

Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity

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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.

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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

¹Salary 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.

²Districts 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

³Districts 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

⁴These include the federal range ratio, the McLoone index, the coefficient of variation, the Gini coefficient, and others, as described by Berne and Stiefel (1984).

⁵The 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.

⁶Districts might add other student categories not reflected in Figure 1, including homeless or migrant education.

⁷The 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 =

$$(N_{\text{total}} \times PPE_{\text{non-categorical}}) + (N_{\text{sped}} \times PPE_{\text{sped}}) + (N_{\text{voc}} \times PPE_{\text{voc}}) + (N_{\text{pov}} \times PPE_{\text{pov}}) + (N_{\text{ESL}} \times PPE_{\text{ESL}}) + (N_{\text{gift}} \times PPE_{\text{gift}}) + (N_{\text{gl}} \times PPE_{\text{gl}})$$

N_{total} = total number of students in a school

$PPE_{\text{non-categorical}}$ = 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 ix 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.

⁸For 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.

⁹Large ranges are to be expected for special education where student needs dramatically vary.

Table 1
Staff-Based Allocation Details

	<i>Cincinnati Public Schools</i>		<i>Hudson Independent School District</i>	
	<i>Average Per-Pupil (Range)</i>	<i>Implicit Weight</i>	<i>Average Per-Pupil (Range)</i>	<i>Implicit Weight</i>
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

^aSpending 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.

¹⁰In 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
Students				
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.

^aFor the portion of student time spent in vocational education classes.

Table 3
Resource Reallocation: Year 1 Implementation of Student-Weighted Allocation

	<i>Average Change</i>	<i>Largest Resource Gain</i>	<i>Largest Resource Loss</i>
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

¹¹A 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%)

^aPercentage 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

¹²School 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.

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