconsiders a solution Vedder proposed to ameliorate the K–12 productivity problem—parental choice combined with the conversion of individual public schools into autonomous, employee-owned enterprises.

Richard Vedder and the Economics of Education

One can think of productivity as outputs divided by inputs. Vedder, in his work on higher education, has been concerned about

---

Cato Journal, Vol. 36, No. 1 (Winter 2016).

Benjamin Scafidi is Professor of Economics and Director of the Education Economics Center in the Coles College of Business at Kennesaw State University. The author thanks Joshua Hall, Jason Taylor, and an anonymous referee for helpful comments. This article draws heavily from the author's two Friedman Foundation for Educational Choice publications (Scafidi 2012b, 2013).

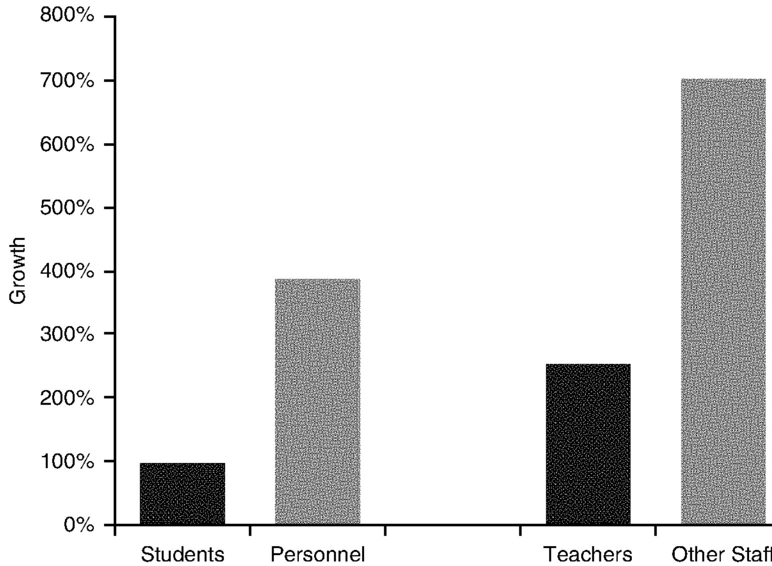
both sides of the productivity equation—that is, higher costs and stagnant or declining output. He adopted a similar approach in his earlier work on K–12 education. In 1996, he wrote a report for the Center for the Study of American Business at Washington University, entitled "School Daze: Productivity Decline and Lackluster Performance in U.S. Education." That report showed the tremendous increases in public school staffing that occurred from 1950 to 1993. According to data from the National Center for Education Statistics, in 1950, there were just over 5 full-time equivalent (FTE) public school employees per 100 students, while by 1993, there were more than 11 FTE school employees per 100 students. Vedder showed that this staffing surge was disproportionately due to increased employment of those who were not lead teachers. As Vedder put it, "While the number of administrators per pupil rose about 50 percent, the big increase was in support staff and in quasi-instructional staff (e.g. teacher aides, guidance counselors)" (Vedder 1996: 4–5).

Using student test results from the National Assessment of Educational Progress and the Scholastic Aptitude Test, Vedder also showed that the output of K–12 public schools—that is, average student performance on standardized exams—either decreased very slightly (1971 to 1992) or increased by about 2 percent (1978 to 1992) during the time period under study. However, this stagnant or slightly higher output occurred at the same time as a dramatic increase in real public school spending and staffing.

The Modern Staffing Surge in K–12 Public Education

According to data available from the U.S. Department of Education's National Center for Education Statistics, between fiscal year (FY) 1950 and FY 2009, the number of K–12 public school students in the United States increased 96 percent, while the number of FTE school employees increased 386 percent (see Figure 1). American public schools hired personnel at a rate four times faster than the growth in student numbers over that period. However, the numbers above obscure important information regarding the nature of the long-term and dramatic increases in staffing. One can place public school employees into two categories—lead teachers and "other" staff (administrators, teacher aides, counselors, cafeteria workers, bus drivers, and so on). Between 1950 and 2009, teaching personnel grew by 252 percent while administrators' and other staff

FIGURE 1
Growth in K–12 Public School Students and Personnel, FY 1950 to FY 2009



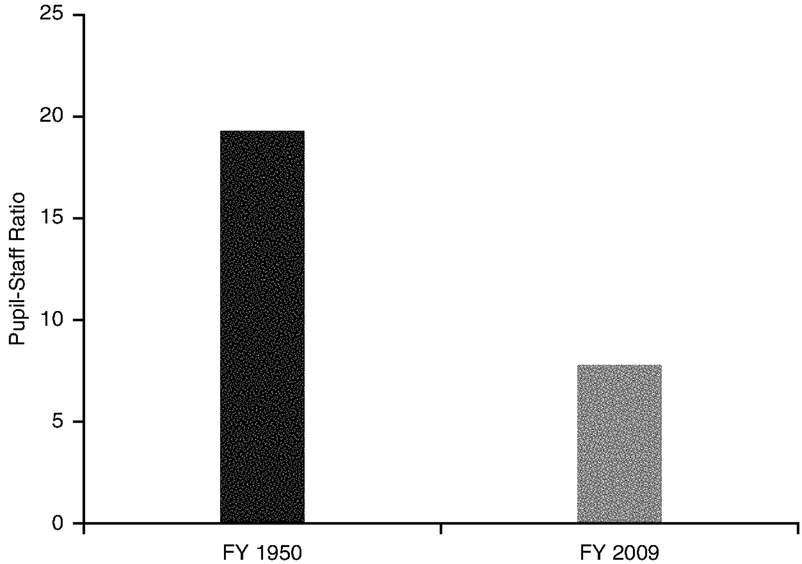
Sources: National Center for Education Statistics (1991b: Table 77; 1995: Table 38; 2011: Tables 36 and 87).

numbers increased 702 percent. That means the rise in "other" staff was more than seven times faster than the increase in students.

Given that public school personnel increased at a much faster rate than students, staff to student ratios declined significantly between 1950 and 2009, as shown in Figures 2 and 3.[1] These trends continued over the past generation. As Figure 4 shows, the number of K–12 public school students in the United States increased by 17 percent between FY 1992 and FY 2009, while the number of FTE school employees increased by 39 percent. Teachers saw a 32 percent rate of

[1]Pupil-teacher ratios are a different concept than average class sizes. Average class sizes are typically measured as how many children are in the average "regular" classroom, which does not include classrooms with one child or a very small number of children. Pupil-teacher ratios are smaller than average class sizes because some teachers get work periods where they are not leading a classroom and because some students get pulled out of regular classrooms for all or part of the school day for individual or small group instruction and other educational services.

FIGURE 2
PUPIL-STAFF RATIO, FY 1950 AND FY 2009



SOURCES: National Center for Education Statistics (1991a: Table 76; 2012: Table 89).

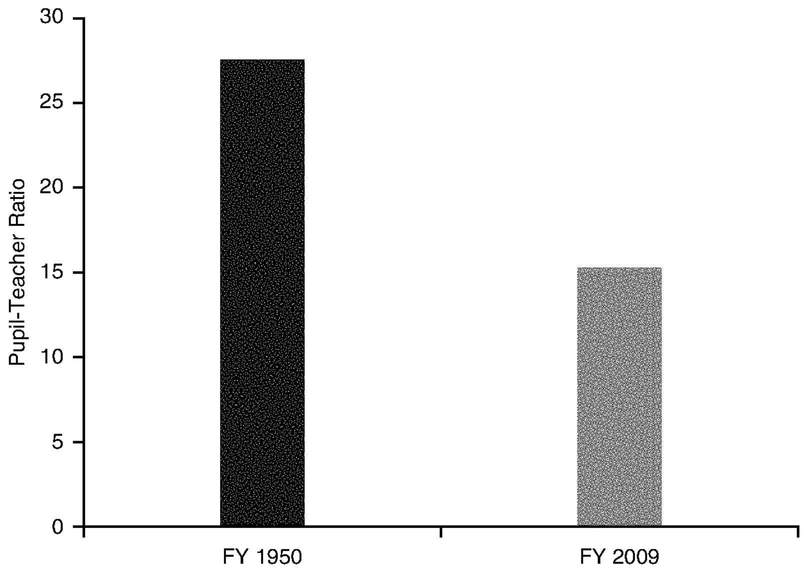
growth, while administrators and other staff experienced a 46 percent rise. That upsurge in nonteaching personnel was 2.3 times greater than the increase in students over the same 18-year period. For teachers, growth was almost twice as large as the increase in students.

In the mid-1990s, Vedder was not the only one warning about too much central administration in K–12 public schools. For example, two well-known public schooling advocates wrote in 1995 that, "educational bureaucracies become endlessly expanding financial sinkholes that eat up resources and create only mischief and red tape" (Berliner and Biddle 1995: 257). And, of course, those words were written *before* much of the increase in administration and other non-teaching personnel depicted in Figure 4 took place.

Did No Child Left Behind Make Us Do It?

The expansion in public school staffing between FY 1992 and FY 2009—including the relatively large increase in nonteaching personnel—cannot be blamed on the federal No Child Left Behind

FIGURE 3
Pupil-Teacher Ratio, FY 1950 and FY 2009



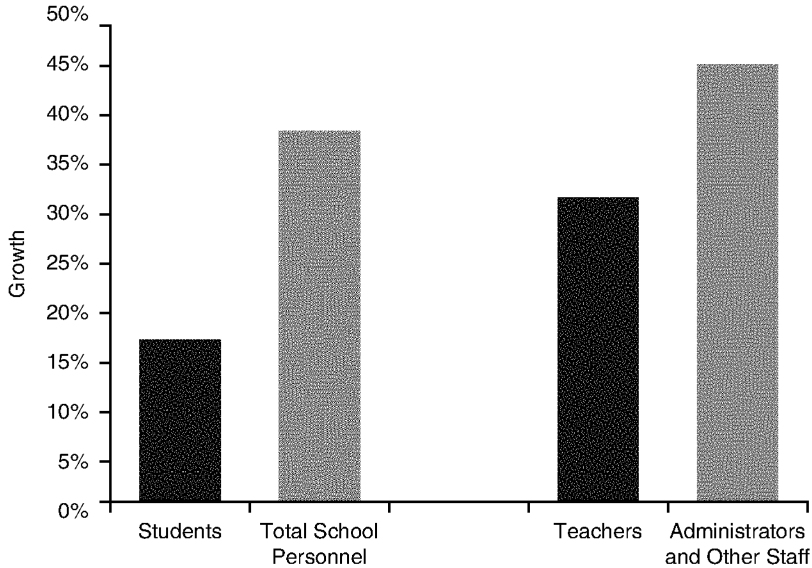
Sources: National Center for Education Statistics (1991a: Table 76; 2012: Table 69).

(NCLB) law. During the pre-NCLB period, FY 1992 to FY 2001, public schools saw their student populations grow 13 percent while school personnel numbers increased 29 percent. The number of teachers increased 23 percent, about 1.75 times the increase in students, while the number of administrators and other staff rose by 37 percent—almost 3 times the increase in student numbers. From the school year in which NCLB was passed (FY 2002) until FY 2009, the number of students rose 3 percent while the number of public school teachers and administrators both increased about 7 percent. The primary difference between the NCLB era and the preceding time period is that the trend toward faster growth in nonteaching staff than in teaching staff was halted.

Although Staffing in U.S. Public Schools Dramatically Increased, Student Achievement Did Not

Is there evidence that increased public school staffing and disproportionate spending on nonteaching personnel improved student

FIGURE 4
Growth in K–12 Public School Students and Personnel, FY 1992 to FY 2009



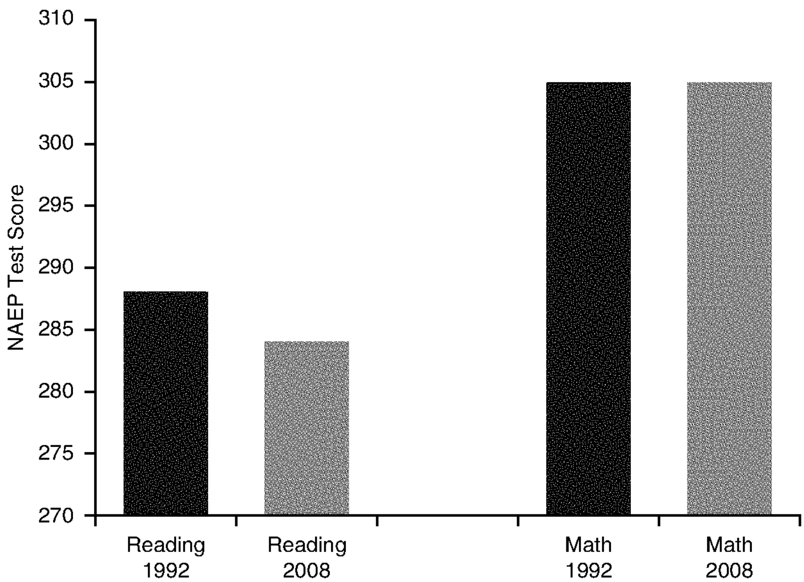
Source: National Center for Education Statistics (1994: Tables 40 and 85; 2011: Tables 36 and 87).

achievement in the United States?[2] After three decades of decline, America's public high school graduation rate has increased slightly over the past generation. Using the most accurate measure of the on-time public high school graduation rate, the National Center for Education Statistics reports that the rate increased from 74.2 percent to 74.7 percent between FY 1992 and FY 2008.[3] However, the public high school graduation rate in 2008 remained slightly below where it was four decades earlier (Heckman and LaFontaine 2010).

[2]While Vedder (1996) considered this specific issue, others have analyzed whether inflation-adjusted increases in spending per student have increased student achievement. Important contributions to this literature include Hanushek and Lindseth (2009) and Greene (2006). Their own studies and their surveys of the literature suggest that the very large increases in real spending per student over time have not been accompanied by increases in student achievement.

[3]This information on public high school graduation rates comes from Table 112 of the *Digest of Education Statistics: 2010* and Table 101 of the *Digest of Education Statistics: 2006*, both from the National Center for Education Statistics (NCES) at the U.S. Department of Education.

FIGURE 5
NATIONAL ASSESSMENT OF EDUCATION PROGRESS (NAEP) TEST SCORES, AGE 17, PUBLIC SCHOOLS, 1992 AND 2008



SOURCE: National Assessment of Education Progress Long-Term Trend Assessment.

Moreover, since 1970, the financial returns in the labor market have declined in relative terms for high school dropouts. This alone should have led to an increase in the public high school graduation rate. Yet, in fact, public high school graduation rates fell over a time period when the economic incentive for students to graduate rose.

The National Assessment of Educational Progress (NAEP) is a series of exams given to samples of students ages 9, 13, and 17. As shown in Figure 5, scores on the NAEP Long-Term Trend Assessment have not increased over the time period under examination, during which public school staffing ballooned.[4]

[4]The NAEP Long-Term Trend Assessment is conducted every four years on a national sample of 9-, 13-, and 17-year-old students. This exam is better than the Main NAEP Assessment for analyzing national trends over time because the Long-Term Trend Assessment has been "relatively unchanged" since it was created, while the Main NAEP Assessment changes "about every decade to reflect changes in curriculum." For a description of the NAEP Long Term-Trend Assessment and how it compares to the Main NAEP Assessment, see nces.ed.gov/nationsreportcard/about/ltt_main_diff.asp.

It may be argued that staffing in American public schools needed to increase from its level several decades ago. Prior to the racial integration of public schools, many African American children had little or no taxpayer funds spent in their segregated schools. Second, students in less wealthy school districts often had much less spent on their education than students in more affluent areas. Third, students with special needs often had relatively few resources devoted to them. Court cases and changes in federal and state policy led to very large increases in public school staffing in the 1950s, 1960s, 1970s, and 1980s. All this being said, however, student achievement in American public schools did not improve when there were large increases in staffing. Therefore, with productivity defined as outputs divided by inputs, it seems clear that there has been a significant decline in the productivity of K–12 schools over the course of the period in question.

Are American Students Getting Worse?

Perhaps the additional public school staff were necessary because American students have become more disadvantaged over recent decades. Many believe children enrolled in schools today are "harder to teach" than children a generation ago (Berliner and Biddle 1995). Family breakdown, increased child poverty, and other factors may have caused the decline in graduation rates and the lack of increased test scores. There is evidence that family breakdown and low family income do contribute to lower levels of student achievement (see, for example, Heckman 2008).

Still, although rates of living with one parent increased significantly in the latter half of the 20th century, in other respects, current American students are more advantaged than their parents were. Specifically, American students typically live in households with more income, more-educated parents (although that will change because of the decline in public high school graduation rates), and fewer siblings than previous generations. Higher income, more-educated parents, and fewer siblings have all been shown to increase student achievement. Thus, those factors may offset the negative social trends that may decrease student achievement.

Because there are factors that, by themselves, would lead to increases or decreases in student achievement, the extent to which American students are harder or easier to teach overall relative to the past is an empirical question. Hoxby (2003) finds that the characteristics of American students in 1998–99 were on balance "more beneficial for achievement" relative to 1970–71. Greene and Forster (2004) use a "teachability" index to estimate changes over time in challenges to student learning, and their results are strikingly similar to Hoxby. Student disadvantages that impede learning actually declined by 8.7 percent between 1970 and 2000. These empirical studies suggest that American students did *not* become harder to teach during the period of large increases in per pupil spending, flat American high school graduation rates, and constant or declining test scores.

How Can Public Schools Lower Class Size and Increase Administrative and Other Nonteaching Staff, Yet Not Increase Student Achievement?

If a given teacher has a smaller class size, she may be more effective because she could spend more time with each student on his or her unique needs. Also, there may be better classroom discipline, fewer disruptions, and so on. It is unlikely that teacher would become less effective with fewer students in the classroom. Nevertheless, when class sizes are lowered, many students will in practice be taught by a newly hired teacher—and that is the key insight needed to understand the tradeoff between class size and teacher effectiveness. Tradeoffs between quantity and quality exist in many realms of life, including class-size reduction (Levine 1999). If public schools across a state or the entire nation implement class-size reductions, they would have to hire thousands of additional teachers, and this is likely to reduce the average quality of teachers. Rivkin, Hanushek, and Kain (2005), Koedel and Betts (2011), and many other empirical studies document the wide disparity in teaching effectiveness within the public education system. Based on those empirical results, Hanushek (2010) demonstrates that even modest improvements in teacher effectiveness would produce very large gains in student achievement. Accordingly, state governments and local public school boards should have been more concerned with improving teacher effectiveness than lowering class sizes. Analogously, it seems likely that hiring more nonteaching personnel would lower the average quality of that workforce in the same way.

Another concern with hiring more nonteaching staff is the possibility it increases bureaucracy and reduces the amount of time and energy teachers can devote to their students. "I used to be up late preparing creative lessons that I loved. Now I'm up late getting my data in," a Fairfax, Virginia, teacher told the *Washington Post* in 2011. The *Post* reporter continued, "She and others from her school said administrative chores have become so excessive that teachers have broken down and cried at work" (McCartney 2011). The *Post* article pins the blame for the increase in "administrative chores" for teachers on testing requirements under NCLB. However, excessive paperwork for teachers has long been a feature of the American public education system. In 1987, researchers had teachers fill out time diaries and found that, on average, they spent eight hours per week on paperwork either at school or at home (Freed and Ketchem 1987). In addition, public school teachers and administrators often have complained about excessive paperwork under the federal Individuals with Disabilities Education Act (IDEA). The National Association of Elementary School Principals (NAESP) and others have advocated for a reduction in paperwork. NAESP quoted one teacher as saying, "It's the additional special-education paperwork that I find most burdensome because I have to generate the same information and repeat it over and over on different forms" (Klein 2004: 58). A study commissioned by the U.S. Department of Education found that paperwork was burdensome for special education teachers and recommended reducing it (Klein 2004).

A decline in average educator quality (the result of hiring more teachers and nonteaching staff) and increased bureaucracy and paperwork (which is perhaps inherent when more nonteaching staff are employed) may explain why increased staffing in public schools does not appear to have boosted student achievement.[5]

[5]Proponents of smaller class sizes typically cite evidence from the Tennessee STAR experiment, which finds that smaller class sizes in grades K–3 may lead to achievement gains for students. While this conclusion is controversial, let's suppose for the sake of argument that it is an accurate interpretation of the research. Even if it is the case that this experiment—which involved 11,600 students—showed that class size reductions boosted student achievement, care must be taken in attempting to translate that result into policy. A statewide, national, or other larger scale reduction in class size could have different effects because of the very large number of new teachers who would have to be hired to create the smaller classes. It is likely that these new teachers would be less effective, on average, than the incumbent teachers. Based on the evidence that there are extremely large differences in teacher effectiveness, new teachers could lead to lower average student achievement and offset any gains from the smaller classes taught by the incumbent teachers.

Opportunity Cost of the Increased Employment of Nonteachers

As a thought experiment, suppose that between FY 1992 and FY 2009, the percentage change in employment of nonteaching staff had mirrored the percentage change in the student population. Between FY 1992 and FY 2009, the number of nonteaching personnel in American public schools increased from 2.1 million FTEs to 3.1 million FTEs, an increase of 46 percent. If the number of nonteaching personnel had instead matched student growth and increased by 17.2 percent, the number of nonteaching personnel nationwide would have been 2.5 million in FY 2009. Thus, the actual number of nonteaching personnel was more than 606,000 FTEs above what it would have been had staffing growth been proportional. What's more, some claim that a large proportion of public school budgets represent "fixed" costs. If that were true, the increase in administration should have been *less* than the increase in students.[6]

As an extremely cautious assumption, let's assume that the average compensation and employment costs of those nonteaching personnel were only $50,000 per year per employee in FY 2009.[7] If that were the case, what would public schools in the United States have been able to save if they had limited changes in the employment of administrators and other nonteaching personnel to the changes in their student populations? The answer to that question comes from taking the "extra" nonteaching personnel and multiplying it by the assumed $50,000 in costs per employee. For the United States as a whole, that calculation indicates that American public schools would have had an additional $30.3 billion in FY 2009 (that's 606,633 × $50,000 = $30.3 billion). That $30.3 billion would represent annual recurring savings in public schools, which could be used for other worthy purposes. For context, $30.3 billion could have provided about 3.3 million students with $9,000 vouchers to be used to offset tuition payments at private schools. Alternatively, $30.3 billion could have

[6]For estimates and an analysis of fixed and variable costs in public education, see Scafidi (2012a).

[7]Data on the employment costs of nonteaching and nonadministrative personnel in public schools are not readily available. However, please see endnote 30 in Scafidi (2012b) for evidence that this $50,000 figure is perhaps a large underestimate.

been used to give each teacher in FY 2009 a raise of over $9,400 per year—a move that might, presumably, increase the quality of those entering the teaching profession.

Comparing Productivity Changes in American Higher Education and K–12 Education

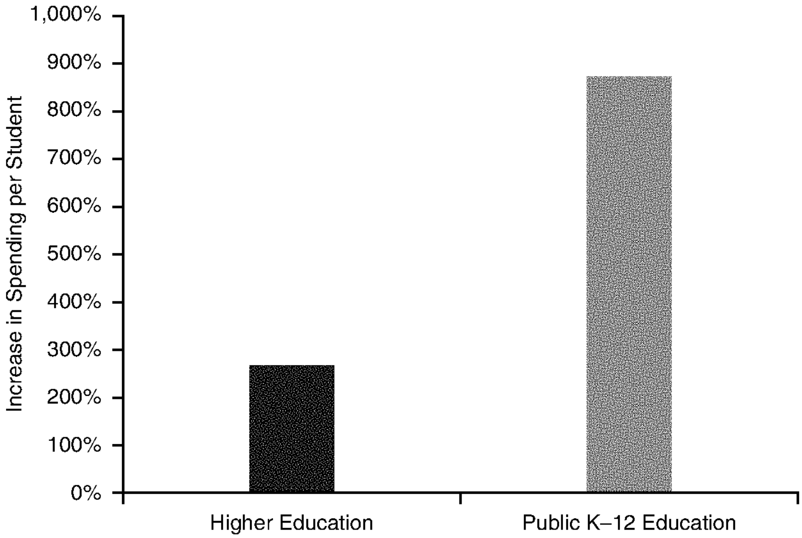
In *Going Broke by Degree: Why College Costs Too Much*, Vedder shows that real current spending per student in U.S. higher education increased from $5,008 per student in 1929–30 to $18,396 in 1999–2000—a real increase of more than 267 percent (Vedder 2004: Table 3-1). Current spending excludes capital expenditures, and his data covered both public and private colleges and universities.

From 1976–77 to 1999–2000, Vedder finds the increase in university staffing per 100 students increased from 18.52 to 20.83, an increase of 12.5 percent. During these time periods, Vedder makes a case that university teaching and research outputs were roughly stagnant (Vedder 2004: 50–59). Thus, Vedder believes—based on his research—that over time, colleges and universities have significantly higher costs yet similar rates of output.

In the preceding sections of this article, I have made the case that outputs in American K–12 public education have been roughly stagnant over time, as measured by student test scores and public high school graduation rates. But how have costs and staffing in K–12 public schools changed over time as compared to the data Vedder cites for higher education? Using the same data source as Vedder, the *Digest of Education Statistics*, which is published annually by the National Center for Education Statistics at the U.S. Department of Education, the real increase in current spending per student in public K–12 education has increased from $900 per student in 1929–30 to $8,765 in 1999–2000—an increase of 873.9 percent. As shown in Figure 6, the increase in real public school spending per student was more than three times the increase that occurred in higher education over this 70-year period.

Regarding staffing, I could not use the exact same time period as Vedder due to a lack of data availability. However, for a shorter time period than considered by Vedder—1980–81 to 1999–2000, staffing in K–12 public schools increased 17.4 percent from 10.24 staff per 100 students to 12.02. As shown in Figure 7, staffing per 100 students

FIGURE 6
Real Increase in Current Spending per Student, 1929–30 to 1999–2000



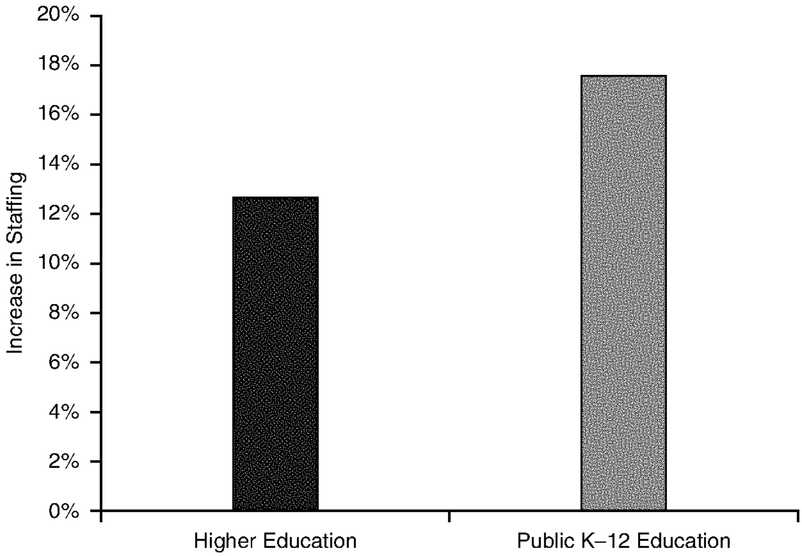
Sources: Vedder (1996: Table 3-1) and National Center for Education Statistics (2011: Table 190).

in K–12 public schools increased faster than the corresponding number in higher education.

What has happened to staffing since 2000, when Vedder's analysis ended? The more recent trends in staffing are compared in Figure 8. In higher education, the trend has reversed—colleges and universities have less staffing in recent years as compared to 2000. Specifically, in 2009–10, institutions of higher education employed 18.1 staff per 100 students, a staffing decline of 15.1 percent since 2000. But, in public K–12 education, the staffing surge continued. K–12 public schools employed 12.02 staff per 100 students in 1999–2000, and by 2009–10, staffing had increased 7 percent to 12.87.

Suppose that Vedder's analysis finding stagnant outputs in higher education, and both Vedder's and my analyses finding stagnant outputs for public K–12 education, are all correct. If that is the case, then the productivity decline in public K–12 education is significantly greater than that for higher education.

FIGURE 7
INCREASE IN STAFFING PER 100 STUDENTS, 1997–2000 FOR HIGHER EDUCATION, 1980–2000 FOR K–12 EDUCATION



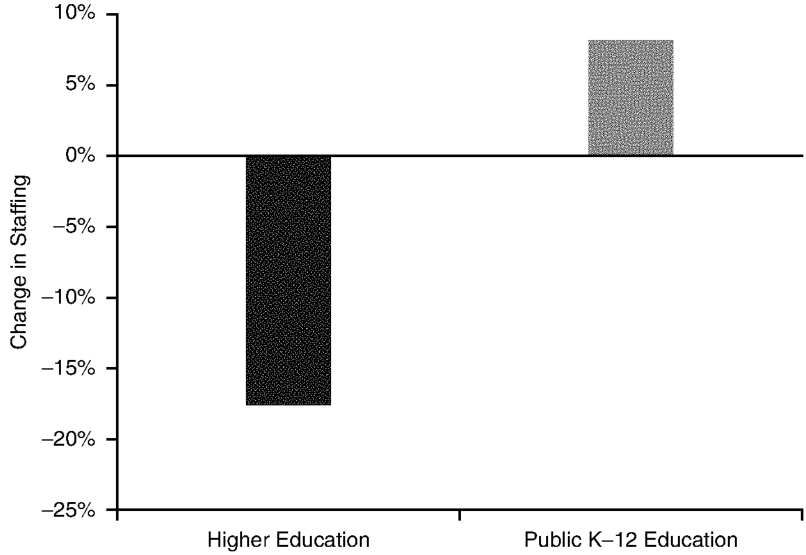
SOURCES: Vedder (1996: Table 3-3) and National Center for Education Statistics (2011: Tables 39 and 84).

For higher education, Vedder has proposed a variety of potential solutions to solve the productivity problem, including allowing more competition among providers and choice for consumers, allowing for-profit institutions more access to higher education markets, online learning, tying taxpayer subsidies to students to the value-added in their knowledge and skills, and greater use of private certifications of skills that bypass higher education altogether (Vedder 2004). The next section of this article describes Vedder's creative proposal for simultaneously solving the productivity problem in K–12 public education and overcoming political resistance to greater competition and more parental choice in schooling.

Universal School Choice and Converting Public Schools to Employee-Owned Enterprises

In a short book, *Can Teachers Own Their Own Schools?*, published in 2000 by the Independent Institute and the Thomas B.

FIGURE 8
Change in Staffing per 100 Students, 2000–10



Sources: Vedder (1996: Table 3-3); National Center for Education Statistics (2011: Table 254; 2012: Table 196; 2015: Tables 203.10, 213.10).

Fordham Institute, Vedder makes a case for universal school choice, as well as for turning over ownership of public schools to public school employees. Vedder proposes that ownership of individual public schools be turned over to school employees through an employee stock ownership plan (ESOP).

Under the Vedder-ESOP proposal, public school employees would be given shares of stock ownership in the public schools where they are employed. As a starting point for discussion, he suggests that principals would receive 200 shares for each year of experience, teachers and other professional staff (assistant principals, counselors, librarians) would receive 100 shares for each year of experience, and support staff (bus drivers, cafeteria workers, and janitors) would receive 50 shares of stock for each year of experience. The principal would be the initial CEO of the company, and the company would own all school property.

Updating and simplifying an example from Vedder (2000), suppose a school had 1 principal, 50 teachers, 22 professional staff, and

28 other staff, and that each staff member had 15 years of experience. Under Vedder's allocation of stock, the principal would own 3,000 shares (15 years × 200 shares), each teacher and professional staff member would own 1,500 shares (15 years × 100 shares), and other staff would own 750 shares each (15 years × 50 shares). The total number of ownership shares would be 132,000. Of those 132,000 shares, teachers would own 75,000 shares; other professional staff would own 33,000 shares; other staff would own 21,000 shares; and the principal would own the remaining 3,000 shares.

Suppose the value of all school assets minus debt—land, building, buses, computers, desks, books, and so on—was $5,000,000. This $5,000,000 is the book value of the school (I have purposely set a low amount so as to be cautious in this example). Suppose, further, that the shares were worth 2 times the book value.[8] Under these assumptions, a teacher's 1,500 shares would be worth over $113,000 at the outset ($5,000,000/132,000 shares = $37.88; and $37.88 × 2 × 1,500 shares = $113,636).

Each employee-owned school would now operate in an autonomous and competitive educational marketplace. Since all taxpayer funds devoted to K–12 education would be allocated directly to parents, parents would have a choice among schools, which in turn would have to compete for students and funds. All schools, including employee-owned schools, would have complete autonomy to decide their tuition, curriculum, class size, pay scale, student discipline, employee dismissal, governance, and all other school policies. Of course, all laws that apply to private schools would apply to employee-owned schools as well.

To be sure, some education reformers are skeptical that public school employees should be given ownership and control over tens of thousands of public schools worth billions of dollars. But skeptics should consider this significant transfer of wealth in light of the other piece of the Vedder-ESOP plan—universal school choice. Employee-owned schools would face a market test—students and the funds dedicated to their education would flow to the schools their parents deem best. If the employee-owned schools could not attract

[8]The companies in the S&P 500 are currently worth more than 2.5 times book value, despite not having a guaranteed market the way K–12 education does, with its taxpayer funding and compulsory attendance laws. Accordingly, this multiple of 2 may be low.

enough students, then the employee-owners would face a stark reality. Their choices would be to (1) improve the quality of their academic and social offerings, (2) hire new and better management, (3) sell their school land and facilities to another educational provider, or (4) see the value of their stock fall dramatically. Thus, employee-owners would have a powerful financial incentive to offer excellent educational programs or sell the valuable assets they own to someone who will.

In addition to ownership shares, myriad other details would need to be specified to convey ownership of public schools to public school employees. For example, should employee-owned schools be allowed to sell their assets for uses outside the K–12 education sector? Allowing the sale of school assets for a wider variety of uses would increase the value of these employee-owned assets. Relatedly, I offer one tweak to Vedder's outline, in the interest of even further increasing opportunities for parents to choose among schools. I would allow public school employees to own vacant school properties as well. Many urban school districts collectively own hundreds of vacant school buildings. These districts have a poor track record in repurposing these properties or selling them (Dowdall and Warner 2013).

I see three tangible benefits of the Vedder-ESOP idea for public schools. First, the incentives of public school employees would become significantly more aligned with the interests of students and their families. Instead of advocating for job protections, cumbersome work rules, more nonteaching positions, and generous retirement benefits, employee-owners of schools would advocate within their own school communities for changes that would increase enrollments and student and family satisfaction. Of course, employee-owners would continue to advocate for more generous taxpayer funding for K–12 education. That would not change relative to the status quo, but employee-owners would face a new and powerful incentive to meet the unique needs of each and every child. Otherwise, children whose needs are not being met will move to other schools that will meet their needs, and the dollars used to fund their education will move as well. Furthermore, those employee-owners would see the value of their stock ownership fall. By contrast, employee-owners who did offer an excellent education that is valued by parents would see the value of their stock ownership rise.

Second, teachers and other public school employees would come to see the benefits of increased diversity in school offerings—not just for students and parents, but for themselves as well. They would be able to create academic and social environments that they believe are best for students and not be subject to the preferences of federal, state, and local officials who impose a large and ever-changing array of mandates on local schools. Given greater autonomy, job satisfaction would increase.

Third, the Vedder-ESOP idea would significantly increase parental choice and the diversity of educational offerings available to parents. Instead of being largely the same in terms of academic and other offerings like current public schools, employee-owned schools would differentiate their offerings and give parents opportunities to match academic and other programs to the specific needs of their children.

Would teachers and other public school employees support stock ownership? While they would lose the certainty of union-negotiated or government-imposed class size limits, salary schedules, and teacher tenure, they would instead gain autonomy and ownership. Vedder writes, "They (teachers and others) would be trading off the lifetime job security under the old arrangement for a significant increase in their wealth plus a greater say in how the school will operate" (Vedder 2000: 30).

Vedder and Hall (2000) find that allowing more competition and choice in K–12 education produces another benefit for teachers. They point out that, theoretically, more competition among schools for students would also lead to more competition among schools for teachers. More competition for teachers would lead to higher pay and better benefits and working conditions. Using 1996 data on Ohio public school districts, Vedder and Hall find that teachers in public schools would experience a $1,084 salary increase if the share of the students in their school districts who attended private schools increased from zero to 20 percent. This salary increase was equal to about 3 percent of the average district teacher salary in Ohio at that time.

Given these benefits, and given the evidence we have about the benefits of increased parental choice in education, the Vedder-ESOP proposal is something education experts, policymakers, parents, and other citizens should debate and something enterprising states or school districts should pursue.[9]

[9]See Forster (2013) for a summary of the evidence regarding programs that extend parental choice in education to private schools.

Conclusion

Richard Vedder is well known for his work on higher education. But his contribution to our understanding of the productivity problem in K–12 education is significant too. Regarding the latter, in 1996, Vedder pointed out the declining productivity in K–12 education—that is, stagnant outputs with significantly greater taxpayer-funded inputs over time (Vedder 1996). To reverse the decline in productivity, Vedder (2000) offers a creative proposal to inject more competition among providers and choice for consumers into the K–12 school system, by converting American public schools into for-profit, employee-owned enterprises.

While Vedder has been rightly concerned with productivity in American institutions of higher education, the analysis presented here shows that the productivity problem in American public K–12 schools is significantly greater. Specifically, over the 1929–30 to 1999–2000 time period analyzed in Vedder (2004), the real increase in current spending per student in higher education increased by 267 percent, while the corresponding increase for public K–12 schools was about 874 percent. Furthermore, in the first decade of the 21st century, staffing per 100 students declined in American colleges and universities by 4.8 percent. Thus, at least one side of the higher education productivity equation has improved in recent years. However, the trend in public K–12 education has continued to worsen—during the first decade of the 21st century, public school staffing per 100 students increased by 7 percent.

Perhaps it is time to heed Vedder's advice for public K–12 education and expand competition and choice through vouchers, tax credits, and by converting individual public schools into autonomous, employee-owned enterprises.

References

Berliner, D. C., and Biddle, B. J. (1995) *The Manufactured Crisis: Myths, Fraud, and the Attack on America's Public Schools*. New York: Basic Books.

Dowdall, E., and Warner, S. (2013) "Shuttered Public Schools: The Struggle to Bring Old Buildings New Life." Philadelphia: The Pew Charitable Trusts.

Forster, G. (2013) "A Win-Win Solution: The Empirical Evidence on School Choice." Indianapolis: Friedman Foundation for Educational Choice.

Freed, C. W., and Ketchem, M. E. (1987) "Teacher Paperwork Study: Type, Time and Difficulty." ERIC Document No. 285681.

Greene, J. P. (2006) *Education Myths: What Special Interest Groups Want You To Believe About Our Schools and Why It Isn't So*. Lanham, Md.: Rowman and Littlefield.

Greene, J. P., and Forster, G. (2004) "The Teachability Index: Can Disadvantaged Students Learn?" Education Working Paper No. 6. New York: Manhattan Institute.

Hanushek, E. A. (2010) "The Economic Value of Higher Teacher Quality." NBER Working Paper No. 16606. Cambridge, Mass.: National Bureau of Economic Research.

Hanushek, E. A., and Lindseth, A. A. (2009) *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools*. Princeton, N.J.: Princeton University Press.

Heckman, J. J. (2008) "Schools, Skills, and Synapses." NBER Working Paper No. 14064. Cambridge, Mass.: National Bureau of Economic Research.

Heckman, J. J., and LaFontaine, P. (2010) "The American High School Graduation Rate: Trends and Levels." *Review of Economics and Statistics* 92 (2): 244–62.

Hoxby, C. M. (2003) "School Choice and Competition: Evidence from the United States." *Swedish Economic Policy Review* 10: 9–65.

Klein, S. (2004) "Reducing Special Education Paperwork." *Principal* 84 (September/October): 58–60.

Koedel, C., and Betts, J. R. (2011) "Does Student Sorting Invalidate Value-Added Models of Teacher Effectiveness? An Extended Analysis of the Rothstein Critique." *Journal of Education Finance and Policy* 6 (1): 18–42.

Levine, A. (1999) "Dueling Goals for Education." *New York Times* (7 April).

McCartney, R. (2011) "Paperwork Burden Plagues Teachers." *Washington Post* (12 November).

National Center for Education Statistics (1991a) *Digest of Education Statistics: 1990*. NCES 91-660. Washington: U.S. Department of Education.

__________ (1991b) *Digest of Education Statistics: 1991*. NCES 91-697. Washington: U.S. Department of Education.

__________ (1994) *Digest of Education Statistics: 1994*. NCES 94-115. Washington: U.S. Department of Education.

__________ (1995) *Digest of Education Statistics: 1995*. NCES 95-029. Washington: U.S. Department of Education.

__________ (2007) *Digest of Education Statistics: 2006*. Washington: U.S. Department of Education. NCES 2007-017.

__________ (2011) *Digest of Education Statistics: 2010*. NCES 2011-015. Washington: U.S. Department of Education.

__________ (2012) *Digest of Education Statistics: 2011*. NCES 2012-001. Washington: U.S. Department of Education.

__________ (2015) *Digest of Education Statistics: 2013*. NCES 2015-011. Washington: U.S. Department of Education.

Rivkin, S. G.; Hanushek, E. A.; and Kain, J. A. (2005) "Teachers, Schools, and Academic Achievement." *Econometrica* 73 (2): 417–58.

Scafidi, B. (2012a) "The Fiscal Effects of School Choice Programs on Public School Districts." Indianapolis: Friedman Foundation for Educational Choice.

__________ (2012b) "The School Staffing Surge: Decades of Employment Growth in America's Public Schools." Indianapolis: Friedman Foundation for Educational Choice.

__________ (2013) "The School Staffing Surge: Decades of Employment Growth in America's Public Schools: Part II." Indianapolis: Friedman Foundation for Educational Choice.

Vedder, R. (1996) "School Daze: Productivity Decline and Lackluster Performance in U.S. Education." Policy Brief No. 171. St. Louis: Center for the Study of American Business at Washington University.

__________ (2000) *Can Teachers Own Their Own Schools? New Strategies for Educational Excellence*. Oakland, Calif.: The Independent Institute.

__________ (2004) *Going Broke By Degree: Why College Costs Too Much*. Washington: AEI Press.

Vedder, R., and Hall, J. (2000) "Private School Competition and Public School Teacher Salaries." *Journal of Labor Research* 21: 161–68.

28

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

The Effect of Extra School Funding on Students' Academic Achievements under a Centralized School Financing System

Hosung Sohn (Lead Author)
Heeran Park
Haeil Jung (Corresponding Author)

Running Head (Short Title): The Effect of Extra School Funding

Hosung Sohn
(Lead Author)
School of Public Service
Chung-Ang University
84 Heukseok-ro Dongjak-gu
Seoul 06974, South Korea
Email: hsohn@cau.ac.kr
Phone: 82-2-820-5123

Heeran Park
Institute of Public Policy and Administration
Chung-Ang University
84 Heukseok-ro Dongjak-gu
Seoul 06974, South Korea
Email: walug71@cau.ac.kr
Phone: 82-10-6462-9735

Haeil Jung
(Corresponding Author)
Department of Public Administration
Korea University
145 Anam-Ro, Seongbuk-Gu
Seoul 02841, South Korea
Email: hijk@korea.ac.kr
Phone: 82-2-3290-2275

Abstract

This paper analyzes the effect of providing extra school funding on student achievement under the homogenous school funding system in South Korea. This study exploits an administrative cutoff rule that determines the provision of school funding and uses a regression discontinuity design to identify a causal impact of extra school funding. The analysis finds that a 20% increase in per-pupil funding for underperforming schools reduced the number of below-average students in mathematics, English, social studies, and science by 19.7%, 17.0%, 16.1%, and 18.1% compared to the control-side means. The research findings suggest that additional funding for underperforming schools to promote vertical equity would improve students' academic outcomes if it is distributed directly to underperforming schools and used to provide new academic programs to students.

Keywords: School Funding, Student Achievement, Regression Discontinuity Designs, Centralized School Financing System

JEL Code: H52, I22, I24

Funding: This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2016S1A3A2924956).

Conflict of Interest: The authors declare that they have no conflict of interest.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

1. Introduction

One of the main goals of school funding policy is to improve students' academic performance. Two distinct approaches in school funding policy are used to achieve this goal. One way is encouraging competition among schools or school districts in connection to funding levels, while the other way is providing more funding for underperforming schools or schools with economically disadvantaged students (McGuinn 2012). In the past decades, economic inequality seems to have exacerbated the disparity of educational performance and opportunity between students in poor and affluent families. Indeed, students with disadvantaged backgrounds face many barriers to performing as well in school compared to students from a more advantaged background, further amplifying socioeconomic inequality in society (Berliner 2005; Condron 2011; Dragoset et al. 2019). Therefore, attention has been focused on school funding to help underperforming schools and students from disadvantaged backgrounds (Jackson, Johnson, and Persico 2016).

School funding for underperforming schools is designed to provide quality education to disadvantaged and underperforming students. Socioeconomic status or individual characteristics such as family background or ethnicity should not be an obstacle to receiving a quality education. Further, school funding for underperforming schools creates a shorter ladder of social mobility for students in poor neighborhoods (Marks, Cresswell, and Ainley 2006; Condron 2011). A holistic strategy to organize resources in schools and share leadership among stakeholders, including schools, students, families, and community-based organizations, seems to be critical (Johnston et al. 2020). Nonetheless, providing grants without any competition may suppress motivation for schools to engage in innovative reform or creative teaching methods. For example, additional subsidies for teachers, which were not designed as an incentive scheme,

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

failed to enhance teaching skills (Leuven et al. 2007; van der Klaauw 2008). Thus, it is essential to understand whether and why additional school funding for underperforming schools is effective in improving students' academic achievements.

The academic achievement gap among students has been a serious issue not only in Western countries, including the U.S., but also outside of Western countries (Chmielewski 2019). Particularly, the achievement gap among elementary and middle school students in South Korea has worsened in recent decades (Byun and Kim 2010; Bae and Wickrama 2015; Choi and Park 2016). South Korea has been one of the Asian countries (including China, Singapore, Japan, and Hong Kong) that have sustained world-class academic performance by encouraging competition among students and schools (OECD 2018). However, the distribution of students' academic performance indicates widening inequality between high and low performers in recent years (You 2015; Lee and Ku 2019). Because elementary and middle schools in South Korea have been funded and tightly controlled by the central government, the school funding per pupil in poor neighborhoods is no less than in wealthy neighborhoods (Ryu 2013; Yang 2012). Also, teachers' ability is quite homogenous in South Korean public schools, on average, because public school teachers rotate among schools. Therefore, it seems that students' family resources and backgrounds are mostly responsible for underperforming students and schools. Thus, given the homogenous school funding structure in South Korea, the additional funding to underperforming schools is more about securing vertical equity.

Specifically, this study focuses on school funding policies for underperforming schools and their effectiveness in improving students' academic achievements in those schools. Therefore, this study examines indirectly whether additional school funding to underperforming

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

schools makes up for students' academic shortcomings that are driven by family resources and backgrounds.

By taking advantage of a cutoff rule based on each school's average share of underperforming students in the provision of school funding in South Korea, this study employs regression discontinuity design (RDD).[1] In our analysis, we assume that schools falling right below or above the cutoff point are similar, on average, in observed and unobserved characteristics of students and schools. In other words, the cutoff rule in school funding is assumed to mimic random assignment by creating the treatment group of schools right above the cutoff point and the untreated schools right below the cutoff point.

Our RDD analysis shows that except for reading results, most of the effect estimates in the other four subjects (mathematics, English, social studies, and science) are statistically significant at the 5% level and considerably large in magnitude. Also, those estimates are robust across different RDD specifications. Specifically, a 20% increase in per-pupil funding for underperforming schools reduced the share of below-average students in mathematics, English, social studies, and science by 19.7%, 17.0%, 16.1%, and 18.1% compared to the control-side means. Moreover, by analyzing how the additional school funding is used post-treatment, we find that the funding was used for operating summer and after-school programs, as well as utilizing outside resources such as hiring college students as tutors. Hence, we argue that improvement in student achievement is driven mainly by such factors.

The rest of this study proceeds as follows. The next section covers previous studies on school funding for underperforming schools. The third section explains the institutional

[1] The Ministry of Education calculates the share of students whose achievement level is below basic (the share of underperforming students) for each of the five subjects: mathematics, reading, English, social studies, and science. According to a cutoff rule by the Ministry of Education, underperforming schools are those whose average share of underperforming students is equal to 5% or above.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

background of our study. The fourth section describes the empirical strategy, the RDD using a natural experiment in South Korea, and the data. The fifth section provides the empirical results, including tests of identifying assumptions of the RDD analysis, tests of effect estimates, falsification tests, and robustness checks. The discussion and conclusion section explains the results and the study's implications.

2. Previous Studies

A large volume of research has been conducted to examine the effects of school finance reforms (SFRs), policies that provide additional funding to low-performing schools or schools with economically disadvantaged students. Many previous studies conducted evaluations of SFRs in the United States (e.g., Jackson, Johnson, and Persico 2016; Lafortune, Rothstein, and Schanzenbach 2018; Kreisman and Steinberg 2019). State supreme courts have overturned school finance systems in 28 states since 1971 due to increased demands for equality in school spending. The court-ordered SFRs led to legislative reforms aimed at reducing disparities in resources and funding across school districts between 1971 and 2010. Since 1990, funding has focused more on providing low-income districts with additional funding (Jackson, Johnson, and Persico 2016). It was a national policy effort to reduce a gap in school spending between wealthy and poor districts by increasing funding to disadvantaged schools or school districts (Jackson, Johnson, and Persico 2016; Lafortune, Rothstein, and Schanzenbach 2018).

Card and Payne (2002) found that SFRs increased funding to poorer districts and contributed to equalization in test score outcomes as well as in spending across districts. This study gauged the impact of policy using an instrumental variable to deal with endogeneity driven by unobserved characteristics that determine the decision to increase school spending, such as factors that lead to test scores gap. Lafortune, Rothstein, and Schanzenbach (2018) also

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

concluded that SFRs led to enhancing the academic performance of students in low-income school districts. Jackson, Johnson, and Persico (2016) examined the effect of increased spending induced by SFRs on long-term outcomes, including adult income. They found that extended spending enhanced wages, family income, and educational attainment. Importantly, the magnitude of effects for students from low-income families was larger than for those from wealthier families.

Several studies investigated state school funding programs aligned with SFRs. Papke (2005) and Roy (2011) estimated the effect of Michigan's school finance equalization program, which aimed to increase funding for the least-funded districts. They found that the program not only allowed budgets to be equal within the state but also improved student performance in low-spending school districts. Papke (2005) found that increased funding had an impact on mathematics test pass rates, especially among schools with initially poor performance. On the other hand, Roy (2011) pointed out a negative effect on student performance in the highest-spending districts. Guryan (2001) examined the aid formula provided by the Massachusetts Education Reform Act of 1993 that intended to equalize funding for public schools across districts. It concluded that expanded funding to low-income districts increased their students' academic performance significantly. Van der Klaauw (2008) and Matsudaira, Hosek, and Walsh (2012) studied education policy under Title I, which is the federal law designed to provide more education funding to students from low-income households in the United States. They found that there was no impact on test scores at the individual level, as well as at the school level, when they used RDD.

Some studies investigated the impact of school funding policy by providing grants through competitive settings under eligibility criteria including poor academic performances,

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

which usually comes with requesting strong reform plans and tight oversights. Goe (2006) evaluated the impact of California's Immediate Intervention/ Underperforming Schools Program (II/USP), which additionally offered financial supports to low-performing schools that were chosen through the application process. Goe (2006) concluded that schools receiving increased funding failed to enhance students' academic achievement. Carlson and Lavertu (2018) studied the effect of the federal school improvement grant (SIG), which was authorized under Title I of the Elementary and Secondary Education Act (ESEA) of 1965 in the United States. While the SIG targeted low-income groups, the grants were provided through competitive awards. Using RDD, they found that Ohio's SIG program contributed significantly to students' academic achievement. In contrast to the results of Carlson and Lavertu (2018)'s study about Ohio's SIG program, however, Dragoset et al. (2019) found no impact of the SIG program on students' outcomes in about 460 schools from 50 school districts in 21 states. More recently, the Race to the Top (RTTT) in the United States, one of the federal education reforms for public schools, targeted a low-performance group but, at the same time, was executed in a competitive manner (McGuinn 2012).[2] Dragoset et al. (2016) found no clear effect of RTTT on students' outcomes.

Researchers in European countries have also conducted evaluations of education policies designed to increase funding for low-performing schools or schools with economically disadvantaged students. Ooghe (2011) studied education policy implemented in Flanders, Belgium that provided extra personnel subsidies to schools based on the students' family background and found that this policy yielded positive effects in enhancing the academic scores of students from low-income families. By contrast, Bénabou, Kramarz, and Prost (2009) found

[2] Race to the Top is a competitive grant program intended to reward states that are "creating conditions for innovation and reform" instead of executing sanctions. It aims at changing to a federal education system from a decentralized education system. One of the goals is to turn around lowest-achieving schools by narrowing race- and income-based achievement gaps.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

no effect of the French ZEP (Zones d'Education Prioritaire) program, which provided extra funding to schools in disadvantaged areas based on student outcomes. Leuven et al. (2007) also showed that the additional funding designed to provide a grant to a disadvantaged group for primary schools in the Netherlands failed to enhance not only pupils' academic scores but also teachers' motivation.

In summary, it seems that previous studies provided inconsistent findings depending on the existing school funding system, how the new funding program was designed, distributed, and used under the local contexts, and the groups targeted by the new funding. As shown earlier, some programs provided funding under competitive settings. Also, there were almost no studies about school funding for underperforming schools or schools with economically disadvantaged students in Asian countries; studies were mostly conducted in Western countries and investigated education funding programs that were designed to narrow a funding gap across schools and school districts.

Moreover, the target of the additional funding was broadly set to be underfunded school districts or school districts with high concentrations of poverty. Because schools in such districts usually consisted of students from low-income families or families with limited educational resources, their research implicitly tested whether additional school funding to underperforming schools or school districts helps them overcome their deficits not only in school spending but also in family resources. As mentioned earlier, school funding and teachers' ability in South Korea are homogenous among elementary schools. Therefore, assuming the same existing resources per pupil in all schools, this study examines whether additional school funding to schools with underperforming students makes up for students' academic shortcomings, which are possibly driven by family resources and background.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

3. Institutional Background

Public education in South Korea is divided into three levels: six years of elementary school, three years of middle school, and three years of high school. Following the principle of autonomy of education adopted in Korea, local education is financed by a special account for educational expenses, which is established under the Local Education Government Act. It is separate from general local finance. The revenue source includes transfers from the central government (local education subsidies and subsidies from the treasury), transfers from local governments (local education tax, tobacco consumption tax, and city and province taxes), and independent revenue sources such as tuition and admission fees.

The school year relevant for this study began in March 2009, and the Ministry of Education in South Korea conducted a nationwide assessment of the educational achievement of students at every educational level in October 2009. The purpose of the assessment was to evaluate the performance of every student and examine whether variations in achievement exist across schools. Assessments were conducted in reading, mathematics, English, social studies, and science, though the assessment area varied by educational level and school years. Every sixth-grade student in elementary school—the focus of our study—was evaluated in all five subjects in October 2009 and July 2010. After the test, every student received a scale score based on their test performance, and each student was given one of four achievement levels for each subject: outstanding, average, basic, and below basic. For the outcome analysis, we define "below average" students as those whose achievement level is basic or below basic. For the assignment variable used for the RDD, we define "underperforming" students as those whose achievement level is below basic.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Based on the 2009 assessment, the Ministry of Education identified underperforming schools based on students' test performance. To be more specific, the Ministry of Education calculated the share of students whose achievement level is below basic for each of the five subjects, and in March 2010 the Ministry identified schools whose average share was equal to 0.05 or above and determined that they were underperforming. The major purpose of the assessment was to help such schools promote student achievement and reduce educational inequality among schools in Korea. Accordingly, the Ministry of Education provided school funding to underperforming schools on the premise that these schools need assistance.

Figure 1 shows the simple correlation between the per-pupil funding level and the share of students below average (binned scatterplot). As the figure suggests, there is a strong downward-sloping relationship between the two variables. Note that schools that received funding were required to use the money solely to promote student achievement. Unfortunately, there is no comprehensive report about how the extra funding for underperforming schools was used in each school. However, according to the Ministry of Education, the extra funding was given directly to underperforming schools (Ministry of Education, Science, and Technology 2010). Also, while there is no official government report on how schools spent their funding, anecdotal stories suggest that schools provided after-school and summer school programs and individual tutoring to students by hiring temporary teachers such as college students. In this study, we tested whether the funding was used for such factors using the survey data administered to principals. Using the post-treatment school-level data, we find that the shares of schools operating summer school and after-school programs were statistically and practically higher for the treated schools. Therefore, it appears that the extra school funding to

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

underperforming schools was directly and properly used to improve students' academic outcomes.

4. Methods and Data

Empirical strategy

The provision of school funding (treatment) is a discontinuous function of each school's average share of students whose achievement level is below basic (henceforth, underperforming). Therefore, the setting allows us to use RDD that is favorable—under certain conditions—for securing the internal validity of research findings. Our treatment variable is the following indicator variable (D_s):

$$D_s = 1\{X_s \geq 0.05\}.$$

X_s indicates the average share of underperforming students in five subjects for school s. Hence, the treatment variable takes the value equal to 1 when the average share is equal to or greater than 0.05, and equal to 0 when the average share is less than 0.05.

The literature on RDD proposes estimating the functions nonparametrically using either global or local polynomial regression (Lee and Lemieux 2010); but local polynomial regression estimators are widely used in practice, as they are shown to provide a consistent estimator for treatment effects in the context of RDD (Hahn, Todd, and van der Klaauw 2001; Imbens and Lemieux 2008). To estimate the treatment effects, we follow the suggestions from the RDD literature by using local linear regression (i.e., degree of polynomial (p) equal to 1) with the triangle kernel function (Fan and Gijbels 1996; Gelman and Imbens 2019). Note that the results under uniform kernel specification and higher-order polynomials are qualitatively similar.

One important parameter that a researcher should determine is the bandwidth (h) choice. The bandwidth is arguably the most important parameter in the RDD study because it determines

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

the analysis sample used in estimation, and discontinuity estimates are, oftentimes, sensitive to the bandwidth choice. As such, many methods are developed for deriving the optimal bandwidth choice in RDD (e.g., Imbens and Kalyanaraman 2012), but the RDD literature suggests providing discontinuity estimates under various bandwidth choices for the sake of transparency in research findings. We, therefore, discuss discontinuity estimates derived under the bandwidth choice provided by Imbens and Kalyanaraman (2012), and provide estimates derived under other bandwidth choices in an appendix.

In sum, using the student-level data, we estimate the following regression model using the observations within $c - h < X_s < c + h$:

$$Y_{is} = \alpha + \tau D_s + \beta(X_s - c) + \gamma(X_s - c)D_s + \varepsilon_{is},$$

where Y_{is}, D_s, $X_s - c$, $(X_s - c)D_s$, and ε_{is} denote a dependent variable, treatment, assignment variable, interaction term between the assignment and treatment variable, and the error term, respectively. The subscript i and s indicate students and schools. The main outcome variable is a dummy variable indicating whether a student received the "below average" grade. The coefficient of interest is τ, the effect of school funding on Y_{is}.

Another issue is related to statistical inference. Errors are likely correlated within schools and not accounting for such serial correlation leads to underestimating the true standard errors (e.g., Moulton 1986; Lee and Card 2008). To obviate serial correlation issues, we conduct statistical inference using cluster-robust standard errors using the method proposed by Calonico et al. (2017). For the variables that vary at the school level, we conduct statistical inference based on conventional standard errors.

Data

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

This study uses restricted administrative data on the national assessment of educational achievement in 2009 and 2010. The data are administered by the Ministry of Education, and we obtained the population data from the Ministry by following the formal application process.[3] The data consist of three datasets: student test scores (in achievement levels) for each of the five subjects, student survey data, and principal survey data. For estimating the treatment effects, we used student-level achievement levels, and for testing the identifying assumptions of an RDD, we used student- and school-level survey data administered to students and principals.

Table 1 shows student- and school-level descriptive statistics by treatment status and pre- and post-treatment periods (Panels A and B). As can be seen from the two panels, the means of many of the student- and school-level baseline covariates are similar between untreated and treated groups when the sample is restricted within the bandwidth of 0.03 and 0.07. Panel C presents student achievements, and it is clear from the panel that the share of below-average students is higher for treated groups in the pre-treatment period. The table also includes statistics on other information such as school funding level and the average number of test-takers (Panel D). The average per-pupil funding is about $3,500. The total number of schools is 594 for untreated groups and 196 for treated groups. The average number of test-takers for the untreated group is 182 and 167 in 2009 and 2010, respectively. For the treated group, the average number of test-takers is 125 and 114 in 2009 and 2010, respectively. Note that the share of test-takers is almost 100% due to the mandatory nature of the exam. Thus, our study is less likely to suffer from attrition bias.

5. Empirical Results

Tests of identifying assumptions

[3] The population data are no longer disclosed. Only the sampled data (2%) are available for the purpose of research.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Identification in RDD comes from the assumption that the relationship between the error term and assignment variable does not change discontinuously around the cutoff point on which the treatment turns. One way to ascertain such an assumption is to verify whether schools have imprecise control over the assignment variable (Lee and Lemieux 2010). If schools can control for the share of underperforming students, it is less likely that the provision of school funding is as good as random near the cutoff point. We present four facts to argue in favor of the assumption. First, the Ministry of Education did not announce the 0.05 cutoff point before the assessment date. Rather, the cutoff point was decided after the grading was done. Second, schools did not grade their students' exams. Each exam that a student took was sent to the Ministry right after the exams concluded. Third, the share of test-takers is extremely high (about 99%) because of the mandatory nature of the exam, so it's less likely that there exists differential test-taking behavior. Fourth, the range of test scores that determine an achievement level (out of four levels) is decided after the grading. Therefore, a school can't engage in manipulating students' test scores to place them at a certain achievement level.

One way to statistically test for the argument that schools have imprecise control over the assignment variable is to conduct a density test proposed by McCrary (2008) and Cattaneo, Jansson, and Ma (2020). The idea behind the density test is that if schools have less control over the assignment variable, the densities of the assignment variable are smooth across the cutoff point. Panel A of Figure 2 shows the densities of the assignment variable. As expected, we do not see any discernible discontinuity in the densities at the cutoff point. To examine the statistical significance of the discontinuity in the densities at the cutoff, we formally derive discontinuity estimates under various bandwidth choices. The results are shown in Panel B of Figure 2. The horizontal axis indicates the bandwidth choice, and the corresponding discontinuity estimates are

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

displayed on the vertical axis. We also juxtaposed a 95% confidence interval to see whether the estimated discontinuities are statistically significant at the 5% level. As can be seen from Panel B, all of the estimated discontinuities are statistically insignificant at the 5% level as the confidence interval encloses the zero horizontal line. We argue, therefore, that manipulation of the assignment variable is less likely given the four facts and density test results.

Another potential threat to identification in our study is that parents may choose to move their children to schools that did or did not receive additional school funding, which may lead to a sample selection issue. While we cannot test for such an issue, we argue that such behavior is less likely. Student mobility rates across schools are low in Korea, and it is hard to believe that parents would send their children to other schools in the middle of the school period just to benefit from such funding. Moreover, the list of schools that received school funding was not publicized by the Ministry of Education, so the mobility issue is less likely to be salient in our setting.

As a final way to verify our identifying assumptions, we test whether baseline characteristics such as gender, family composition, teacher characteristics, and school characteristics are systematically correlated with the assignment variable, especially near the cutoff point. In the context of an RDD, we should not observe any statistically significant discontinuities in the densities of these variables at the cutoff point. While we cannot test for the differences in unobservable characteristics between the two groups, the prevalence of statistically significant discontinuities in observable covariates may confound our treatment effects. Figure A1 shows the densities of the baseline student covariates by the assignment variable. The densities of all the variables are very smooth across the assignment variable, and we do not see any salient discontinuities in these variables at the cutoff point. In Figure 3 (Panels A and C) and

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Figure 4 (Panels A, C, E), we present densities of baseline test performance by the assignment variable. The share of underperforming students is, in general, increasing in the assignment variable without any discernible discontinuities at the cutoff point. Densities of school characteristics (Panels A, C, and E in Figure A2 and Panels A and C in Figure A3) are very smooth across the assignment variable, and no discernible discontinuities are observed at the 0.05 cutoff point. Note, however, that it is not the case for the share of schools providing customized instructional materials (Panel E in Figure A3). While we cannot test the statistical significance of the observed discontinuity in the share at the cutoff point from the figure, the difference in the ratio seems to be approximately 0.1. Finally, we tested whether there is a discontinuity in the number of test-takers at the cutoff point. The densities are presented in Figure A4. As can be seen from the figure, while the densities are downward trending across the assignment variable, there is no discernible discontinuity at the cutoff point.

In Table 2, we present regression discontinuity estimates for student-level baseline covariates. As we mentioned in the empirical strategy subsection, we provide effect estimates under various bandwidth choices. As can be expected from the densities of these covariates, discontinuity estimates at the cutoff point are statistically and practically insignificant, regardless of the bandwidth choice. We also tested whether baseline test performance is significantly different, and Table 3 presents the results ("Pre-treatment" column). All the discontinuity estimates are statistically and practically insignificant. Table 4 presents discontinuity estimates for baseline school characteristics ("Pre-treatment" column). As can be inferred from Figure A3 (Panel E), estimated discontinuities are significant only for the share of schools providing customized instructional materials. Though the discontinuities are statistically significant for this variable, we argue that this does not invalidate our identifying assumption because the estimated

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

discontinuities are very small (approximately 0.14). While we cannot test for the differences in other school-level covariates due to data limitations, we further argue that school characteristics are less likely to be significantly different between the two groups given that elementary education is mandatory in Korea and that the Ministry of Education makes a significant effort to homogenize school-level characteristics across the schools. All in all, we proceed with the assumption that school funding is as good as random at the cutoff point, given the results presented in Figures 3 and 4, Figures A1 to A3, and Tables 2 to 4.

Effect estimates

To examine whether school funding led to a meaningful increase in student achievement, we first conduct a graphical analysis using RD-type graphs presented in Figures 3 and 4. The fitted line is derived from local linear specification using the triangular kernel function. The bandwidth used for fitting the line is 0.018. We use this specification across the figures for the sake of consistency. On the left side of the figures, we show densities of test performance using pre-treatment test results. We should not observe any significant discontinuities for pre-treatment test results, as there was no treatment. On the right side of the figures, we present densities of test performance using post-treatment test results. Presentation of the pre-and post-treatment densities side by side, we argue, would facilitate the examination of treatment effects.

Panels A and B of Figure 3 show densities of mathematics results before and after treatment, respectively. Before the treatment, the densities are increasing smoothly by the assignment variable value, and there does not appear to be a significant discontinuity at the 0.05 cutoff point. After the treatment, however, the densities are smooth up to the cutoff point, followed by a huge drop in the density at the cutoff point, and the densities are quite noisy thereafter. Turning to the science results (Panels C and D of Figure 3), we see a similar pattern

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

for the pre-treatment test results and similar discontinuity for the post-treatment test results. Panels C to F in Figure 4 show the same information for social studies and English exams. That is, densities are smooth across the assignment variable for the pre-treatment test results. Discontinuities are, however, salient for the post-treatment outcomes.

The pattern of the densities of reading test results is, however, different from the other four subjects. As can be seen from Panel A of Figure 4, the pattern of the densities for the pre-treatment period is similar with other subjects, but that is not true for the post-treatment period (Panel B). The densities observed for the treated group are located, in general, at the lower portion of the graph, implying that the average share of underperforming students in the treated group is lower than that of the untreated group. Note, however, that we do not see any significant discontinuity near the cutoff point where the treatment effect is identified. In other words, the results imply that, while the average share of underperforming students is lower for the treated group, no difference in the share is observed when the comparison is based on schools around the cutoff point. Hence, it seems that the effect of school funding on reading achievement is insignificant.

Table 3 displays the regression discontinuity estimates. Each student received one of the achievement categories. Our outcome variable is an indicator variable that indicates whether a student received the "below average" grade. We conducted a regression of this indicator variable on the treatment variable that varies at the school level, and so our effect estimate indicates the average difference in the proportion of students scoring "below average" between treated and untreated schools. In the table, we present both the pre-and post-treatment effect estimates. All the discontinuity estimates are derived from student-level data and local linear specification ($p = 1$) using the triangular kernel function. Note that discontinuity estimates under local quadratic

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

specification and other kernel functions are qualitatively similar (available upon request). In the table, we present discontinuity estimates under our preferred bandwidth choice provided by Imbens and Kalyanaraman (2012), which is approximately 0.018. The choice of $h = 0.018$ implies that the discontinuity estimate is derived from comparing untreated schools, whose share of underperforming students is between 0.032 and 0.049, with treated schools, whose share is between 0.050 and 0.067. The discontinuity estimates under other bandwidth choices are available in an appendix (i.e., Table A1).

As can be expected from the graphical analysis in Figures 3 and 4, all the estimated discontinuities for pre-treatment outcomes are not statistically significant. The magnitude of the effect estimates is also very small, ranging from -0.021 to 0.007, which indicates that the share of underperforming students is similar near the cutoff point before the treatment. To give an example, the discontinuity observed under the bandwidth choice of 0.018 for mathematics is 0.007, with a standard error of 0.013. The effect estimate indicates that the average share of underperforming students in the 2009 exam for treated schools (schools whose share in the 2009 exam is between 0.050 and 0.067) is 0.7 percentage points higher than that of untreated schools (schools whose share in the 2009 exam is between 0.032 and 0.049). The number implies that the share of underperforming students is similar between untreated and treated groups. As mentioned previously, results presented in the "Pre-treatment" column of Table 3 are in favor of the identifying assumption of our RDD setting, given that all the discontinuity estimates are statistically and practically insignificant.

The last column of Table 3 shows the results of the post-treatment outcome analysis. For reading, the estimated discontinuities are around -0.023, and the effect estimate is statistically insignificant. The results imply that school funding was not effective in reducing below-average

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

students in reading. Contrary to the reading results, the effect estimates for the other four subjects are statistically significant. Moreover, the magnitude of the estimated discontinuities is practically significant. To be more specific, we find that the share of below-average students in mathematics decreased by 6.5 percentage points. For English, the estimated discontinuity is approximately 4.6 percentage points, though the statistical significance is slightly weaker compared with the other three subjects. The estimated effects on social studies and science are 5.3 and 3.8 percentage points, respectively.

To benchmark our effect estimates in terms of the effect of change in school funding, we estimated the percent change in per-pupil funding driven by the policy. Specifically, we conducted an RD analysis using per-pupil funding as an outcome variable and estimated the discontinuity in the funding at the cutoff point. The result shows that the change in average per-pupil funding at the cutoff point is about 20% under the optimal bandwidth choice of about 0.019. Note that the control-side means for each subject are 0.33, 0.27, 0.33, and 0.21. Accordingly, the effect of a 20% increase in per-pupil funding is equivalent to a decrease of 19.7% (= 0.065/0.33, math), 17.0% (= 0.046/0.27, English), 16.1% (= 0.053/0.33, social studies), and 18.1% (= 0.038/0.21, science) in the proportion of students who received the below-average achievement level.

Relating our effect estimates to previous studies, note that Kreisman and Steinberg (2019) find that a 10% increase in expenditures yields about 0.1 SD increase in reading scores and 0.08 increase in math. Papke (2005, 2008) finds that a 10% spending increase led to a nearly 4 percentage point increase in the fraction of students scoring as proficient on a fourth-grade math test. Our effect estimates are relatively larger than those found in previous studies, and we argue that such estimates are driven mainly by the three mechanisms. First, schools had a strong

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

reason to focus on reducing the share of students "below basic" in the subsequent year, because focusing resources on low-achieving students was strongly encouraged by the Ministry of Education. Schools that received funding were required by the Ministry to use the money solely to promote student achievement. Schools were encouraged to hire teachers, mentors, and operate after-school programs and were refrained from using the funding on things such as buildings, etc., which are relatively less effective in promoting student achievement. Thus, it's very likely that schools assigned additional teachers to low-performing students and focused most of their attention on improving the achievement level of these students.

Second, Korea is famous for "education fever" as evidenced in various sources. Given the competitive educational environment that surrounds Korea's education system, parents put significant pressure on teachers. Hence, it's very likely that schools put significant effort into freeing themselves from being labeled as underperforming schools. While the list of underperforming schools was not publicized, the list may have been shared anecdotally by teachers, students, and parents. Given the first and second reasons mentioned above, many of the treated schools might have focused efforts on the lowest performers such as by doing a so-called "teaching to the test" practice (Lazear 2006). Third, we plotted the density of the distribution of school performance and examined whether there is a lot of density in the performance distribution very close to the cutoff for "below basic." If there is such density, the small improvement in learning might be enough to lift a large share of students from below basic to above. As can be seen from Figure 5, we find that most of the treated schools were clustered around 0.05 and 0.1. Thus, we believe that the relatively large effect estimates observed in our setting were driven by the combined effect of additional funding and the three factors mentioned above.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

To examine whether schools focused resources on low-achieving students and whether some of the mechanisms mentioned above are pervasive, we analyzed the effect on other performance margins. Specifically, we estimated the regression discontinuity effects on the other two achievement categories (i.e., whether a student received an outstanding achievement or average achievement). We find that the reduction in the share of below-average students in mathematics is accompanied mostly by increases in the share scoring the average grade. Also, we find that the reduction in the proportions of below-average students in social studies and science are accompanied mostly by increases in the share scoring the outstanding grade. We argue that the decrease in the share scoring below average being mapping to movements along at least one of the other score thresholds implies plausibly that many of the mechanisms mentioned above are pervasive.

One question that arises from the discussion above is how much of the estimated impact could be due to the increase in school spending per se. Isolating the causal impact of each mechanism mentioned above is difficult because measuring each mechanism reliably is a challenging task. We argue, however, that the estimated impact is driven mostly by the spending for two reasons. First, the national assessment of educational achievement in 2009 was the first nationwide assessment that relaxed informational constraints about students' achievement. Accordingly, such assessment was a wake-up call for many schools. Second, school funding based on this assessment was one of the first that increased spending constraints. That is, schools were able to spend such funding solely on promoting student achievements. Hence, we argue that these two factors interacted to produce the impact of school spending.

Robustness checks

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

To further assess the robustness of our estimated results, we conducted falsification tests. The idea behind our falsification tests is that if the discontinuity estimates observed at the 0.05 cutoff point are driven mainly by school funding, we should not observe any discontinuities around cutoffs where there is no variation in the treatment. For example, we should not observe statistically and practically significant discontinuity at the cutoff point, such as 0.02, because school funding is not provided for schools whose share of underperforming students is around 0.02. If the statistically significant discontinuity observed for the 0.02 cutoff point is of a similar magnitude as that of the 0.05 cutoff point, it indicates a serious threat to the internal validity of the results.

Figure A5 shows the densities of post-treatment outcomes for all the subjects around the false cutoffs. Specifically, we examined the densities around 0.02 and 0.03 cutoff points. As can be seen from all the panels in Figure A5, all the densities are smooth across the values of the assignment variable. The estimated discontinuities at the false cutoffs are presented in Table A3. All the estimates are derived under the same specification that we used for the true cutoff point. Panel A displays discontinuity estimates at the 0.02 cutoff point, and Panel B shows discontinuity estimates at the 0.03 cutoff point. Notably, all the discontinuity estimates are statistically insignificant. The size of the discontinuities is also very small. While not shown in the paper, discontinuity estimates under the local quadratic specification for English turned out to be statistically significant at the 5% level. Note, however, that the magnitude of the estimates is very small (i.e., 0.014). We, therefore, argue that such statistical significance is driven by a small variance in the densities. In conclusion, we conclude that the results of the falsification tests support the internal validity of our findings.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Another potential threat in this study is mean reversion. According to Chay, McEwan, and Urquiola (2005), if observable and unobservable factors that drive mean-reversion are continuous at the cutoff point, then the regression discontinuity design will allow for isolating the effect estimates that are free of mean reversion because the design will effectively cancel out the effect of mean-reversion. As a matter of course, we cannot test whether unobservable factors that affect mean-reversion are similar across the cutoff point. We argue, however, that our effect estimates are less likely to be biased by mean reversion because we are using the same schools between the two periods and because many observable school characteristics are continuous at the cutoff point. Moreover, Kane and Staiger (2002) note that the most significant factor that induces mean reversion is the number of students. Because there is no discernible discontinuity in the number of test-takers at the cutoff point, we argue that the RDD setting in our context is less likely to be biased by the mean reversion issue. Furthermore, the number of schools is much larger. Thus, we argue that the mean reversion at the school level is less likely to be salient in our context.

6. Discussion and Conclusion

Many studies in the United States and Europe have examined education policies that provided additional funding for underperforming schools or schools with economically disadvantaged students to improve students' academic outcomes. These studies investigated the effect of school funding to narrow a gap in school funding across schools and school districts under a localized school financing system. The findings were inconsistent due to how the new funding was distributed and used under the local contexts, and what groups were targeted by the new funding program. Compared to those previous studies, our study is unique and informative because it examines a new targeted funding program that directly financed underperforming schools for

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

academic programs on specific subjects in a homogenous school funding context. Specifically, taking advantage of the cutoff rule of the provision of school funding to underperforming schools in South Korea, this study conducts an RDD analysis and consistently estimates the impact of school funding on sixth-grade elementary students in five subjects: reading, mathematics, English, social studies, and science.

The results show that school funding for underperforming schools was effective in improving students' test outcomes in mathematics, English, social studies, and science, but no significant effect was found in reading. Specifically, a 20% increase in school funding decreased the share of below-average students in mathematics, English, social studies, and science by 19.7%, 17.0%, 16.1%, and 18.1%, respectively, compared to the control-side means. These results are not only statistically significant but also considerable in magnitude.

From a policy perspective, it would be informative if a researcher could investigate how schools used their funding. Although there is no official information on how each school used the extra funding, anecdotal evidence shows that many schools hired temporary teachers to provide after-school and summer school programs and individual tutoring to students. To test statistically whether the funding was used for such programs, we present the densities of school covariates in Figures A2 and A3. In the figures, Panels A, C, and E correspond to the pre-treatment densities, while Panels B, D, and F correspond to the post-treatment densities. For example, we see that many of the densities of the share of schools operating after-school programs increased after the treatment (Panel F in Figure A2). Also, the shares of schools utilizing outside resources (Panel D in Figure A3) and using customized instructional materials (Panel F in Figure A3) increased significantly when compared with the pre-treated period. The discontinuity estimates for these school covariates are presented in Table 4. As can be seen from

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

the "Pre-treatment" column, while most of the discontinuity estimates are statistically and practically insignificant, all the estimates are negative, indicating that the shares of schools operating after-school and summer school programs, utilizing outside resources, and providing customized instructional materials are higher in the untreated schools. Note, however, that discontinuity estimates all become positive after the treatment, implying that the shares in these factors are higher for treated schools, though the discontinuity estimates are imprecise due to the small sample size and possibly due to large variance in the densities. Nevertheless, it seems that the extra school funding was used properly to improve students' academic outcomes.[4]

Some of the previous studies of additional funding for underperforming schools argued several reasons the intervention was not effective in improving students' academic achievements. First, the money might not directly go to the underperforming schools in some of the funding interventions, so that the impact of the interventions was negligible or null (Goe 2006). Second, the additional funding was not used to initiate new academic programs and resources for students (Leuven et al. 2007; van der Klaauw 2008). Third, existing local funding of schools was reduced after the extra school funding, implying crowd-out across school districts (Gordon 2004; Matsudaira, Hosek, and Walsh 2012). Fourth, the additional school funding is relatively small and often not enough to make up the economically disadvantaged students' limitations from their lower-income family backgrounds and resources (Bénabou, Kramarz, and Prost 2009; van der Klaauw 2008).

The first and second explanations imply that school funding for underperforming schools in our study is found to improve students' academic outcomes because it is given directly to

[4] Using student-level data, we also tested whether the share of students who participated in after-school programs are higher for the treated schools during the post-treatment period (i.e., 2010). We find that the share of after-school program participants is about 9 percentage points (24%) higher in the treated schools and the estimates are statistically significant.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

those targeted schools and used solely to provide new academic programs and resources for student academic improvement. The third and fourth explanations are closely related to how public schools are funded and how much underperforming schools were underfunded. Most public schools in the United States are locally funded by property taxes, and their school spending varies by whether school districts are located in poor or wealthy neighborhoods. Thus, programs focusing on horizontal equity, school finance reform, or school funding for underperforming schools in the United States were designed to equalize uneven funding across school districts but might not be enough to provide extra help for underperforming schools beyond equalization in funding.

On the other hand, public elementary and middle schools in South Korea are funded homogeneously, and funding is controlled closely by the central government. Under such a policy environment, the additional school funding in our analysis works as extra resources for students' academic programs in underperforming schools. Therefore, our findings suggest that a school funding program to promote vertical equity would improve students' academic outcomes under the policy condition of homogenous school funding. Also, our findings imply that additional funding for underperforming schools would work if it were given directly to those targeted schools and used solely to provide new academic programs and resources for student academic improvement.

Some limitations and caveats exist in our study. First, it is not possible to know whether and how underperforming schools are sustaining their new programs and resources after their extra funding ended. Second, this study is not able to evaluate the long-term impact on students' test scores and their learning behavior, as the administrative data are available only for two years. Third, we must be cautious about generalizing our findings to other contexts such as

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

secondary school students because our analysis is based on sixth-grade elementary students in South Korea. Also, RDD analysis may constrain our results to local interpretation related to the cutoff rule of the school funding provision in our study. Fourth, students' academic outcomes in our study are relatively simple compared to other studies. As explained earlier, after the test in each subject, students were given one of four achievement levels: outstanding, average, basic, and below basic.

Although there are limitations and caveats, this study is meaningful because it is one of the first studies on such policies in Asia, and its policy circumstances, as well as implementations, were different from other previous studies in Western countries. Thus, the findings of this study encourage new studies to examine the impact of school funding on underperforming schools across diverse countries and under different school funding schemes.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

References

Bae, Dayoung, and Kandauda AS Wickrama. 2015. Family socioeconomic status and academic achievement among Korean adolescents: linking mechanisms of family processes and adolescents' time use. *Journal of Early Adolescence* 35(7): 1014–1038.

Bénabou, Roland, Francis Kramarz, and Corinne Prost. 2009. The French zones d'éducation prioritaire: Much ado about nothing? *Economics of Education Review* 28(3): 345–356.

Berliner, David C. 2005. Our impoverished view of educational reform. *Teachers College Record* 108: 949–995.

Byun, Soo-yong, and Kyung-keun Kim. 2010. Educational inequality in South Korea: The widening socioeconomic gap in student achievement. *Research in the Sociology of Education* 17: 155–182.

Calonico, Sebastian, Matias D. Cattaneo, Max H. Farrell, and Rocío Titiunik. 2017. rdrobust: Software for regression discontinuity designs. *Stata Journal* 17(2): 372–404.

Card, David, and Abigail A. Payne. 2002. School finance reform, the distribution of school spending, and the distribution of student test scores. *Journal of Public Economics* 83: 49–82.

Carlson, Deven, and Stéphane Lavertu. 2018. School improvement grants in Ohio: Effects on student achievement and school administration. *Educational Evaluation and Policy Analysis* 40(3): 287–315.

Cattaneo, Matias D., Michael Jansson, and Xinwei Ma. 2020. Simple local polynomial density estimators. *Journal of the American Statistical Association* 115(531): 1449–1455.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Chay, Kenneth Y., Patrick J. McEwan, and Miguel Urquiola. 2005. The central role of noise in evaluating interventions that use test scores to rank schools. *American Economic Review* 95(4): 1237–1258.

Choi, Yool, and Hyunjoon Park. 2016. Shadow education and educational inequality in South Korea: Examining effect heterogeneity of shadow education on middle school seniors' achievement test scores. *Research in Social Stratification and Mobility* 44: 22–32.

Chmielewski, Anna K. 2019. The global increase in the socioeconomic achievement gap, 1964 to 2015. *American Sociological Review* 84(3): 517–544.

Condron, Dennis J. 2011. Egalitarianism and educational excellence: Compatible goals for affluent societies? *Educational Researcher* 40(2): 47–55.

Dragoset, Lisa, Jaime Thomas, Mariesa Hermann, John Deke, Susanne James-Burdumy, Cheryl Graczewski, Andrea Boyle, Courtney Tanenbaum, Jessica Giffin, Rachel Upton, and Thomas E. Wei. 2016. *Race to the Top: Implementation and relationship to student outcomes.* Washington, DC: Institute for Education Sciences.

Dragoset, Lisa, Jaime Thomas, Mariesa Hermann, John Deke, Susanne James-Burdumy, and Dara Lee Luca. 2019. The impact of school improvement grants on student outcomes: Findings from a national evaluation using a regression discontinuity design. *Journal of Research on Educational Effectiveness* 12(2): 215–250.

Fan, Jianqing, and Irene Gijbels. 1996. *Local polynomial modelling and its applications: Monographs on statistics and applied probability 66*. Vol. 66. CRC Press.

Gelman, Andrew, and Guido Imbens. 2019. Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business & Economic Statistics* 37(3): 447–456.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Goe, Laura. 2006. Evaluating a state-sponsored school improvement program through an improved school finance lens. *Journal of Education Finance* 31(4): 395–419.

Gordon, Nora. 2004. Do federal grants boost school spending? Evidence from Title I. *Journal of Public Economics* 88(9-10): 1771–1792.

Guryan, Jonathan. 2001. Does money matter? Regression-discontinuity estimates from education finance reform in Massachusetts. NBER Working Paper No. 8269.

Hahn, Jinyong, Petra Todd, and Wilbert van der Klaauw. 2001. Identification and estimation of treatment effects with a regression-discontinuity design. *Econometrica* 69(1): 201–209.

Imbens, Guido, and Karthik Kalyanaraman. 2012. Optimal bandwidth choice for the regression discontinuity estimator. *Review of Economic Studies* 79(3): 933–959.

Imbens, Guido W., and Thomas Lemieux. 2008. Regression discontinuity designs: A guide to practice. *Journal of Econometrics* 142(2): 615–635.

Jackson, C. Kirabo, Rucker C. Johnson, and Claudia Persico. 2016. The effects of school spending on educational and economic outcomes: Evidence from school finance reforms. *Quarterly Journal of Economics* 131(1): 157–218.

Johnston , William R., John Engberg, Isaac M. Opper, Lisa Sontag-Padilla, and Lea Xenakis. 2020. *Illustrating the promise of community schools: An assessment of the impact of the New York City Community Schools Initiative*. Research Report. RR-3245-NYCCEO. RAND Corporation.

Kane, Thomas J., and Douglas O. Staiger. 2002. The promise and pitfalls of using imprecise school accountability measures. *Journal of Economic Perspectives* 16(4): 91–114.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Kreisman, Daniel, and Matthew P. Steinberg. 2019. The effect of increased funding on student achievement: Evidence from Texas's small district adjustment. *Journal of Public Economics* 176: 118–141.

Lafortune, Julien, Jesse Rothstein, and Diane Whitmore Schanzenbach. 2018. School finance reform and the distribution of student achievement. *American Economic Journal: Applied Economics* 10(2): 1–26.

Lazear, Edward P. 2006. Speeding, terrorism, and teaching to the test. *Quarterly Journal of Economics* 121(3): 1029–1061.

Lee, David S., and David Card. 2008. Regression discontinuity inference with specification error. *Journal of Econometrics* 142(2): 655–674.

Lee, David S., and Thomas Lemieux. 2010. Regression discontinuity designs in economics. *Journal of Economic Literature* 48(2): 281–355.

Lee, Inwha, and Namwook Ku. 2019. Analysis of PISA 2015 reading achievement characteristics of Korean students and influence of educational context variables. *Journal of Reading Research* 50: 113–144.

Leuven, Edwin, Mikael Lindahl, Hessel Oosterbeek, and Dinand Webbink. 2007. The effect of extra funding for disadvantaged pupils on achievement. *Review of Economics and Statistics* 89(4): 721–736.

Marks, Gary N., John Cresswell, and John Ainley. 2006. Explaining socioeconomic inequalities in student achievement: The role of home and school factors. *Educational Research and Evaluation* 12(2): 105–128.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Matsudaira, Jordan D., Adrienne Hosek, and Elias Walsh. 2012. An integrated assessment of the effects of Title I on school behavior, resources, and student achievement. *Economics of Education Review* 31(3): 1–14.

McCrary, Justin. 2008. Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142(2): 698–714.

McGuinn, Patrick. 2012. Stimulating reform: Race to the Top, competitive grants and the Obama education agenda. *Educational Policy* 26(1): 136–159.

Ministry of Education, Science, and Technology. 2010. *Schools in Need of Achievement Improvement Support Program: Master Plan*. Republic of Korea.

Moulton, Brent R. 1986. Random group effects and the precision of regression estimates. *Journal of Econometrics* 32(3): 385–397.

Ooghe, Erwin. 2011. The impact of 'Equal Educational Opportunity' funds: A regression discontinuity. IZA Discussion Paper No. 5667.

Organization for Economic Co-Operation and Development (OECD). 2018. *PISA 2018 results: Executive summary*. Paris: OECD.

Papke, Leslie E. 2005. The effects of spending on test pass rates: Evidence from Michigan. *Journal of Public Economics* 89(5–6): 821–839.

Papke, Leslie E. 2008. The effects of changes in Michigan's school finance system. *Public Finance Review* 36(4): 456–474.

Roy, Joydeep. 2011. Impact of school finance reform on resource equalization and academic performance: Evidence from Michigan. *Education Finance and Policy* 6(2): 137–167.

Ryu, Min Jung. 2013. A study on the reform of financial grants for local education. *Korean Journal of Local Government Studies* 17(3): 315–334.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Van der Klaauw, Wilbert. 2008. Breaking the link between poverty and low student achievement: An evaluation of Title I. *Journal of Econometrics* 142(2): 731–756.

Yang, Won Young. 2012. An analysis of financing in rural schools focused on public elementary and middle schools in Jeollabuk-Do. *KNU Journal of Educational Research* 27: 1–22.

You, Hyesun. 2015. Do schools make a difference?: Exploring school effects mathematics achievement in PISA 2012 using hierarchical linear modeling. *Journal of Educational Evaluation* 28(5): 1301–1327.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table 1: Descriptive statistics

	Pre-treatment (year 2009)				Post-treatment (year 2010)			
	Untreated		Treated		Untreated		Treated	
Variables	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
			Panel A: Student characteristics					
% female students	0.48	0.08	0.48	0.13	0.47	0.09	0.47	0.16
% preparing schoolwork	0.37	0.11	0.33	0.15	0.35	0.14	0.33	0.18
% reviewing schoolwork	0.43	0.11	0.41	0.15	0.47	0.14	0.49	0.21
% taking online lectures	0.53	0.11	0.51	0.17	0.64	0.16	0.50	0.22
Avg. no. of family members	3.18	0.22	3.26	0.45	3.17	0.25	3.24	0.37
			Panel B: School characteristics					
% Master's degree or higher	0.22	0.15	0.23	0.19	0.23	0.16	0.24	0.19
% newly hired teachers	0.10	0.11	0.13	0.16	0.08	0.10	0.12	0.15
% operating after school	0.92	0.27	0.90	0.30	0.94	0.23	0.98	0.12
% operating summer school	0.81	0.39	0.88	0.33	0.82	0.38	0.94	0.23
% utilizing outside resources	0.63	0.48	0.53	0.50	0.63	0.48	0.72	0.45
% using customized materials	0.84	0.36	0.73	0.44	0.83	0.37	0.92	0.28
			Panel C: Achievement (% below average students)					
Reading	0.30	0.09	0.36	0.13	0.28	0.11	0.25	0.17
Mathematics	0.23	0.08	0.29	0.12	0.33	0.13	0.27	0.19
English	0.28	0.10	0.36	0.14	0.27	0.12	0.26	0.18
Social studies	0.41	0.09	0.46	0.13	0.33	0.13	0.27	0.19
Science	0.18	0.07	0.22	0.10	0.21	0.10	0.16	0.14
			Panel D: Other information					
Average number of test takers	182	114	125	100	167	108	114	93
Average per-pupil funding (2010)					$3,122	(1,663)	$3,761	(2,038)
Total number of schools	594		196		594		196	

Notes: The numbers in parentheses are standard deviations (i.e., Std.).

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table 2: Regression discontinuity estimates for baseline student-level covariates

	Bandwidth (h)			
Baseline outcomes	$h = 0.009$	$h = 0.012$	$h = 0.015$	$h = 0.018$
Share of female students	0.007	0.004	0.007	0.008
	(0.017)	(0.015)	(0.013)	(0.012)
	[25,297]	[36,164]	[50,954]	[69,739]
Share of students preparing schoolwork	−0.027	−0.025	−0.026	−0.022
	(0.024)	(0.019)	(0.016)	(0.014)
	[25,186]	[35,996]	[50,712]	[69,408]
Share of students reviewing schoolwork	−0.027	−0.026	−0.023	−0.017
	(0.027)	(0.021)	(0.018)	(0.016)
	[25,190]	[35,985]	[50,726]	[69,423]
Share of students taking online lectures	−0.004	−0.001	−0.003	0.001
	(0.024)	(0.021)	(0.018)	(0.016)
	[25,131]	[35,918]	[50,621]	[69,299]
Number of family members	0.074	0.066	0.046	0.034
	(0.051)	(0.042)	(0.036)	(0.032)
	[25,311]	[36,181]	[50,973]	[69,765]

Notes: Standard errors clustered at the school level are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived using local linear specification (i.e., $p = 1$) and the triangular kernel function.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table 3: Regression discontinuity estimates for pre-and post-treatment achievement level

	Effect estimates	
Outcome variables	Pre-treatment	Post-treatment
Reading	−0.021	−0.023
	(0.014)	(0.022)
	[69,678]	[63,794]
Mathematics	0.007	−0.065**
	(0.013)	(0.026)
	[69,683]	[63,779]
English	−0.013	−0.046*
	(0.017)	(0.024)
	[69,684]	[63,794]
Social studies	−0.003	−0.053**
	(0.015)	(0.025)
	[69,664]	[63,808]
Science	−0.001	−0.038**
	(0.010)	(0.019)
	[69,667]	[63,806]

Notes: An outcome variable is a dummy variable that indicates whether a student received the "below average" grade. The effect estimate is derived from a regression of this indicator variable on the treatment variable that varies at the school level. The effect estimate indicates the average difference in the proportion of students scoring "below average" between treated and untreated schools. Regression discontinuity estimates are derived under the bandwidth choice of 0.018. Standard errors clustered at the school level are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived using local linear specification (i.e., $p = 1$) and the triangular kernel function. ** and * indicate statistical significance at the 5 and 10% levels, respectively.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table 4: Regression discontinuity estimates for baseline and post-treatment school characteristics

	Effect estimates	
	Pre-treatment	Post-treatment
Share of teachers with master's degree or higher	−0.028	0.043
	(0.030)	(0.031)
	[679]	[674]
Share of newly hired teachers	−0.006	0.014
	(0.026)	(0.025)
	[676]	[672]
Share of schools operating after school	−0.040	0.047
	(0.060)	(0.040)
	[680]	[675]
Share of schools operating summer school	−0.040	0.114**
	(0.054)	(0.054)
	[680]	[675]
Share of schools utilizing outside resources	−0.104	0.085
	(0.086)	(0.082)
	[680]	[675]
Share of schools providing customized materials	−0.143*	0.048
	(0.081)	(0.066)
	[680]	[675]

Notes: Regression discontinuity estimates under the bandwidth choice of 0.018. Standard errors are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived using local linear specification (i.e., $p = 1$) and the triangular kernel function. ** and * indicate statistical significance at the 5 and 10% levels, respectively.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

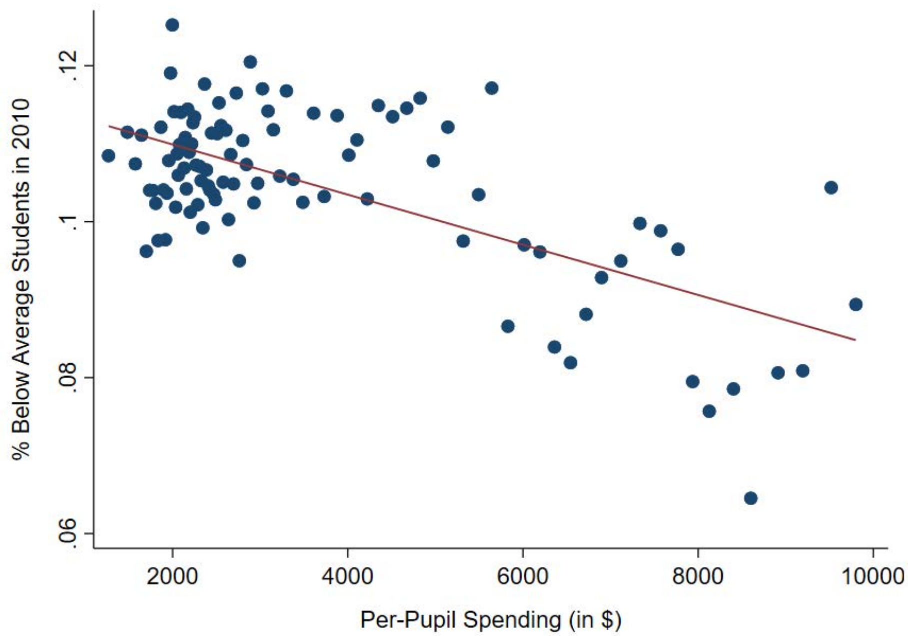
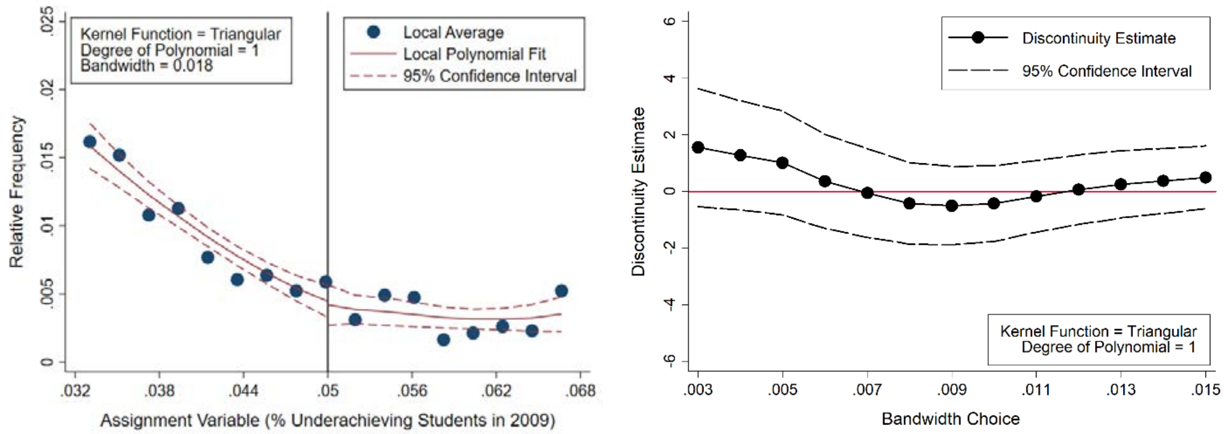


Figure 1: Per-Pupil Spending vs. % Below Average (Binned Scatterplot)

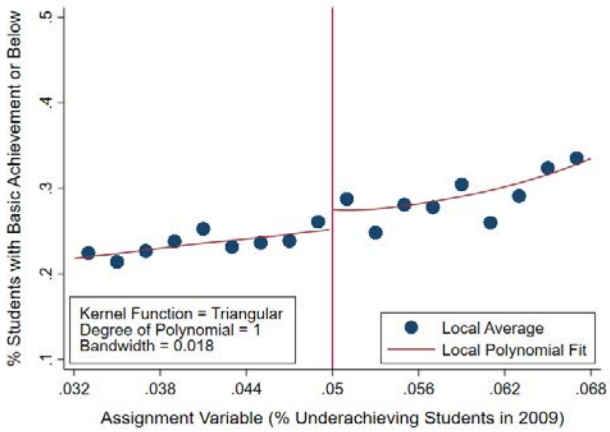
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



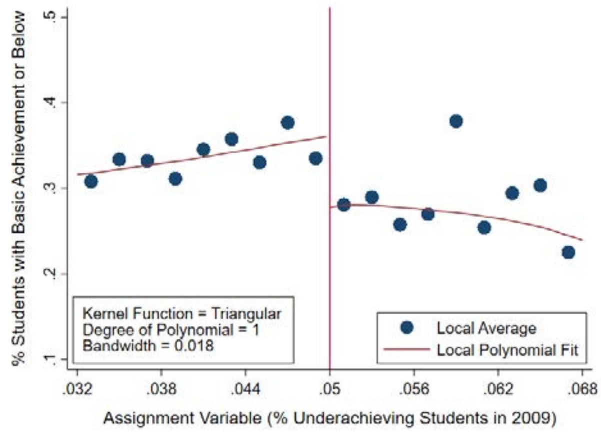
Panel A: Density of the Assignment Variable   Panel B: Discontinuity Estimate by Bandwidth

Figure 2: Results of Density Test

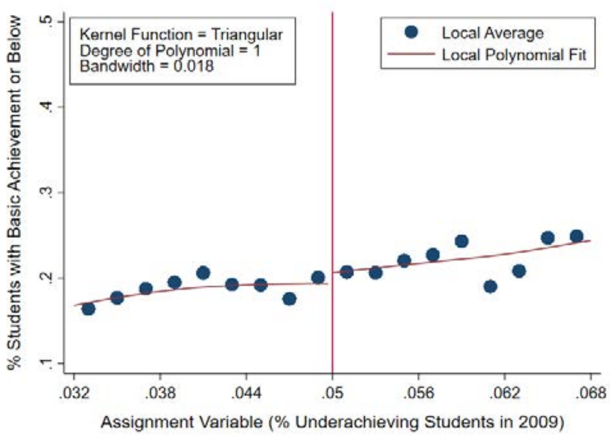
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



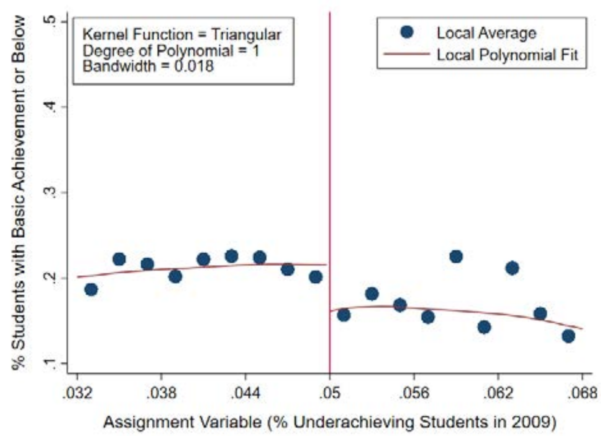
Panel A: Math (Before Treated)



Panel B: Math (After Treated)



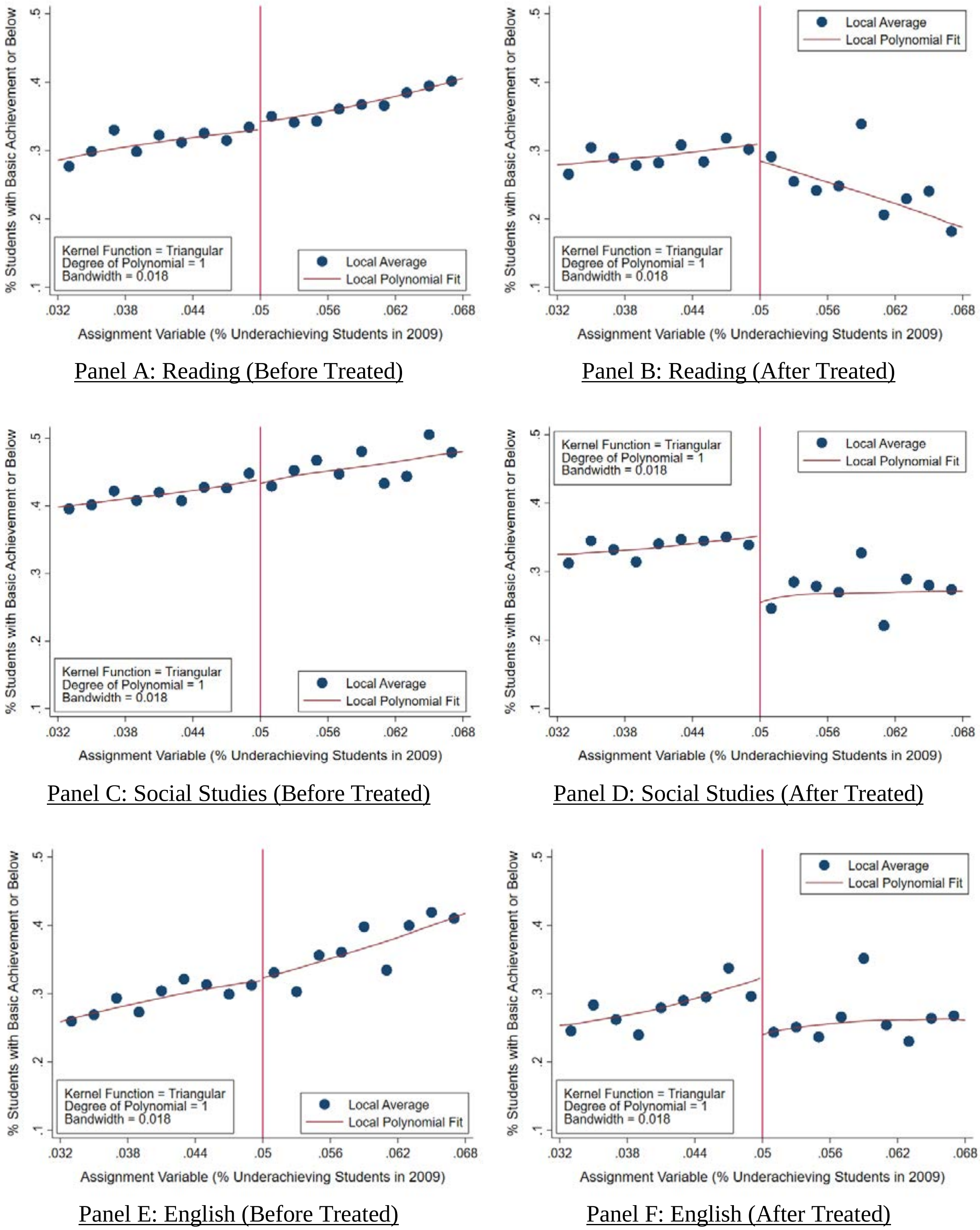
Panel C: Science (Before Treated)



Panel D: Science (After Treated)

Figure 3: Density of Math and Science Performance Before & After Treatment

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



Panel A: Reading (Before Treated)

Panel B: Reading (After Treated)

Panel C: Social Studies (Before Treated)

Panel D: Social Studies (After Treated)

Panel E: English (Before Treated)

Panel F: English (After Treated)

Figure 4: Density of Reading, Social Studies, & English Performance Before & After Treatment

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

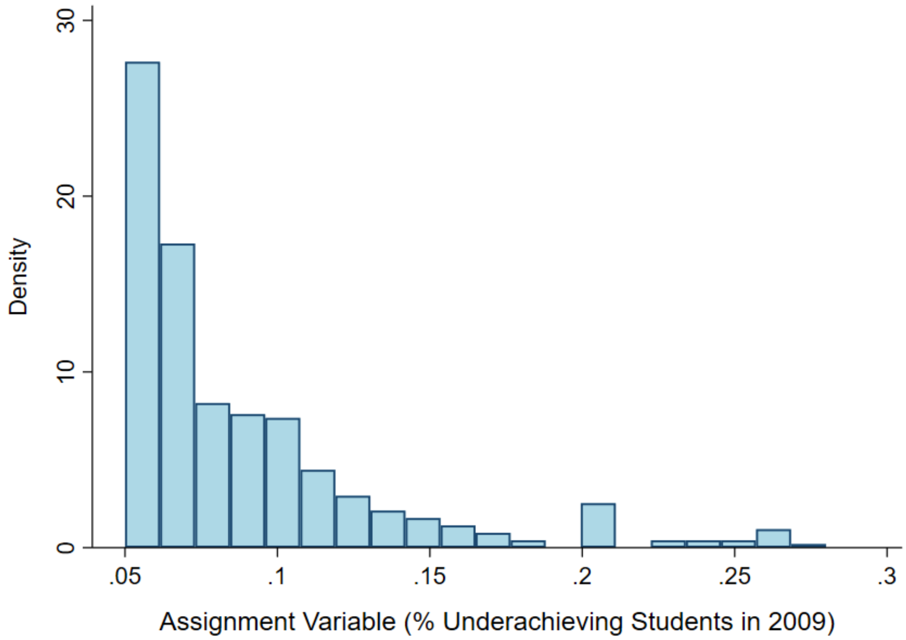
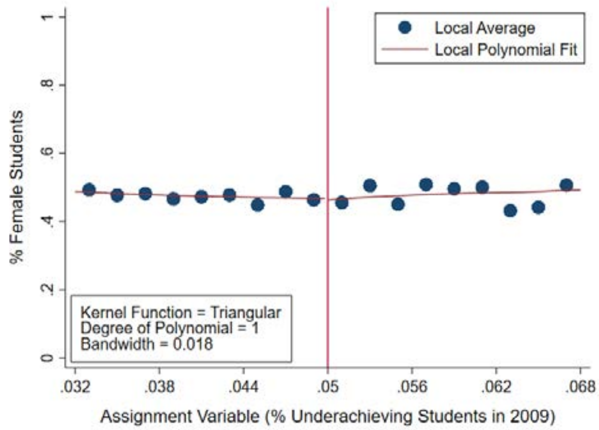
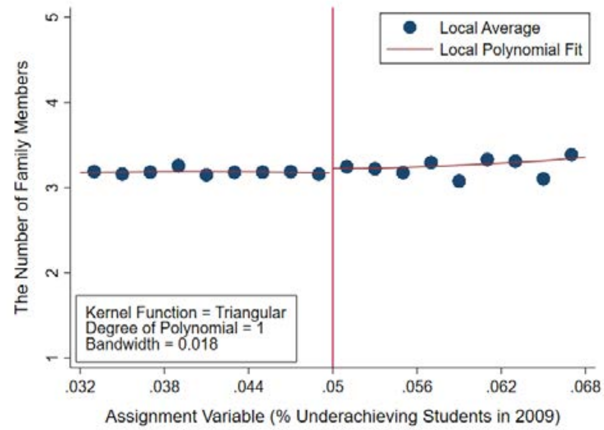


Figure 5: Density of Treated Schools

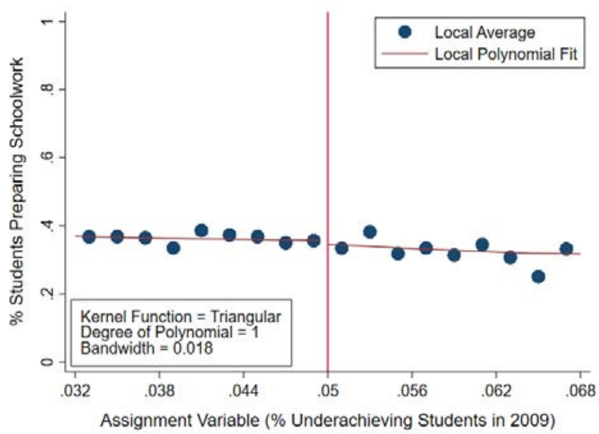
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



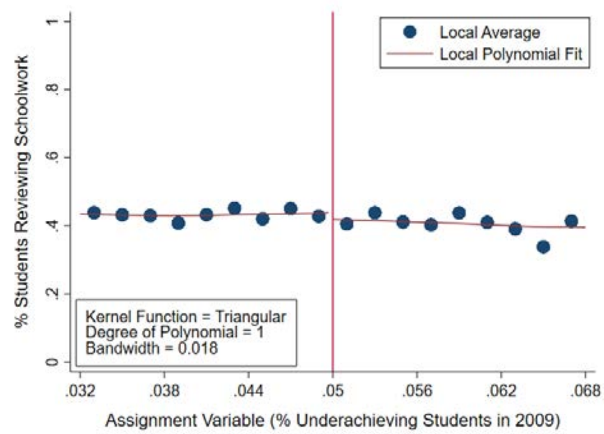
Panel A: % Female Students



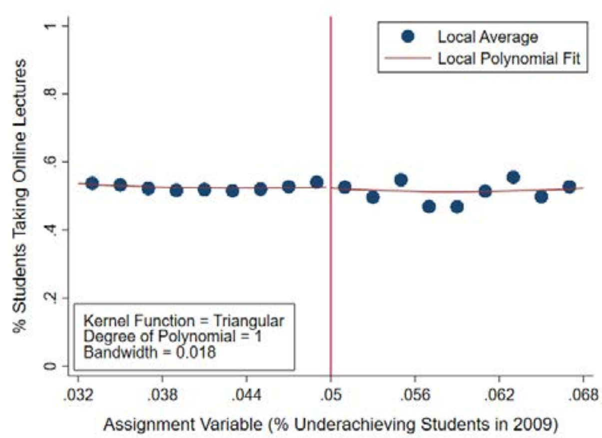
Panel B: Number of Family Members



Panel C: % Preparing Schoolwork



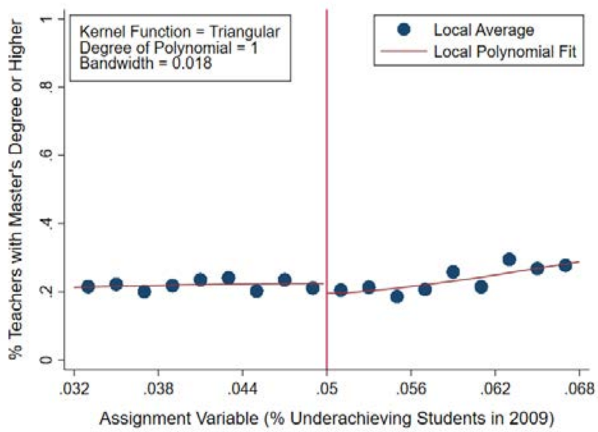
Panel D: % Reviewing Schoolwork



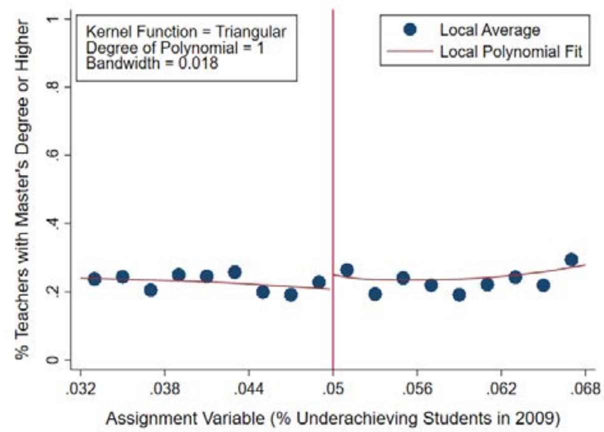
Panel E: % Taking Online Lectures

Figure A1: Density of Baseline Student Covariates by the Assignment Variable

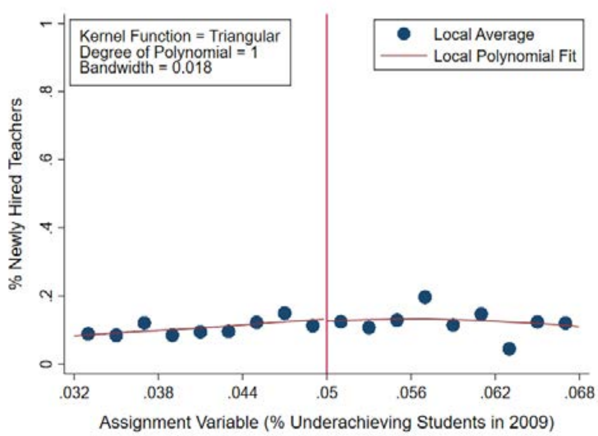
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



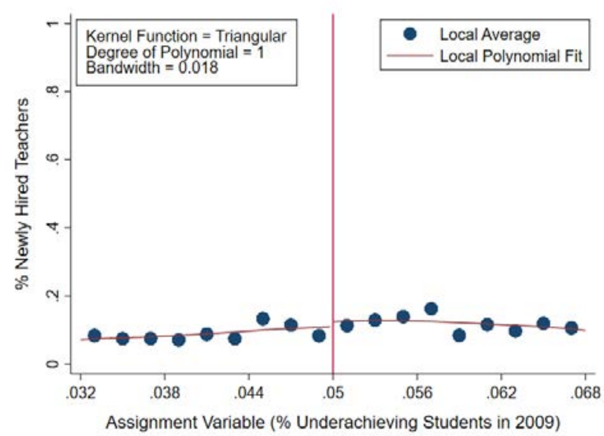
Panel A: % Master's Degree or Higher
(Before Treated)



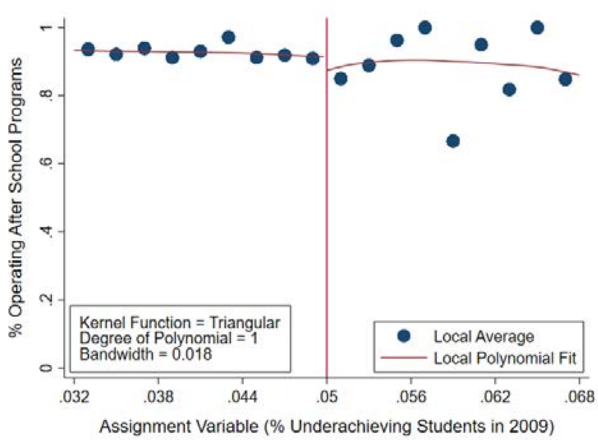
Panel B: % Master's Degree or Higher
(After Treated)



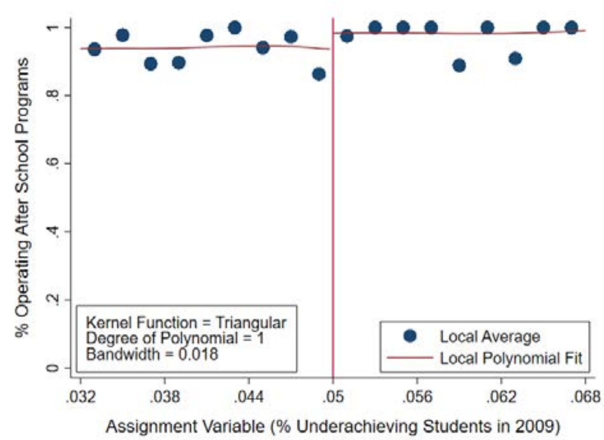
Panel C: % Newly Hired Teachers
(Before Treated)



Panel D: % Newly Hired Teachers
(After Treated)



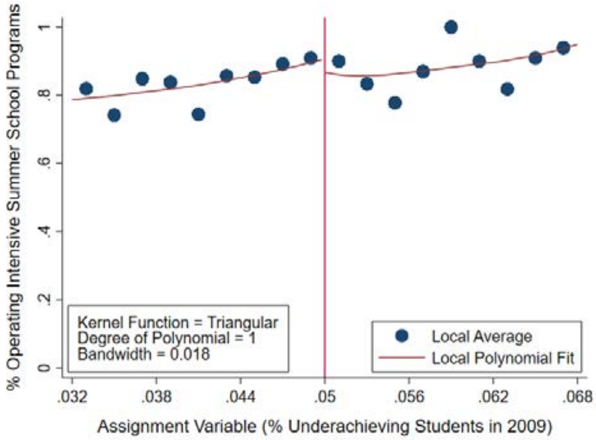
Panel E: % Operating After-School Programs
(Before Treated)



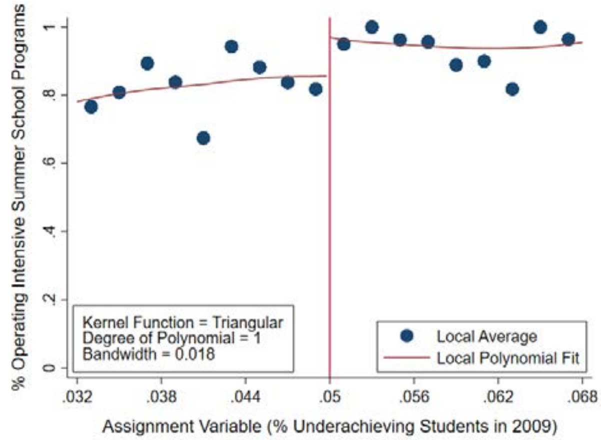
Panel F: % Operating After-School Programs
(After Treated)

Figure A2: Density of School Covariates Before & After Treatment I

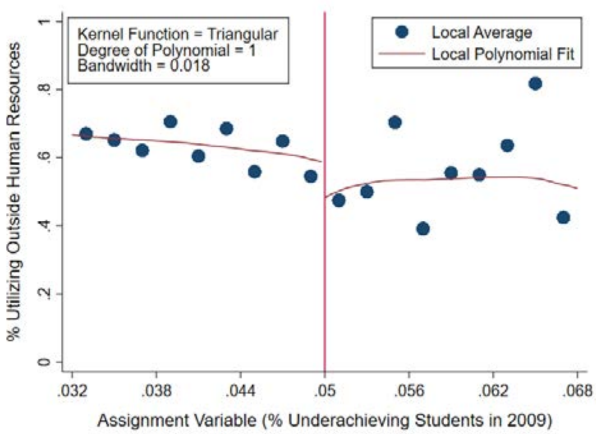
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



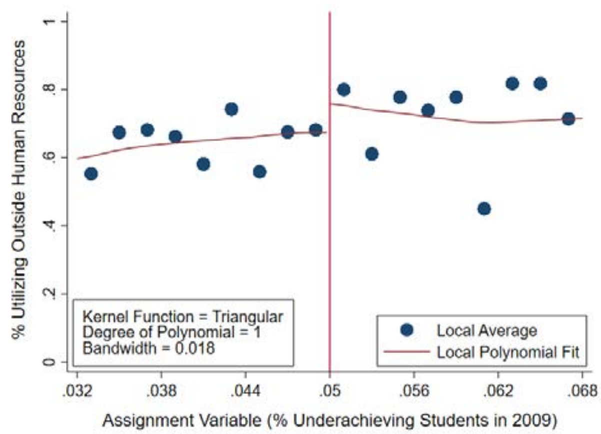
Panel A: % Operating Summer School Programs (Before Treated)



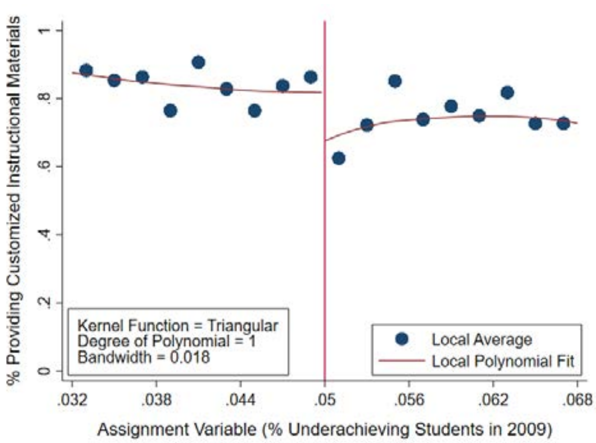
Panel B: % Operating Summer School Programs (After Treated)



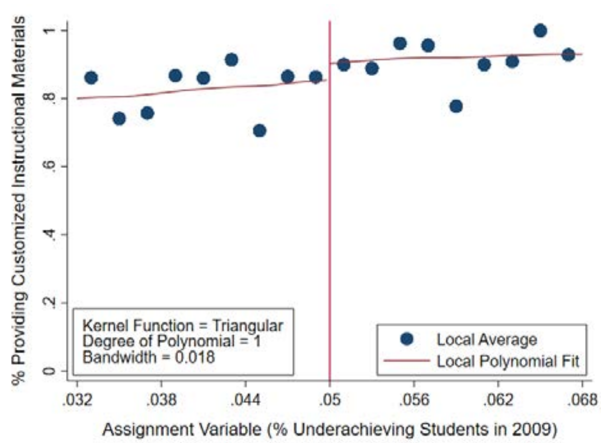
Panel C: % Utilizing Outside Human Resources (Before Treated)



Panel D: % Utilizing Outside Human Resources (After Treated)



Panel E: % Customized Instructional Materials (Before Treated)



Panel F: % Customized Instructional Materials (After Treated)

Figure A3: Density of School Covariates Before & After Treatment II

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

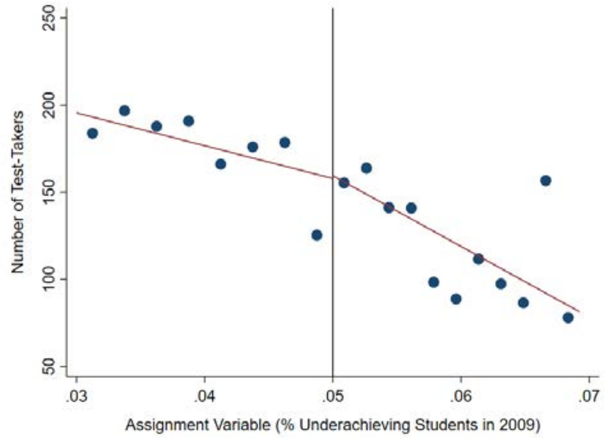
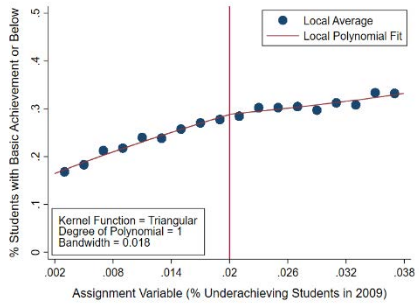
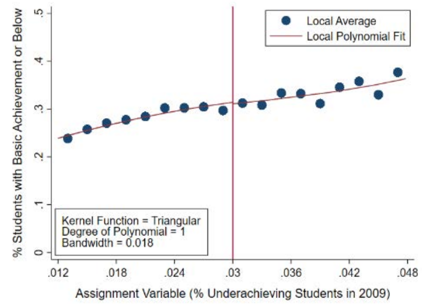


Figure A4: Number of Test-Takers by the Assignment Variable

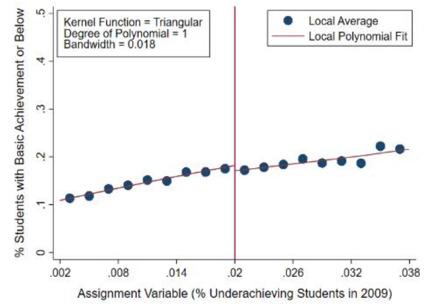
Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375



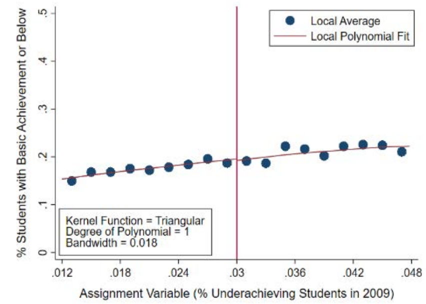
Panel A: Math ($C = 0.02$)



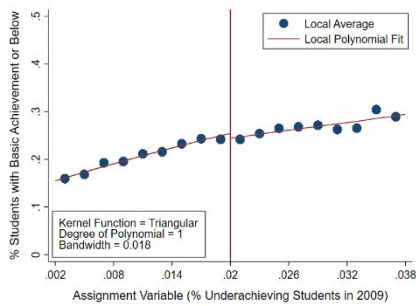
Panel B: Math ($C = 0.03$)



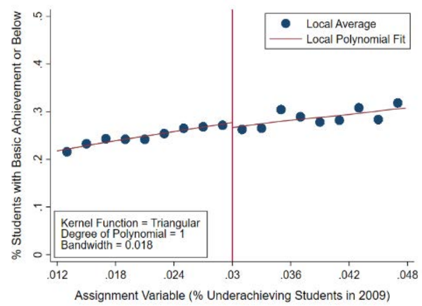
Panel C: Science ($C = 0.02$)



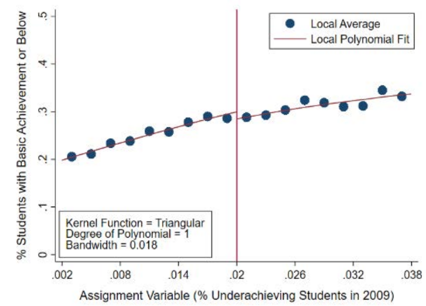
Panel D: Science ($C = 0.03$)



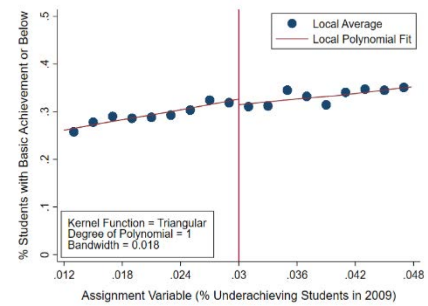
Panel E: Reading ($C = 0.02$)



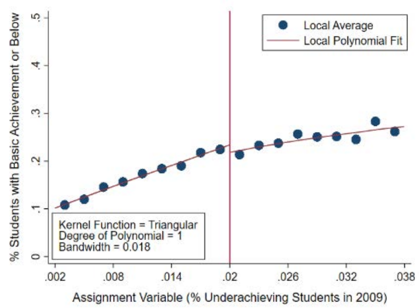
Panel F: Reading ($C = 0.03$)



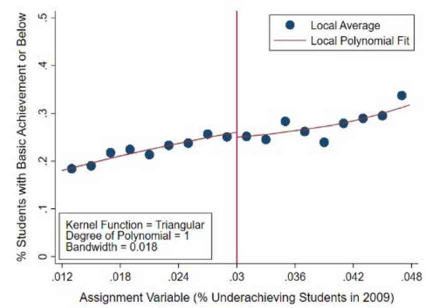
Panel G: Social Studies ($C = 0.02$)



Panel H: Social Studies ($C = 0.03$)



Panel I: English ($C = 0.02$)



Panel J: English ($C = 0.03$)

Figure A5: Density of Test Performance at the False Cutoffs (C)

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table A1: Regression discontinuity estimates based on student-level data

	Bandwidth (h)			
	$h = 0.009$	$h = 0.012$	$h = 0.015$	$h = 0.018$
	Panel A: Discontinuity in pre-treatment achievements			
Reading	−0.021	−0.026	−0.024	−0.021
	(0.021)	(0.018)	(0.016)	(0.014)
	[25,279]	[36,127]	[50,899]	[69,678]
Mathematics	0.012	0.007	0.009	0.007
	(0.017)	(0.015)	(0.014)	(0.013)
	[25,280]	[36,129]	[50,904]	[69,683]
English	−0.008	−0.019	−0.014	−0.013
	(0.023)	(0.021)	(0.019)	(0.017)
	[25,279]	[36,129]	[50,904]	[69,683]
Social studies	−0.019	−0.017	−0.008	−0.003
	(0.021)	(0.018)	(0.016)	(0.015)
	[25,263]	[36,118]	[50,895]	[69,664]
Science	0.003	0.001	0.000	−0.001
	(0.833)	(0.942)	(0.985)	(0.930)
	[25,265]	[36,121]	[50,897]	[69,667]
	Panel B: Discontinuity in post-treatment achievements			
Reading	−0.020	−0.033	−0.028	−0.023
	(0.033)	(0.029)	(0.026)	(0.022)
	[23,391]	[33,478]	[46,778]	[63,794]
Mathematics	−0.060	−0.078**	−0.072**	−0.065**
	(0.038)	(0.034)	(0.030)	(0.026)
	[23,396]	[33,457]	[46,760]	[63,779]
English	−0.054	−0.066**	−0.058**	−0.046*
	(0.038)	(0.031)	(0.027)	(0.024)
	[23,378]	[33,468]	[46,774]	[63,794]
Social studies	−0.063*	−0.069**	−0.061**	−0.053**
	(0.038)	(0.032)	(0.028)	(0.025)
	[23,399]	[33,478]	[46,791]	[63,808]
Science	−0.034	−0.043*	−0.041*	−0.038**
	(0.029)	(0.024)	(0.021)	(0.019)
	[23,398]	[33,477]	[46,789]	[63,806]

Notes: An outcome variable is a dummy variable that indicates whether a student received the "below average" grade. The effect estimate is derived from a regression of this indicator variable on the treatment variable that varies at the school level. The effect estimate indicates the average difference in the proportion of students scoring "below average" between treated and untreated schools. Standard errors clustered at the school level are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived with local linear specification (i.e., $p = 1$) and the triangular kernel function. ** and * indicate statistical significance at the 5 and 10% levels, respectively.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table A2: Discontinuity in baseline and post-treatment school characteristics

	Bandwidth (h)			
	$h = 0.009$	$h = 0.012$	$h = 0.015$	$h = 0.018$
	Panel A: Baseline school characteristics			
% with a Master's degree or higher	−0.006	−0.010	−0.020	−0.028
	(0.045)	(0.038)	(0.034)	(0.030)
	[265]	[375]	[503]	[679]
% newly hired teachers	−0.010	−0.022	−0.014	−0.006
	(0.035)	(0.031)	(0.029)	(0.026)
	[265]	[373]	[501]	[676]
% operating after school	−0.054	−0.051	−0.045	−0.040
	(0.092)	(0.077)	(0.068)	(0.060)
	[266]	[376]	[504]	[680]
% operating summer school	−0.038	−0.056	−0.043	−0.040
	(0.067)	(0.062)	(0.058)	(0.054)
	[266]	[376]	[504]	[680]
% utilizing outside resources	−0.108	−0.091	−0.093	−0.104
	(0.123)	(0.106)	(0.096)	(0.086)
	[266]	[376]	[504]	[680]
% providing customized materials	−0.216*	−0.182*	−0.169*	−0.143*
	(0.118)	(0.100)	(0.090)	(0.081)
	[266]	[376]	[504]	[680]
	Panel B: Post-treatment school characteristics			
% with a Master's degree or higher	0.073*	0.072*	0.057*	0.043
	(0.043)	(0.038)	(0.034)	(0.031)
	[265]	[375]	[503]	[674]
% newly hired teachers	0.023	0.010	0.009	0.014
	(0.032)	(0.029)	(0.027)	(0.025)
	[265]	[375]	[502]	[672]
% operating after school	0.114	0.079	0.053	0.047
	(0.081)	(0.058)	(0.048)	(0.040)
	[266]	[376]	[504]	[675]
% operating summer school	0.162*	0.118	0.120*	0.114**
	(0.089)	(0.072)	(0.062)	(0.054)
	[266]	[376]	[504]	[675]
% utilizing outside resources	0.042	0.070	0.093	0.085
	(0.128)	(0.106)	(0.093)	(0.082)
	[266]	[376]	[504]	[675]
% providing customized materials	0.025	0.070	0.059	0.048
	(0.100)	(0.083)	(0.073)	(0.066)
	[266]	[376]	[504]	[675]

Notes: Standard errors are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived with local linear specification (i.e., $p = 1$) and the triangular kernel function. ** and * indicate statistical significance at the 5 and 10% levels, respectively.

Education Finance and Policy Just Accepted MS.
https://doi.org/10.1162/edfp_a_00375

Table A3: Falsification test results based on false cutoffs

	Bandwidth (h)			
	$h = 0.009$	$h = 0.012$	$h = 0.015$	$h = 0.018$
	Panel A: False cutoff = 0.02			
Reading	−0.009	−0.009	−0.009	−0.010
	(0.010)	(0.009)	(0.008)	(0.007)
Mathematics	0.003	0.004	0.003	0.001
	(0.013)	(0.011)	(0.010)	(0.009)
English	−0.024	−0.020	−0.016	−0.016
	(0.011)	(0.010)	(0.009)	(0.008)
Social studies	−0.015	−0.015	−0.014	−0.014
	(0.012)	(0.010)	(0.009)	(0.009)
Science	−0.011	−0.011	−0.011	−0.012
	(0.009)	(0.008)	(0.007)	(0.006)
	Panel B: False cutoff = 0.03			
Reading	−0.021	−0.016	−0.011	−0.010
	(0.015)	(0.013)	(0.012)	(0.011)
Mathematics	0.003	0.004	0.002	−0.003
	(0.017)	(0.015)	(0.014)	(0.012)
English	−0.011	−0.006	−0.005	−0.010
	(0.016)	(0.014)	(0.013)	(0.012)
Social studies	−0.025	−0.018	−0.013	−0.012
	(0.017)	(0.015)	(0.014)	(0.013)
Science	−0.010	−0.006	−0.003	−0.002
	(0.014)	(0.012)	(0.011)	(0.010)

Notes: An outcome variable is a dummy variable that indicates whether a student received the "below average" grade. The effect estimate is derived from a regression of this indicator variable on the treatment variable that vary at the school level. The effect estimate indicates the average difference in the proportion of students scoring "below average" between treated and untreated schools. Standard errors clustered at the school level are in parentheses. The number of observations is in brackets. Regression discontinuity estimates are derived with local linear specification (i.e., $p = 1$) and the triangular kernel function.

EDUCATION COMMISSION OF THE STATES

POLICY BRIEF

JAN 2022

Student Counts in K-12 Funding Models

Eric Syverson and Chris Duncombe

Whether through enrollment numbers or attendance estimates, the way states count their K-12 students directly impacts the allocation of hundreds of billions of dollars in state and local aid to school districts each year. While student count policies have consistently had a considerable impact on resource allocation, the COVID-19 pandemic, coupled with changing learning environments, have raised new considerations for state policy.

States use student count policies to raise or lower a district's funding amount based on changes to the size of its student population. As a result, districts stand to lose tens of thousands of dollars each year because of normal variations in student attendance and enrollment. Recent challenges with fluctuating enrollment illustrate the central role student counts play in K-12 funding models and why it is important that these counts are accurate. The COVID-19 pandemic made clear just how dramatic an effect a shift in enrollment can have on the level of resources states provide to schools. K-12 student enrollment declined 3% in the 2020-21 school year with most states experiencing a decline of 1% to 4% — the largest decline in enrollment since 2000. While a decline in enrollment of 3% may appear modest, the impact on school district budgets would have been significant had states not taken action to prevent these financial losses for districts.

This Policy Brief summarizes different state approaches to counting students for funding purposes, highlighting advantages and challenges for each method. It then presents future considerations for student count policies given three current trends:

Key Terms

Student counts: The total number of students who receive state funding. States may use enrollment or attendance to determine the student count.

Student attendance: The total number of students present at school on a given day.

Student enrollment or membership: The total number of students registered to attend a school at a given time.

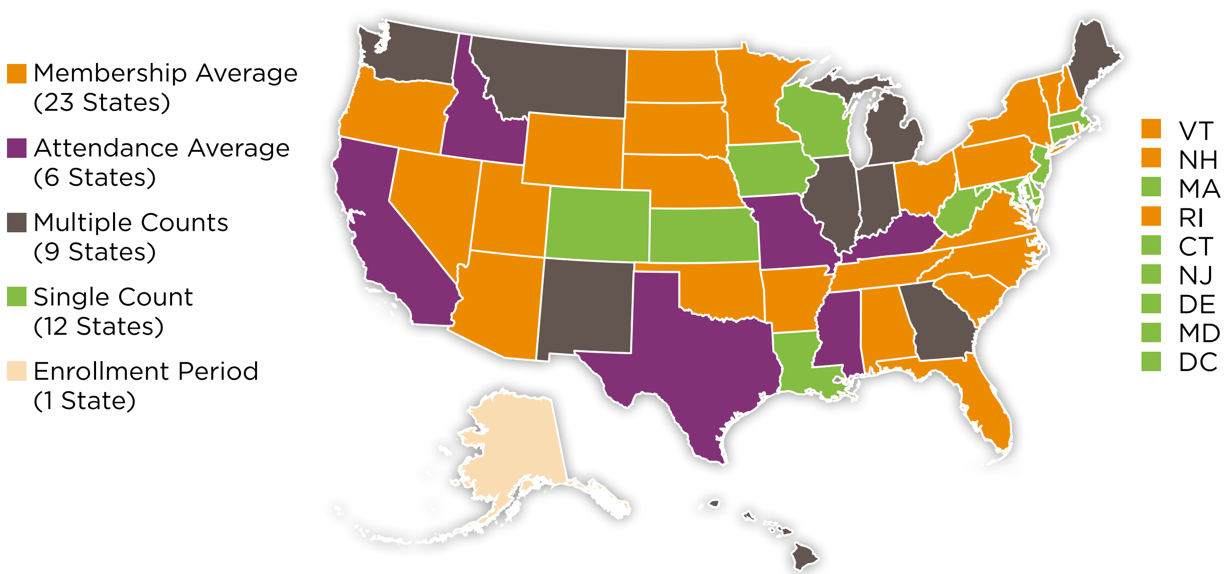
- Students are increasingly using online instruction.
- States are enacting hold harmless policies in response to COVID-19.
- Growth of universal free meals are impacting counts for students from low-income backgrounds.

State Approaches to Student Counts in K-12 Funding Models

Although states employ different funding models to allocate resources to districts, all models require districts to count their student population; states use these counts to calculate the amount of funding each district receives. States that use the student-based foundation model typically set a base per-pupil funding amount for every student counted. In states using a resource-based allocation model, student counts determine the number of funded full-time equivalent staff through a staff-to-student ratio (i.e., 1 full-time equivalent:25 students). Student count policies also allow states to determine how many students belong to specific population groups who may qualify for additional per-pupil funding.

States employ a variety of methods to count student attendance and enrollment for funding purposes. In the 50-State Comparison: K-12 and Special Education Funding, Education Commission of the States identified five different policy approaches outlined in state statutes: single count, multiple counts, enrollment period, attendance average and membership average.

Student Count Policies



Single Count

States using a single count methodology collect student enrollment or attendance from a single day, typically early in the fall, as the student count for the entire year. This point-in-time method does not make mid-year adjustments based on attrition or transfers during the school year.

Advantages

- Administration: States and districts only need to collect fall enrollment data, which they already submit to the U.S. Department of Education.

Challenges

- Accuracy: The single count approach is insensitive to fluctuations that occur throughout the school year, including students transferring from one district to another, students enrolling after the selected count day or students who drop out of school. For states using attendance, students absent on the count day will be excluded.
- Equity: Districts losing or gaining students throughout the school year will not be compensated for these changes. Students who move frequently are more likely to be from low-income backgrounds, families that are not homeowners and Black families compared with students who do not move frequently.

Multiple Counts or Count Period

States using multiple counts collect enrollment or attendance counts on two or more days per year, typically early in the fall and spring. The count days are averaged together, and funding allocations are adjusted accordingly. States with an enrollment count period are similar but do so over a period of multiple days. (If the duration of the enrollment count period is a full school year, or most of a school year, the state is considered to be using a membership average method.)

Advantages

- Administration: As a compromise between the single day and school year average, multiple count days are fairly easy to administer — with only one or a few adjustments throughout the school year.
- Accuracy: Unlike a single day count, there is at least one mid-year adjustment to account for shifting student populations.

Challenges

- Accuracy: This approach does not capture enrollment or attendance fluctuations with as much accuracy as an annual average.

Pre-Kindergarten and Kindergarten Enrollment

Pre-K and kindergarten had much larger enrollment declines during the COVID-19 pandemic compared with other grade levels. Enrollment in pre-K and kindergarten declined 13% compared with a decline of 3% for grades one through eight and 0.4% for grades nine through 12. The enrollment drops also had considerable variability by race and socioeconomic status. The declines may be temporary as some families chose to wait a year to enroll their child. Kindergarten enrollment is showing signs of rebounding in the 2021-22 school year.

Attendance Average

States using an attendance average calculate the average number of children in attendance each day for all or most of the school year. States may account for excused absences.

Advantages

- Accuracy: The attendance count is not based on a single point or a few points in time — which can fluctuate significantly — but on attendance throughout most or all of the school year or across multiple school years.
- Equity: Districts have a financial incentive to maintain or improve attendance, as their state funding allocation depends on consistent student attendance. This policy may direct districts to focus on student populations that have historically experienced barriers to consistent attendance, including students with a disability, as well as American Indian, Pacific Islander and Black students, English learners and students from low-income backgrounds.

Challenges

- Administration: Attendance averages can be more time-consuming and costly to administer than counting students on one or multiple days. Districts must collect attendance throughout the year and submit updates to the state. States may need to monitor for inconsistencies.
- Equity: This approach penalizes districts with lower attendance rates. Districts with attendance challenges may already be under-resourced and have difficulty overcoming student barriers to attendance, particularly with restricted funding.
- Stability: Attendance counts may fluctuate as has been illustrated during the COVID-19 pandemic. At least one state has shifted temporarily from attendance to enrollment during the pandemic with attendance more uncertain during the public health crisis, and another state is considering making this change on a permanent basis.

Membership Average

States using a membership average, also called average daily membership or average daily enrollment, calculate the average number of children enrolled in each district for most or all of the year. The average can be based on the previous or current school year. States may periodically update the membership average throughout the year or reconcile budgeted estimates with the actuals at the end of the year.

Advantages

- Accuracy: The enrollment count is not based on a single point or a few points in time, which can fluctuate more significantly, but throughout most or all of the school year or across multiple school years.
- Equity: This approach funds districts based on the number of students a district must be prepared to instruct rather than the number of students in attendance. As a result, there are no negative funding effects on districts with absent students.

Challenges

- Administration: This method can be more time consuming and costly to administer. The state and districts must monitor enrollment throughout the year, and districts may need to submit multiple reports to the state. States may need to develop quality control processes to identify inconsistencies in these reports.
- Equity: While the membership average does not penalize districts for students who are absent, it also does not provide a financial incentive for districts to increase student attendance.

Considerations for Student Count Policy

Learning environments are evolving and student count policy can reflect these changes. As states adapt their student count policy, future consideration can be given to recent trends, which include the increased use of online instruction, the increased use of hold harmless policies in response to COVID-19, and the decreased availability of free or reduced-price meals data. This section discusses these trends and highlights state policy to respond to the changing landscape.

Online Instruction

The COVID-19 pandemic accelerated an established trend of increasing student enrollment in virtual instruction. During the pandemic, full- and part-time virtual enrollment dramatically increased, accounting for nearly 40% of enrollment declines in traditional public schools. The pandemic also shifted students enrolled in traditional schools into remote learning, as districts responded to school building closures by adopting virtual or hybrid instructional models. This transition to virtual instruction has been aided by almost $200 billion in federal relief funds that have increased district capacity to provide technology and internet access for students.

The increase in online learning has prompted states to revisit their student count policies to better account for remote and virtual learning. States enacted legislation in 2021 that permit districts and charters to offer online instruction and set parameters on how online instruction impacts student counts and funding. These parameters include limiting the amount of remote instruction a student can receive, the percentage of students that can be enrolled in a district's virtual program and the amount of funds awarded per student.

Arizona (H.B. 2862) permits districts and charter schools to satisfy the state instructional time requirements, which are used to calculate average membership, with a combination of in-person instruction and remote instruction. The legislation caps the portion of remote instruction at 50% for the 2021-22 school year and 40% thereafter. Since Arizona uses a membership average to allocate funds, the legislation means that districts and charters offering remote instruction to students below the cap will not be financially penalized for doing so.

Indiana (H.B. 1001) directs the Indiana Department of Education to review student attendance for the purpose of classifying students as either in-person or virtual for their spring and fall membership counts. Students are classified as virtual if they receive at least 50% of instructional services virtually. This distinction is important, because virtual students receive 85% of the foundation amount that in-person students receive. Indiana (S.B. 2) enacted temporary measures to exempt students who are not currently enrolled in a virtual charter or were not classified as virtual students pre-pandemic from receiving the reduced foundation amounts.

North Dakota (S.B. 1232) permits school districts and governing boards of nonpublic schools to adopt a policy to allow students to engage in virtual instruction and continue to qualify for the average daily membership count, which is used by the state to allocate funds.

Texas (S.B. 15) allows school districts and charters schools that receive a C or higher on the state's accountability rating to establish their own remote learning program independent from the Texas Virtual School Network. Students in the remote learning program are counted the same as other students in determining average daily attendance. The state limits participation to 10% of the total district or charter enrollment.

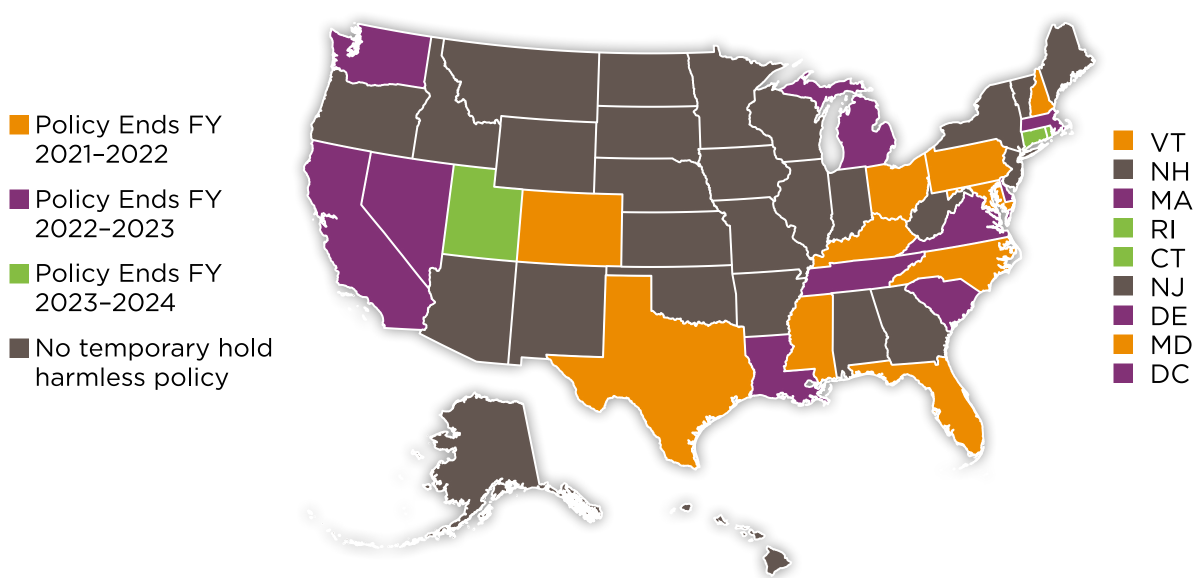
While the pandemic has created a temporary boom in online instruction, initial findings indicate continued interest in remote instruction. Virtual programs continue to see annual enrollment growth. As state policymakers look to the future of student count and fund allocation policies, it will be critical to take the structural differences inherent in virtual instructional models into consideration.

Hold Harmless Policies

Last year, Education Commission of the States found that hold harmless policies were a common state response to the disruptions in traditional student count methods caused by the COVID-19 pandemic. These policies typically allow districts to use their prior year, pre-pandemic enrollment or attendance numbers to receive the same amount of funding for the current year. Hold harmless policies limit revenue declines for school districts that would otherwise lose funding because of enrollment declines or changes in tax revenue. Alternatively, hold harmless policies may cap total revenue declines to a specified percentage or dollar figure.

Throughout 2021, states continued to enact or extend hold harmless policies. A review of state statutes, enacted legislation, executive orders, and state education agency directives identified 22 states that enacted temporary hold harmless policies because of the COVID-19 pandemic. While most states' hold harmless policies will end after fiscal year 2021-22, a few states will continue to hold districts harmless through fiscal years 2023-24.

Temporary Hold Harmless Policies



Other states enacted permanent hold harmless policies prior to the COVID-19 pandemic. **Maine** and **Vermont** enacted permanent hold harmless policies in 2021. States may enact permanent hold harmless policies to provide financial assistance to many schools experiencing enrollment declines or to ensure districts receive a new base amount of funding before the state transitions to a new funding formula.

The most notable benefit of temporary hold harmless policies was to help schools avoid drastic budget cuts driven by sharp and unexpected enrollment or attendance declines, particularly as schools and districts worked to respond to increased student needs because of pandemic disruptions. However, while temporary hold harmless policies buoyed districts' finances, researchers warned state leaders of potential drawbacks as the policies expire — or if they are left in place too long. First, many districts may face a fiscal cliff because of declining enrollment coupled with the end of federal relief, forcing schools to make painful budget cuts in coming years. Second, some argue the dollars used to hold districts financially harmless may be more impactful if used for a specific purpose rather than generalized stability. In addition, as states enact new, more equitable school funding formulas, hold harmless policies may temporarily maintain inequitable funding by delaying a state's transition.

Policymakers can also consider the incentives that hold harmless policies create. Some question whether the policy removes incentives to increase student attendance, as districts do not lose money if attendance falls. Similarly, research shows that, even without hold harmless provisions, districts typically wait too long to make structural changes to their budgets when faced with enrollment declines. States temporarily holding districts harmless may unintentionally exacerbate existing delays to necessary structural changes to district budgets.

Student Enrollment Growth

Although many schools can expect to educate fewer students in the future than before the pandemic, some schools will have to grapple with the opposite issue: increased student enrollment. For example, during the COVID-19 pandemic, many parents decided to delay preschool and kindergarten enrollments, or to enroll students in public charter schools. Researchers argue that some portion of these students will re-enroll in public schools in the coming years.

Certain states and districts also anticipate growing student populations as a result of continuing demographic trends. According to the 2020 census, western and southern states experienced faster population growth than midwestern and northeastern states, with most of the growth concentrated in suburban and urban areas. Rural and exurban areas in all states comparatively lost population. While 34 states provide increased funding for small and isolated school districts in rural areas, policymakers may want to consider growing resource needs in many suburban and urban school districts.

During the 2021 legislative sessions, a few states enacted policies to provide supplemental funding to districts experiencing or anticipating enrollment increases:

Alabama (S.B. 9) provides additional funds for districts experiencing student growth based on net year-over-year average daily membership growth in the two years previous to fiscal year 2022. The new growth allowance will be funded at 100% of the amount allocated to districts under the previous current-units allotment for nonvirtual students. Funding for growth of full-time virtual student enrollment will be based on the average cost to educate a full-time virtual student.

Montana (H.B. 33) allows districts to anticipate enrollment increases by notifying the Office of Public Instruction before June 1 of the year before the budget year. The anticipated enrollment increases the district's budget limits, alongside state and local funding levels. If the actual enrollment based on the fall count is lower than the anticipated enrollment used to determine the budgeted average number of belonging students, the Office of Public Instruction will recalculate the district's budget.

Utah (S.B. 1) creates the Enrollment Growth Contingency Program for fiscal years 2021 and 2022. This program creates a hold harmless provision for 2021. For fiscal year 2022, it requires the state to assign local education agencies experiencing a net growth in students more than the previous year with additional weighted pupil units before the enrollment count. Additionally, local education agencies may request the state to pre-fund higher-than-anticipated student enrollment growth before the enrollment count for districts that had a significant decline in student enrollment during the 2020-21 academic year.

West Virginia (H.B. 2852) authorizes the state to provide advanced payments at the districts' request of up to 60% of the school districts' estimated share of aid based on projected enrollment increases. It requires districts to refund state aid if that aid is more than what is required for actual enrollment growth.

Students From Low-Income Backgrounds

For decades, the measure for identifying and counting students facing economic barriers has been through student participation in free or reduced-price meals. States have consistently depended on free or reduced-price meal data to allocate resources and design accountability systems to support this student population. However, as the growth of free meal programs lead to fewer and fewer schools collecting this data, the measure has become increasingly obsolete, forcing states to explore alternatives.

The transition away from free and reduced-priced meals started with the Healthy, Hunger-Free Kids Act of 2010. The act created the Community Eligibility Provision (CEP), which allows eligible districts or schools to receive full or partial federal reimbursement to offer all students free meals. Though the program expanded access to free meals, participating districts and schools no longer collected free or reduced-price lunch data, removing a key measure from state allocation calculations.

Recent increases in universal free meal programs will further reduce the availability of this data. In response to COVID-19, the U.S. Department of Agriculture approved waivers for the 2020-21 and 2021-22 school years to reimburse all student meals regardless of family income — temporarily making free school meals universal. States have also started to approve their own universal free meal programs. **California**'s state budget requires districts to provide free meals for all students starting in the 2022-23 school year and provides state funds to reimburse some of the costs; the **California** Legislature is currently considering the Free School Meals For All Act to make this change permanent. Similarly, **Maine**'s budget expands free meals for all students once the federal waivers expire.

States had started to transition to new measures of student poverty since the passage of CEP, and the increased interest in universal free meals will further necessitate this transition. The most common alternative to the free and reduced-price lunch measure is direct certification in federal benefit programs, such as the Supplemental Nutrition Assistance Program and Temporary Assistance for Needy Families. Though these programs capture much of the same population as the free and reduced-price lunch programs, different eligibility requirements mean that some students — such as those from families who are not citizens — who were previously counted are now excluded.

States have taken action to create more robust measures of the needs of students from low-income backgrounds:

Maryland ([Md. Code Ann., Educ. § 5-222]) uses both direct certification and a supplemental income form provided to families to determine the number of students from low-income backgrounds in CEP participating schools.

Oregon ([Or. Rev. Stat. Ann. § 327.013]) has opted not to use free or reduced-price lunch or direct certification, and instead uses childhood poverty data that is published annually by the U.S. Census Bureau.

Washington uses a state-developed family income survey offered in multiple languages every year to determine the number of students from low-income backgrounds in CEP schools.

Final Thoughts

Student count policies are a vital component of every state's school funding model. States use attendance or enrollment counts to determine the overall amount of funding each school district receives annually. As state policymakers evaluate their funding mechanisms, they can consider the advantages and disadvantages associated with each of the existing student count policies, particularly with respect to equitable access to educational resources.

In addition, the COVID-19 pandemic and ongoing shifts in student demographics have created further challenges for traditional student count policies. Widespread adoption of online learning and a general decline in public school enrollment led states to enact methods to count virtual student attendance and hold harmless policies to prevent drastic decreases in school funding. Long-term trends, such as growing urban and suburban school districts and shifting methodologies to define and track students from low-income backgrounds, can prompt states to consider how they can make better use of student count policies to allocate resources. Finally, the examples discussed in this brief highlight the benefit of continuing to revisit student count policies as programs, funding models and external conditions change.

About the Authors

Eric Syverson

As a policy analyst, Eric supports the policy team by tracking legislation, completing 50 state comparisons, and answering information requests. Prior to joining the Education Commission of the States, he earned a bachelor's degree at the University of Kansas and a master's of public administration at the University of Colorado Denver. Contact Eric at esyverson@ecs.org.

Chris Duncombe

Chris focuses on K-12 school finance as a senior policy analyst at Education Commission of the States. Chris has 10 years of experience working on fiscal policy at the state and local level with a focus on school funding, and his previous research in Virginia informed state policymakers in their design of equity-based school funding. Chris believes in the power of diverse, well-resourced learning environments and the key role school finance plays in setting the stage for student success. Contact Chris at cduncombe@ecs.org.

30

A Fifty-State Survey of School Finance Policies And Programs: An Overview[1]

Deborah A. Verstegen and Teresa S. Jordan

ABSTRACT

This overview provides a synthesis of a comprehensive survey of school finance programs in the 50 states conducted in 2006–07. Information was provided by chief state school finance officers or persons with expertise in a state's public school funding-allocation system. Brief descriptions of the major Pre-K–12 funding formulae, district-based finance components, student-based finance components, and revenue and expenditure information were provided for each of the 50 states. Results show an increase in states' use of foundation-type programs; changes as a result of state-level accountability systems, including increased recognition of the differentiated needs of students; and an increase in state support for capital outlay. Consistent with court decisions, states appear to be taking a more active role in the design of public school finance programs that recognize the differences in the needs of pupils, schools, and school districts.

INTRODUCTION

It has been written that the old sage who said, "the only thing that doesn't change is change itself," could well have been speaking about education finance. That continues to describe the current state of school finance policies and programs across the 50 states. Just this year New York, New Jersey, Tennessee, and South Dakota enacted major changes in their education-funding formulae. Other alterations preceded these in several states including Hawaii, Indiana, Missouri,

Deborah A. Verstegen and Teresa S. Jordan are professors for the Department of Educational Leadership in the College of Education at the University of Nevada.

and Michigan. More changes in state-funding policies will surely continue into the future. With this in mind, we provide a "first look" at school-finance policies across the 50 states for 2006–07 with findings emerging from a comprehensive 50-state survey of finance policies and programs.

It has been over 10 years since information has been available for all 50 states related to state-financing policies and programs for public elementary and secondary education. The most recent 50-state finance survey was conducted by the National Center for Education Statistics in 1997–98.[2] Prior to that release, the Education Commission of the States disseminated a state-finance survey in 1990.[3]. This research updates previous work by providing comprehensive information on finance policies and programs for all 50 states for 2007.

METHODOLOGY

The survey methodology was iterative and spanned several years. First, an electronic state-finance survey was sent to the chief state education-finance officer in each of the 50 states in December, 2006 requesting information on funding public elementary and secondary schools in the state during 2006–07. Subsequently, there were at least two written follow-up requests for data from non-responders and several phone communications, which resulted in information for all but four states. University professors or state association personnel filled these gaps and completed the survey for the missing states.[4] Finance policies and programs were then described, written into a common format for all 50 states and posted via a website at the University of Nevada for final review and verification by state department of education officials and chief-financial officers. Based on the feedback received, additional changes and corrections were incorporated into the final version of the 50-state survey.[5]

FINDINGS

Survey findings were reported for several major areas of interest to policymakers, educators, and others, including a description of the major Pre-K–12 finance formula for funding public schools, district-based finance components, student-based finance components, and revenue and expenditure information. This information was detailed by state and then depicted by separate components across all 50 states.

Findings emerging from the survey were informative and supported the adage that "the more things change the more they stay the same." Currently states fund public elementary and secondary schools through the use of one of four traditional finance formulae: (1) foundation programs, (2) district power equalization systems, (3) full-state funding, and (4) flat grants. Additionally, several states have combined these formulae in two-tiered systems.

Table 1 provides a summary of major finance systems by state, drawn from the survey data for 2007. For a complete state-by-state list, see Appendix A.

The largest category, state Foundation School Programs (FSP), were used by 40 states in 2007. When states employing a foundation program as part of a combination-funding approach are added to other states supporting education through these Strayer-Haig schemes, the total number of states using foundation formula to pay for elementary and secondary education rises beyond a supermajority to 45 states. Recently New York, Indiana, and Michigan shifted to a foundation program for funding public education. Clearly, this is the program of choice for the allocation of state aid to school districts within state borders.

FSP support education through a set-state guarantee per pupil or per teacher unit. Localities contribute to this amount usually through a uniform-tax rate or the funding that would result from it. With similar tax efforts, poor localities raise less and wealthy localities, more, due to variations in local-property tax bases. The state makes up the difference up to the specified guarantee, also referred to as the foundation amount. This is referred to as equalization. Usually localities can "go beyond" the state guaranteed amount with additional property taxes that are unmatched by the state.

Of states employing this approach, California uses a foundation program which is referred to as a revenue limit. Each district receives its revenue limit from local-property tax sources with balances made up by the state. However, each district's revenue limit is different based on historical factors. Property taxes are defined by Proposition 13 and collection and distribution of property-tax revenues is the responsibility of counties, in a manner defined by the state legislature.[6] In another state, Tennessee, the Basic Education Program (BEP) is

Table 1. State-School Finance Formula, 2007

Type of Funding Formula	2006–07
Foundation Program	40
District Power Equalizing	3
Full State Funding	1
Flat Grant	1
Combination / Tiered System Grants	5
Total	50

a foundation program with the state setting an amount of per-student funding to be distributed and then equalized based on a district's fiscal capacity. The latest rendition, BEP 2.0, adds additional poverty-based funding determined by the percentage of students in the district that are eligible to receive funding for federal-free and reduced-price lunches.[7] Likewise, the new system established in New York is called a foundation formula, but it allows districts the choice of a percent equalizing aid ratio or a set tax rate and is therefore, theoretically, a hybrid formula.[8]

Unlike Foundation Programs, District Power Equalizing systems (DPE) support taxpayer equity, rather than pupil equity, by providing equal yield for equal effort. DPE formulae consist of guaranteed tax-base systems, guaranteed-yield approaches, and percentage-equalizing formulae.[9] Only the following three states use a district power equalization approach: Vermont (guaranteed yield),[10] Wisconsin (three-tiered guaranteed tax base),[11] and Rhode Island (percentage equalization). These programs shift decision choices and policy options for taxing and spending for schooling from the state to the locality. The local district determines spending and taxing levels within state-determined limits, and the state matches differences in what is raised locally and what is guaranteed. There are various levels of support based on local choices providing taxpayer equity across the state. For example, the guaranteed-yield system in Vermont has a base of $8,210 at a tax rate of 8.7 mills. For every percent the voters add to this amount, the tax rate goes up 1% until double-tax rates become operative above 125% of the average spending level. Under Wisconsin's three-tiered guaranteed tax base, the state makes up the difference in what is raised for each tier locally, and what would have been raised under the state-prescribed guarantee. Guaranteed valuations differ for K-12, K-8, and union high-school districts under a primary, secondary, and tertiary guarantee.[12]

Other types of state finance systems provide full funding from the state or flat grants. Although local funds are not part of the finance plan under full-state funding (FSF) or flat grants, flat grant systems permit local supplements but FSF systems do not. Hawaii uses full-state funding and North Carolina reports flat grants as the major state-aid mechanism.

Five states provide combination approaches—Georgia pays for schools through a combination of foundation and guaranteed tax-yield formulae, and Illinois uses three finance formulae.[13] It employs a foundation program as base and also uses an alternative method and flat-grant funding when local resources exceed 93% or 175% of the foundation level, respectively. In 2006–07 the foundation level was $5,334 per pupil. In Kentucky, under SEEK (Support Education Excellence in Kentucky) funding is derived from a base foundation level with superimposed optional two tiers of supplementation, each under a DPE. Under

Tier I, a school district can levy an equivalent tax rate, which will raise revenue up to 15% above the adjusted SEEK base. The local effort is equalized at 150% of the statewide average per-pupil, assessed-property valuation. Tier II allows additional levies to produce up to 30% above the adjusted SEEK base plus Tier I, but is not matched by the state. Other two-tiered systems include Montana and Texas. Montana has a foundation and guaranteed tax-base program; and Texas employs a Foundation and Guaranteed Yield Program.

The funding system for Pennsylvania was classified as a foundation program based on historical information. Since about 1991, it has frozen its system and subsequently provided: (1) a hold harmless for what each district received the previous year (usually about 96–97% of the total state funding for regular education); (2) A series of 4–8+ supplements based on a changing set of priorities each year (e.g. low income, high taxes, poverty, growth, small-district assistance, etc); and (3) a minimum guarantee of generally 2% if the district did not reach that much through supplements.[14]

Cross-Cutting Themes

In reviewing the full gamut of state-finance policies, it can be observed that there is a great deal of variation among major state-finance systems, despite the relative parsimony in their use. States provide different amounts of state guaranteed funding per child or teacher, count students for funding purposes in a variety of ways, and employ a variety of adjustments to their general-funding system. For example, Connecticut supports a per-pupil foundation level of $5,891, while Michigan pays $7,108; Massachusetts, an average of $8,425 per student; New Jersey, $7,913; Nevada, $5,122; and New Mexico, $3,446. Idaho provides $25,436 per instructional unit. These amounts are not as straightforward as they may appear, as they can be based on pupil counts (e.g., ADM, ADA, Enrollment) or weighted pupil counts with special needs student adjustments to headcount—and the state share of these amounts generally vary with localities responsible for the difference between the guarantee and state aid. The local effort varies substantially across states and may or may not actually be required as part of the finance system.

A key issue related to funding formulae and the amount of funds it provides per child is whether or not that amount is sufficient to teach all children to state standards.[15] Interestingly, Maine's foundation program specifically mentions that it is an "adequacy-based" formula—an apparent improvement on past state systems where the amount of the major equalizing grant was based more on politics or residual budgeting than on a rational basis or need. Maine's essential programs and services-funding formula uses cost analysis to establish the amount, level, and costs of education components needed in each school and to ensure all students have equitable opportunities to achieve proficiency on state learning standards. Mississippi uses data from schools that are considered to be successful and efficient to determine base-student allocations i.e., foundation amounts. Missouri develops an "adequacy target" based on several factors, including average current expenditures of districts meeting all performance standards established by the Missouri State Board of Education.

Special Education Finance Formula

States also provide district and student adjustments to the basic support guarantee to acknowledge cost pressures beyond the control of the district.[16] For districts, these cost pressures include size, geography, the cost of doing business, and student demographics. Students in poverty (as a proxy for students at risk of dropping out of school), students with limited-English proficiency or with disabilities require additional funding to meet state standards and goals. These provisions can be included in the major finance grant or can be added to that amount as a separate provision outside the major finance formula. Recently, Tennessee and Hawaii added provisions to their finance system for high-cost students.

Table 2 is a summary of funding mechanisms that states use to pay for special education and related services. For a complete state-by-state list, see Appendix B.

State special education funds are supplemented by federal aid under the Individuals with Disabilities Education Act (IDEA). Currently 49 states report state aid for special education through pupil weights, teacher units, cost reimbursements, or census methods of allocation. Only Rhode Island reported no additional funding for this purpose. States may also have an "other" means of providing funds as well, such as providing additional funds for extraordinarily high-cost students. For example, Alabama reports a "catastrophic" funding cat-

Table 2. State Funding of Special Education, 2007

Type of Funding	2006–07
Weights / Per Pupil	20
Cost Reimbursement	10
Instructional Unit	6
Census	5
Other Grants	17

Note: Duplicated Count.

egory for this purpose. Connecticut reports an excess-cost grant for extraordinary costs a school district may incur for special-education students, defined as 4.5 times the prior year's average cost per pupil. Massachusetts has a "circuit breaker" that funds costs above 4 times the foundation budget at 75%; and New Hampshire provides "catastrophic aid" at 100% of costs when they are 10 times the state average per-pupil expenditure with 80% reimbursed for special-education costs that reach 3.5–10% of the state-average expenditure.

Generally, states pay for special-education programs and services through one of four major methods: (1) per-pupil funding, either weighted or flat grant, (2) cost reimbursement, (3) instructional-teacher units, and (4) census. States provide funding through intermediate units rather than directly to the school district as is the case in Colorado, New York, and Wisconsin. Currently, 20 states provide per-pupil funding for special education through weights that recognize the excess cost of the special-education programs and service beyond the regular-education program amount. For example, if special education costs 90% of general education, the weight would be .90. With general-education costs included (1.0), the student would be weighted at 1.90 and generate 1.9 times the foundation amount-state guarantee. States may set limits on the percent of students funded under weighted systems and can include multiple or single weights for different categories. When states use weights to fund special education, as the general funding increases, so does special-education funding.

Currently, Oklahoma has 12 categories based on a student's disability; Texas has nine weights based on instructional arrangements (e.g. resource room, self-contained) and one weight for "mainstreamed students"—Delaware and Kentucky have three broad-weighted categories based on exceptionality, while Hawaii uses four broad categories based on needed-support levels. New Mexico has four categories based on service needs. Florida uses a new method also based on service needs and costs entitled, exceptional student education (ESE) Matrix of Services.[17] Matrices are completed by checking all the services that will be provided to the student consistent with the student's individual education program (IEP). Students are then placed into one of five support levels. About 60%, 25%, and 10% of students are placed in levels 1,2,3, respectively, and do not receive additional funds beyond their grade weights—support levels 4 and 5 generate a weight of 3.734 and 5.201, respectively, and include about 5–6% of all students. Several states use a single weight to fund programs (Maryland, Oregon, Utah, and West Virginia). A question of interest is how students are supported when they are integrated into the general-education classroom whether additional funding weights follow students to the place services are received. Texas, for example, provides a specific weight for mainstreamed students.

States also use cost-reimbursement methods to support special education. These methods usually define eligible costs and the percentage of these costs that will be reimbursed. Ten states currently use this approach. Five states use instructional-unit approaches to funding that pay teachers generally based on the number of students served. A new category of interest is census-based funding, which provides costs based on the total number of students in the school district irregardless of the number of special-education students served. It provides funding based on the overall percentage of total students in a school district, not on the basis of students with disabilities. Thus, this model provides no fiscal incentives for classification. As noted in the California response, "the funding model is based on the assumption that, over reasonably large geographic areas, the incidence of disabilities is relatively uniformly distributed." In addition to the census approach, California provides funds for concentrations of high-cost, low-incidence disabilities.

Other approaches to pay for special education are also evident in the survey data. Alaska provides a block grant that funds special students, including vocational education, gifted and talented, and bicultural-bilingual. Arkansas is the only state that directly discusses adequacy in relation to special-education funding—an area of interest across the country, which includes funding for low-income students and English Language Learners (ELL).

Funding for Low Income Students and English Language Learners

States also report providing funding for low-income students and students with Limited English Proficiency (LEP). These state-funding methods are summarized in Table 3. For a complete state-by-state list, see Appendix C. Most states use weighted approaches for these categories of need, but eligibility require-

Table 3. State Funding-Low Income, English Language Learners, 2007

State Support	2006–07
Low Income / Compensatory Education	
Yes	34
No	16
English Language Learner / Bilingual Bicultural	
Yes	37
No	13
Neither Low Income nor ELL Funding	3

ments, whether the grant is inside or outside the major-equalization grant and other criterion for the receipt of aid, can vary widely. These formulae for low-income students may be used to target aid to a school district, but then are available to redistribute based on the need of remediation or low-test scores at the school site.

Currently, 34 states fund students that are low income, a proxy for being at risk of dropping out of school, or funding is based on students in need of remediation. In Kentucky, the eligibility criterion is based on students eligible for the federal-free lunch program—in Michigan, it is free breakfast, lunch or milk per pupils. In Nebraska, a progressive percentage are multiplied by students qualified for free lunches/milk, or children under 19 years of age living in a household with adjusted-gross income less than $15,000, whichever is greater. In Iowa, eligibility is based partially on both free- and reduced-lunch (F&R) count in addition to budget enrollment of the school district. Texas supports students eligible for F&R lunch and pupils who are pregnant. New York provides state support for students who are at risk for not meeting learning standards. Likewise, South Carolina provides funding for students who fail to meet statewide standards in reading, writing, and math, or who do not meet first grade readiness-test standards.

Weights vary but range between 1.0 (an additional 100%) in Minnesota for free lunch recipients, to 5% in Mississippi. Most states provide an additional 25% in funding for low-income students and target eligibility on either federal-free or reduced-price lunch status or both. Connecticut provides an additional 25%, Georgia, 31%; Hawaii, 10%; Louisiana, 19%; Maine, 20%; Michigan, 11.5%; Minnesota, 100% for free-lunch recipients and 50% for reduced-lunch recipients; Missouri, 25%; Oregon, 25%; South Carolina, 26%; and Texas and Vermont, 25%.

In a notable shift from previous practice, almost four of five states provide additional support for ELLs or bilingual-bicultural education. While Delaware and Alaska use block grants to fund these programs, most states provide assistance through various weights. In Arizona, a weight of 11.5% is included in the basic-state aid calculations to provide additional funds, whereas Florida reports funding for speakers of other languages at 1.275. The new weighted-student Hawaii formula supports ELL students at 0.1885 or 18.9% of general-education aid. Iowa provides another 22%, Maine, between 30–60% of funds depending on the number of children in the LEA, and Missouri supports LEP students at 60% of basic aid, when the count of students exceeds the state threshold—currently at 1.1% of the districts ADA. Nebraska (.25), Oregon (.50), Texas (.10) and Vermont (.20) also report additional weights for ELLs as part of the state formula.

Only three states provide no additional support for either compensatory education or ELLs—Nevada, Montana, and South Dakota. This puts school districts into a position of having to make false choices—either take funds from general education to pay for high-cost students or ignore the special needs of some students altogether.

Funding for Capital Outlay and Debt Service

The Bishop decision of the Arizona Supreme Court[18] in 1994 extended the concept of equalization to include capital facilities in addition to net current expenditure for operations. State legislatures have enacted a variety of programs to assist school districts with the cost of constructing new facilities or retrofitting existing facilities on an approved project basis by: (1) including a per pupil grant that may be used for capital outlay or debt service in the state's foundation formula; (2) funding all or a share of the cost of constructing new facilities or retrofitting of existing facilities on an approved-project basis; (3) sharing the cost of retiring bonded indebtedness on a percentage or a fiscally-equalized basis; (4) creating independent commissions whose sole function is to assist school districts to provide facilities that meet state standards; and (5) improving the bond rating of an individual school district's general obligation-bond issues by pledging the full faith and credit of the state as security of the bonds. Total annual funding in fiscal year (FY) 2006–07 ranged from over $1.0 billion in California to $10 million in South Carolina. Permissible uses of funds have ranged from additional classrooms to schools for new students. Several programs have been enacted in the past 20 years.[19] The number of programs with broad coverage increased, and the number with "no-state program" decreased from 19 states to 11 states. Table 4 summarizes funding mechanisms that states use for capital outlay and debt service. For a complete state-by-state list, see Appendix D.

Table 4. State Funding for Capital Outlay and Debt Service Programs, 2007

Item in Funding Formula	2006–07
Grants for Debt Service	11
State Guarantee of District Bonds	2
Equalized Debt Service Grants	5
Loans	6
Approved Project Grants (Capital Outlay)	3
Equalized Project Grants (Capital Outlay)	14
No State Funds	11

Funding for Transportation

For reporting purposes, state methodologies for funding public school transportation programs have been placed into seven groups: (1) a separate calculation, or part of a block grant, in the general state-aid formula; (2) density formulae based on bus-route miles, pupils per bus-route mile, or square miles in the school district; (3) cost reimbursement formulae with a fiscal-equalization feature to adjust disbursement of funds to school districts; (4) cost-reimbursement formulas that pay the full cost to school districts; (5) cost reimbursements that only reimburse the district for approved costs; and (6) programs that pay a uniform amount for each transported pupil. Table 5 summarizes funding mechanisms that states use to pay for pupil transportation services for students. Appendix E provides a state-by-state listing of transportation funding.

The most prevalent funding method was cost reimbursement, either actual cost, fiscally-equalized cost, or allowable cost. Some form of cost reimbursement was used in 24 states. Two states reported no specific state funding for pupil transportation.

SUMMARY

This comprehensive 50-state survey of state-finance policies and programs updated information on state support for public elementary and secondary education—the previous information is over a decade old. Several areas of interest were found. First, more states are using a foundation program as the major formula to pay for schools—other states use one of the four traditional methods of funding education or combine them into tiered approaches. In the past, foundation formulae supported a minimum, basic education but this may be chang-

Table 5. Items in State Funding Formula

Item in Funding Formula	2006–07
In Funding Formula	11
Density Formula	9
Equalized Reimbursement	2
Full Cost Reimbursement	5
Allowable Reimbursements	17
Per Pupil	5
No State Aid	2

ing. Maine, and several other states, report adequacy-based foundation formula intended to provide sufficient funding for all children to reach state standards.

Next, states are modifying their funding systems to provide additional support to districts for students and districts with special needs. All but one state report additional state aid to pay for special-education programs and services—this augments federal aid for special education under the Individuals with Disabilities Education Act (IDEA). Most states provide this assistance through weighted systems as in the past. However, new census-based approaches are also evident as reported by California. States provide funding to meet extraordinary or catastrophic costs of special education.

Additional funding for compensatory education or low-income students (a proxy for at-risk youth) is also being addressed across the states as is funding for ELLs. Currently 31 states support programs for children who are at risk of failing or dropping out of school, and 37 states provide assistance for ELLs. Also, there has been an increase in the number of states that address capital outlay or debt service and pupil transportation. Thirty-nine states currently provide support for capital outlay and/or debt service. Twenty-four states support pupil transportation, primarily through the use of some type of cost-reimbursement program.

Endnotes

1. The authors wish to thank the College of Education, University of Nevada, Reno, for a scholarly activities grant that supported this work. We are also grateful to state officials for the information contained in this paper, and university professors or state agency personnel who filled the gaps. Finally, we wish to acknowledge Paul Amador, graduate assistant, UNR, and Christine Promin, graduate assistant, UNLV, for their efforts in formatting and reformatting the survey.

2. Sielke, C. C.; Dayton, J. Holmes; C. T., & Jefferson, A. (Eds.) (2001). *Public School Finance Programs of the United States and Canada: 1998-1999.* Washington, D. C.: United States Department of Education, National Center for Education Statistics. (NCES 2001-309) approximately 1300 pages. Available on CD-ROM and on line at http://www.nces.ed.gov/pubsearch.

3. Verstegen, Deborah (1990). *School Finance at a Glance.* Denver, CO: Education Commission of the States. See also, Salmon, R., et.al., (1988). *Public School Finance Programs of the United States and Canada 1986-87,* American Education Finance Association and Virginia Polytechnic Institute and State University, Blacksburg, Virginia;, Editorial Projects in Education. Quality Counts, *Education Week* January 6, 2005 p. 100-101.

4. For Pennsylvania, William Hartman; Virginia, Lisa Driscoll and Richard Salmon; Brian Aust in South Dakota; and in Tennessee, Gary Peevley.

5. Full survey may be accessed at UNR *Center for Research and Educational Planning's* website: http://repc.unr.edu/ or UNLV *Center for Education Policy Studies'* website: http://educational-leadership.unlv.edu/new_design/ctrforedPolicyStudy/index.html.

6. Picus, L. (2008). Personal communication with the author.

7. Peevely, G (2008). Personal communication with the author.

8. Cunningham, D. (2008). Personal communication with the author.

9. See Alexander, K. & Salmon, R. (1995). *Public School Finance.* Boston, MA: Allyn and Bacon. Odden, A. & Picus, L. (2008). School Finance: A Policy Perspective. N.Y.: McGraw Hill.

10. Mathis, W. (2008). Vermont uses a guaranteed yield to pay for public schools. The base is $8,210 at a tax rate of $0.87 per $100 of fair market value. This is the statewide property tax base. For every percent the voters add to this amount, the tax rate goes up 1% until the tax rate doubles at 125% of average spending. Personal communication with the author.

11. Rossmiller, R. (2008). Personal communication with the author. See also: www.legis.state.wi.us/lfb/Informationalpapers/27.pdf.

12. Wisconsin Legislative Fiscal Bureau (January, 2007). *State Aid to School Districts* (Informational Paper 27). Madison, WI: State Capitol.

13. Verstegen, D. A. (2007). *Adequate Funding of Illinois Public Schools.* Policy Research Brief. Department of Educational Organization and Leadership, College of Education, University of Illinois. URL: www.ed.uiuc.edu/eol/edadmin/OLearyChair.html.

14. Hartman, W. (2008). Personal communication with the author

15. See: Verstegen, D. A. (2002). Financing Adequacy: Towards New Models of Education Finance That Support Standards-Based Reform. *Journal of Education Finance*, 27(3), p. 749-781.

16. Anthony, P. Jacobson, S. L., Ed. (1992). *Helping Students at Risk: What are the Educational and Financial Costs*? Newbury Park, CA: Corwin Press, Inc.

17. URL: www.fldoe.org/ese/pdf/matrixnv.pdf.

18. *Roosevelt Elementary School District No.66 v. Bishop*, 877 P.2nd 806 (AZ.,1994).

19. Salmon, R., et.al., (1988). *Public School Finance Programs of the United States and Canada 1986-87*, American Education Finance Association and Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Appendix A. Fifty State School Finance Formulae, 2007

State	Flat Grant	Foundation	DPE	Full Funding	Combination/ Tiered
Alabama		X			
Alaska		X			
Arizona		X			
Arkansas		X			
California		X			
Colorado		X			
Connecticut		X			
Delaware		X			
Florida		X			
Georgia					X
Hawaii				X	
Idaho		X			
Illinois					X
Indiana		X			
Iowa		X			
Kansas		X			
Kentucky					X
Louisiana		X			
Maine		X			
Maryland		X			
Massachusetts		X			
Michigan		X			
Minnesota		X			
Mississippi		X			
Missouri		X			
Montana					X
Nebraska		X			
Nevada		X			
New Hampshire		X			
New Jersey		X			
New Mexico		X			
New York		X			
North Carolina	X				
North Dakota		X			
Ohio		X			
Oklahoma		X			
Oregon		X			
Pennsylvania		X			
Rhode Island			X		
South Carolina		X			
South Dakota		X			
Tennessee		X			
Texas					X
Utah		X			
Vermont			X		
Virginia		X			
Washington		X			
West Virginia		X			
Wisconsin			X		
Wyoming		X			
Total	**1**	**40**	**3**	**1**	**5**

Appendix B. Fifty-State School Finance Allocation Mechanisms for Special Education, 2007

State	Per Pupil/ Weighting	Cost Reimbursement	Unit	Census	Other
Alabama				X	X
Alaska					X
Arizona	X				X
Arkansas		X			
California				X	X
Colorado					X
Connecticut					X
Delaware			X		
Florida					X
Georgia	X				
Hawaii	X				
Idaho			X		
Illinois					X
Indiana		X			
Iowa	X				
Kansas			X		
Kentucky	X				
Louisiana	X				
Maine		X			
Maryland	X				
Massachusetts				X	X
Michigan		X			
Minnesota		X			
Mississippi			X		
Missouri	X				
Montana					X
Nebraska		X			
Nevada			X		
New Hampshire		X			X
New Jersey	X				
New Mexico	X				
New York	X				
North Carolina				X	
North Dakota					X
Ohio	X				
Oklahoma	X				
Oregon	X				X
Pennsylvania				X	
Rhode Island					
South Carolina	X				
South Dakota					X
Tennessee	X				
Texas	X				
Utah	X				
Vermont		X			
Virginia			X		
Washington	X				X
West Virginia	X				
Wisconsin		X			
Wyoming		X			
Total	**20**	**10**	**6**	**5**	**17**

Appendix C. Fifty State Financing for Low Income and English Language Learners, 2007

State	Low Income/ CompensatoryEducation Funding		English Language Learner/ Bilingual Funding	
	Yes	**No**	**Yes**	**No**
Alabama	X		X	
Alaska		X	X	
Arizona	X		X	
Arkansas		X	X	
California	X		X	
Colorado	X			X
Connecticut	X		X	
Delaware	X			X
Florida		X	X	
Georgia	X			X
Hawaii	X		X	
Idaho		X	X	
Illinois	X		X	
Indiana	X		X	
Iowa	X		X	
Kansas		X	X	
Kentucky	X			X
Louisiana	X		X	
Maine	X		X	
Maryland	X		X	
Massachusetts	X		X	
Michigan	X		X	
Minnesota	X		X	
Mississippi	X			X
Missouri	X		X	
Montana		X		X
Nebraska	X		X	
Nevada		X		X
New Hampshire		X	X	
New Jersey	X		X	
New Mexico		X	X	
New York	X		X	
North Carolina	X		X	
North Dakota		X	X	
Ohio	X			X
Oklahoma		X	X	
Oregon	X		X	
Pennsylvania	X			X
Rhode Island		X	X	
South Carolina	X			X
South Dakota		X		X
Tennessee	X		X	
Texas	X		X	
Utah		X	X	
Vermont	X		X	
Virginia	X			X
Washington	X		X	
West Virginia		X		X
Wisconsin	X		X	
Wyoming		X	X	
Total	**34**	**16**	**37**	**13**

Source: Verstegen and Jordan (2008). A Fifty State Survey of School Finance Policies and Programs. University of Nevada.

Appendix D. State Funding for Debt Service and Capital Outlay, 2007

State	Item In Funding Formula	Debt Service Grants	State Bond Guarantee	Equalized D/S Grants	Loan	Approved Project Grants	Equalized Project Grants
Alabama				X			
Alaska						X	
Arizona	X						
Arkansas		X					
California						X	
Colorado							
Connecticut							X
Delaware							X
Florida	X						
Georgia						X	
Hawaii						X	
Idaho							
Illinois							
Indiana							
Iowa							
Kansas						X	
Kentucky		X				X	
Louisiana							
Maine							X
Maryland						X	
Massachusetts				X		X	
Michigan							
Minnesota	X				X		X
Mississippi	X						
Missouri	X		X				
Montana							X
Nebraska							
Nevada							
New Hampshire							X
New Jersey				X			X
New Mexico							X
New York	X			X			X
North Carolina			X		X		
North Dakota							
Ohio						X	
Oklahoma							
Oregon	X						
Pennsylvania						X	
Rhode Island							X
South Carolina						X	
South Dakota							
Tennessee	X						
Texas	X		X	X			
Utah			X			X	
Vermont	X			X	X	X	
Virginia			X				
Washington							X
West Virginia							
Wisconsin	X						
Wyoming						X	
Total	**11**	**2**	**5**	**6**	**3**	**14**	**11**

Appendix E. State Funding for Transportation, 2007

State	In Funding Formula	Density Formula	Equalized Reimbursement	Full Cost Reimbursement	Allowable Reimbursement	Per Pupil
Alabama					X	
Alaska						X
Arizona		X				
Arkansas	X					
California					X	
Colorado		X				
Connecticut			X			
Delaware				X		
Florida	X					
Georgia					X	
Hawaii				X		
Idaho					X	
Illinois					X	
Indiana	X					
Iowa	X					
Kansas		X				
Kentucky		X				
Louisiana						
Maine		X				
Maryland					X	
Massachusetts				X		
Michigan	X					
Minnesota		X				
Mississippi		X				
Missouri					X	
Montana					X	
Nebraska				X		
Nevada					X	
New Hampshire	X					
New Jersey						X
New Mexico					X	
New York			X			
North Carolina					X	
North Dakota					X	
Ohio					X	
Oklahoma	X					
Oregon	X					
Pennsylvania					X	
Rhode Island						
South Carolina					X	
South Dakota	X					
Tennessee	X				X	
Texas		X				
Utah					X	
Vermont						X
Virginia		X				
Washington						X
West Virginia	X					
Wisconsin						X
Wyoming				X		
Total	**11**	**9**	**2**	**5**	**17**	**5**