Do Districts Using Weighted Student Funding Formulas Deliver More Dollars to Low-Income Students?

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Abstract

School districts have increasingly adopted weighted student funding (WSF) formulas that allocate dollars, rather than staff positions, to schools in the name of equity and flexibility. While research to date has studied equity in some of these districts, there is no research that examines the entire cohort of WSF districts together. This paper examines how equitably 20 WSF districts distribute dollars to their schools as measured against a cohort of 20 comparable districts that use a traditional, centralized staffing model. We find that while a majority of all 40 study districts drive more dollars to low-income students, low-income students in WSF districts are more likely than their peers in other districts to both receive additional dollars and to receive a greater share of district expenditures. We also find that WSF districts that have had their formula in place for longer are more equitable than recent adopters.

Keywords: weighted student funding, district funding formulas, low-income students, equity.

Do Weighted Student Funding Districts Deliver More Dollars to Low-Income Students?

After decades of attention on states to address inequities across districts, pressure is now shifting to districts to ensure they deliver resources equitably *across schools*. These pressures are likely to grow with the Every Student Succeeds Act (ESSA) requirement for states to publish data on school-by-school spending from fiscal year 2019 onward, revealing spending patterns within every public school district.[1] Meanwhile, the March 2021 American Rescue Plan included a first-of-its-kind "maintenance of equity" provision prohibiting districts from enacting spending cuts that disproportionately harm high-poverty schools (American Rescue Plan Act of 2021, 2021). The new attention to within-district equity raises questions about district allocation processes and whether different allocation strategies result in more (or less) equitable funding distributions across schools.

Across the United States, most public school districts allocate resources to schools based on a centralized staffing model. Under a centralized model, the school district takes in local, state, and federal funds and then makes allocations to schools in the form of staff, programs, and services. However, researchers have demonstrated that traditional, centralized staffing-based funding models can lead some districts to allocate fewer resources to disadvantaged students (Rose & Weston, 2013; Miles & Roza, 2006; Roza & Hill, 2004; Heuer & Stullich, 2011). For example, while poor and minority students on average receive slightly more per-pupil funding than non-poor and white students in the same district, 44% of districts provide more dollars to more advantaged students (Shores and Ejdemyr, 2017).

A growing number of school districts are adopting a decentralized approach to school

[1] These data, published on individual state websites, have been cleaned and aggregated in the NERD$ Database https://edunomicslab.org/nerds/.

budgeting called weighted student funding (WSF) (Roza et al., 2020).[2] Under WSF, the district collects revenue from the same local, state, and federal sources, but then directs *money* to schools — not staff, programs, or services — for principals to use at their discretion. In general, school leaders in WSF districts have some discretion in the number and type of staff they hire with the dollars they receive, barring class-size prescriptions and other requirements. WSF models typically start with a base dollar amount per pupil and then add weights for student characteristics, such as students who are English learners, students in specific grade levels, or students from families living in poverty (Ladd, 2008; Miles & Roza, 2006; Petko, 2005). While districts implement WSF for a variety of reasons, including increased flexibility and transparency, districts most frequently cited equity as a key rationale in adopting WSF (Roza et al., 2020)

A total of more than 5 million students now attend school in a district that uses a WSF model to allocate at least part of its spending (Roza et al., 2020). However, limited research has been done about the effects of WSF on how money is allocated within districts, how different funding models affect school staffing decisions, and, ultimately, how those decisions affect student outcomes. This study aims to look at one particular question: Do districts utilizing WSF models allocate dollars more equitably than districts that are relying on more centralized staffing-based allocation models?

In our analysis, we find strong evidence that within WSF districts, low-income students receive more dollars per pupil than their peers. We also find promising evidence that WSF districts are slightly more progressive than comparison districts. That said, this analysis also

[2] School districts and states use 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." For the purposes of this paper, we refer to all of these as WSF models.

suggests that WSF is not the *only* way districts can allocate resources progressively.[3] We find that across WSF and comparison districts alike, low-income students generally received more funding than their peers. Additionally, we find evidence that districts that have been using a WSF formula for longer are more progressive than more recent adopters. While not definitive, it suggests that district leaders may be using WSF formulas as one way to allocate more resources to low-income students.

Background

Despite the use of a WSF model by some of the country's largest districts - including New York City, Houston, and Chicago – most current research into WSF has focused on narrow questions for a small number of districts (Roza et al., 2020). In fact, we found no prior study on spending, budget, or equity in WSF districts covering more than 10 districts, and nearly all research covered just one or two districts. In contrast, this study includes *all* WSF districts that met our criteria (see below) as of the 2018-2019 fiscal year. In addition, by focusing on dollars spent, we encompass all types of resources, including labor costs, that a district uses money to purchase. For the purposes of this study, we use "equitable" to mean that low-income students attend schools receiving more dollars per-pupil on average than their peers in the same district.

Better understanding WSF effects on resource allocation patterns is critical as researchers and practitioners alike grapple with effective ways to use resources. A wide body of research has spotlighted inequities that emerge when lower-income and minority students are taught by less experienced and thus lower-paid teachers. In some locales, these gaps have persisted for decades (Goldhaber et. al., 2019). These teacher quality gaps are common in staffing-based funding

[3] Throughout this paper, we use "resources" to mean dollars specifically. While we measure equity in terms of dollars, those dollars ultimately buy a school's resources: teachers, other staff, curricular materials, etc.

models, which allocate teacher counts to schools without regard to their experience or pay. A low-income school might receive the same *number* of teachers with the same staffing ratios as higher-income schools within the same district. And yet, the actual spending patterns can vary widely. These salary-driven inequities can exist in WSF districts too when the district uses average salaries (instead of real salaries) for the purposes of school apportionment (Miles and Roza, 2006).

Another type of inequity can result from uneven staffing or programs (such as magnet schools, advanced course offerings, or special education services) or other factors outside of salary differences. It is often these kinds of spending inequities that motivate district leaders to shift to WSF models (Ladd, 2008; Miles & Roza, 2006; Roza et al., 2020). In a recent study, 89% of WSF district leaders identified improved equity as a key motivation for WSF implementation (Roza et al., 2020), with "improved equity" represented by the redistribution of resources to the students most in need.

While much of the school finance literature focuses on inter-district spending inequities, evidence suggests that cross-district gaps may be closing over time (Lafortune et. al., 2018). Moreover, research suggests that *intra*-district spending inequities are at least as large as cross-district spending gaps (Shores & Ejdemyr, 2017). Other researchers have found that district-level processes may be the reason that, systemically, fewer dollars are spent on low-income students (Carr, Gray, & Holley, 2007; Rubenstein, Schwartz, & Stiefel, 2006).

Given the above, it's perhaps unsurprising that studies of individual WSF districts report mixed findings. Several studies offer examples of individual WSF systems resulting in uneven spending equity or otherwise falling short on spending equity. (Baker, 2009; Malen et al., 2017; Chambers et al, 2010; U.S Department of Education, 2019). On the other hand, other researchers

have found that WSF systems can distribute resources equitably to schools and better link dollars to student need, effectively driving more resources to the neediest students (Cooper et al., 2006, p. 13; Miles and Roza, 2006; Levin et al., 2013). In other words, existing research suggests the WSF model can support equitable distribution of dollars, but it does not *guarantee* resource equity.

This study significantly advances the current WSF literature in both scope and methodology. In terms of scope, prior research has typically examined one or two WSF districts as case studies: Our literature review surfaced no study that has systematically examined equity across all WSF districts. By analyzing all current WSF districts in the United States of which we are aware,[4] this study provides an unprecedented snapshot of WSF as a whole, allowing comparisons that cannot be extrapolated from the results of more limited or single-district studies.

In terms of methodology, while many previous WSF studies rely on district-level budget data based on average teacher salaries, we use school-by-school expenditure data reflecting actual salaries, which is now available to the public for the first time. Expenditure data let us see at which school dollars actually landed. This is in contrast to budget data, which assign the same salary to all teachers regardless of whether they are paid more or less than the district average. For that reason, budget figures can mask uneven school-level spending, with more experienced, higher-paid teachers tending to congregate in lower-need schools, taking a disproportionate share of local and state monies with them (Rose & Weston, 2013; Miles & Roza, 2006; Roza et al., 2004). As such, studies that use budget data and average salaries ignore one of the biggest drivers of school-level spending differences–given that labor constitutes some 80 percent of K-

[4] Districts operating WSF as of the 2018-19 school year.

12 school spending–and may therefore understate the equity impact of WSF (Hussar et al., 2020). Fortunately, we were able to take advantage of newly available school-by-school spending data that allows a closer look at within-district budget allocations than were possible previously. As part of the 2015 Every Student Succeeds Act, states are required to collect and report comparable school-by-school expenditure data. These data must encompass both personnel (with their actual salaries) and non-personnel spending, as well as a breakout of expenditure by source (federal and state/local funds). States were required to first publish this data on their 2018-19 report cards and must continue to report them annually.

We use this data to analyze the school-by-school spending data to compare within-district spending patterns among WSF districts and a matched set of non-WSF peer districts. As explained in further detail in the methods section, we chose to focus on within-state comparisons for a few key reasons.

For this study, a *progressive* (more equitable) district means that low-income students on average attend schools receiving more dollars per pupil than all other students in the district. Conversely, a *regressive* (less equitable) district means low-income students on average attend schools receiving fewer dollars per pupil than other students.

This study does have limitations. Although we are interested in the question of whether WSF facilitates equitable spending patterns, due to the lack of comparable historical school-by-school spending data, we cannot systematically examine changes before and after all WSF districts implemented their funding models. That is, we can look at *when* districts adopted their WSF formulas, but we cannot measure or control for other shifts that occur in the lead up to or after its adoption. Additionally, we cannot account for all other policy changes in these districts that could potentially impact spending and equity. As such, the results should not be interpreted

as proving causality between using a WSF formula and increased likelihood of a progressive distribution of resources to schools and students. Rather, this study offers a snapshot of the equity landscape in WSF districts compared with similar non-WSF districts in the 2018-19 school year.

Prior research suggests implementation factors and details vary in terms of how district WSF formulas distribute resources to schools and students (Reason Foundation, 2019). Districts' political, budgetary, academic and other contexts vary widely, as do their formula details, including what share of the total district funds are funneled through the WSF formula. For example, Roza et al. (2020) finds that most WSF districts allocate between 30 and 50 percent of their total district funds through their formula, leaving the majority of funds flowing through more staffing- or program-based allocations, or centrally-managed services (like transportation, custodial, and food services). This means that a substantial share of district funds, even among districts we classify as "WSF districts," continue to flow through other mechanisms outside the weighted-student formula. While the WSF formulas may flow progressively within a district, it is possible that other types of spending do not, which could affect our overall results.

This study also provides a framework to analyze intra-district spending patterns using the now publicly-available ESSA school-by-school per-pupil expenditure data. We intentionally used a straightforward, accessible method to evaluate equity that district and state leaders, advocacy groups, and other stakeholders can use to measure the equitable distribution of funding in their communities. These calculations can help inform the public, local and state policymakers, and districts that are currently implementing or considering WSF formulas.

Research Questions

We examine whether low-income students in WSF districts receive more money per

student than all other students in the district. We then examine if low-income students are more likely to have increased per-student resources in WSF districts or in comparison districts.

The analysis is guided by the following three main research questions:

1. Among WSF districts, how does per-pupil spending compare among schools serving low-income versus other students?
2. Are WSF districts more or less progressive than similar comparison districts?
3. Among WSF districts, how does within-district spending equity change over time?

Data Sample and Methods

To narrow our study to WSF districts, we started with earlier work (Roza et al., 2020) to identify all U.S. districts using WSF as of 2017. They began with an extensive 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 as utilizing WSF (Koteskey & Snell, 2017; Koteskey, 2016). We then surfaced an additional two districts that began using WSF in fiscal year 2019 (Barnard, 2019). Next, we drew on work from Roza (2020) and Ladd (2008) to identify key criteria for defining the list of WSF districts for the purposes of this study:

> "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." (Roza, 2020, p. 8).

We identified 20 districts that met these two criteria as of the 2018-19 school year.[5] While we cannot guarantee these are the only districts using WSF, these 20 represent all districts that

[5] Although Hawaii met our two criteria, we excluded it given that it is a state operating a single school district. We also excluded Springfield Empowerment Zone since it is a group of schools within a district, not a district itself.

surfaced in our literature review that met our criteria. Table 1 below lists those districts and the year in which they adopted a WSF model.

Table 1

20 Districts Met Our Criteria for a WSF Model in 2018-2019

District	Year adopted WSF
Atlanta Public Schools (Atlanta, GA)	2018
Baltimore City Public Schools (Baltimore, MD)	2008
Boston Public Schools (Boston, MA)	2011
Chicago Public Schools (Chicago, IL)	2013
Cleveland Metropolitan School District (Cleveland, OH)	2014
Denver Public Schools (Denver, CO)	2007
Douglas County School District (Castle Rock, CO)	2008
Houston Independent School District (Houston, TX)	2000
Indianapolis Public Schools (Indianapolis, IN)	2017
Jefferson County Public Schools (Golden, CO)	2015
Metro Nashville Public Schools (Nashville, TN)	2015
Milwaukee Public Schools (Milwaukee WI)	2001
New York City Department of Education (New York City, NY)	2007
Newark Public Schools (Newark, NJ)	2011
Norwalk Public Schools (Norwalk, CT)	2016
Orleans Parish (New Orleans, LA)	2017
Poudre School District (Fort Collins, CO)	2007
Prince George's County Public Schools (Upper Marlboro, MD)	2012
San Francisco Unified School District (San Francisco, CA)	2002
Shelby County Public Schools (Memphis, TN)	2018

We focused on elementary and middle schools with a highest grade of 9th grade or lower. To ignore outliers, we excluded a school if its per-pupil spending figure was less than half or more than double the district's overall weighted average.[6]

To determine how much districts spent, we use current expenditures at the district and school level to focus on monies directly under district control,[7] and we focused on expenditures of state and local funds at the school site. We excluded federal dollars since those are tied to federal formulas and often earmarked for spending on particular populations, and therefore outside of the district's control. Where possible, we also excluded any central office expenditures not tied to any funding allocation model.[8] Central office expenditures include central office staff salaries, and can also include transportation costs, special education or counseling services, and other dollars that are not tied directly to specific schools.

We followed the "low-income" definition that states chose to report, such as eligibility for federal free-and reduced-price school meals (FRL) or direct certification, a process in which a student can be automatically certified to receive free-and reduced-price school meals if his or her family participates in another public benefit program. A school with a 70 percent FRL population may not be socioeconomically identical to a school in another state where 70 percent

[6] Our goal was to include as many schools as possible, but to exclude schools where spending was exceptionally high or low, possibly related to data integrity issues or spending tied to factors beyond the district's allocation methodologies. These rules allowed us to capture all elementary and middle schools for 20 of the 40 total districts. For the other 20 districts, we excluded 0.1 to 5.3% of schools. Excluded schools were often magnet schools, charter schools, or alternative schools, which may not always use the same allocation or expenditure reporting processes as other schools.

[7] States vary in what they include in their per-pupil calculation, but current expenditures exclude expenditures on long-term projects or spending not directly related to annual current operating expenses for K-12 or PK-12 students, including debt service, capital projects, community service funds, and adult education.

[8] We were unable to subtract out central office expenditures from the New Jersey data, which affected both the WSF district in that state as well as its matched control district.

of students are directly certified, but our main analysis used the same definition for both WSF and our within-state control districts. Additionally, our analysis was comparing *within-district* spending to determine whether districts allocated more money to the most and least disadvantaged students regardless of the poverty metric used.

To compare spending at schools attended by the average low-income student in a district to spending at those attended by the average *non*-low-income student in that same district, we adapted a progressivity measure popularized in a 2017 study by Matthew Chingos and Kristin Blagg.[9] Whereas Chingos and Blagg made comparisons among districts within *states*, we applied the same methodology to analyze funding equity among schools within *districts*. Specifically, to calculate "progressivity," we assign each school's spending level to all the students in the school. Then for each district, we compute the average spending for low-income students and compare it to the average for all other students. If a district then has a progressivity of $200, that would imply that, on average, low-income students attended schools that were allocated $200 more per-student than the average spent on schools attended by other students.

This progressivity measure allows a student-level analysis that would not otherwise be possible, enabling understanding of the resources experienced by the average low-income student in a district. We chose this method over others because it measures expenditures at the student level within a district, and it is able to account for variations across schools.[10] This method also produces both a categorical determination (is the district's spending progressive or regressive?) and quantifies the direction of the results (by how much is the district progressive or regressive?). To explore differences in resource equity between districts that do and do not have

[9] Chingos, M. & Blagg, K. (2017, May). Do Poor Kids Get Their Fair Share of School Funding? Urban Institute. https://www.urban.org/sites/default/files/publication/90586/school_funding_brief_1.pdf

[10] Rather than the McLoone Index, the coefficient of variation, or other measures.

a WSF allocation model, we created an in-state comparison group of 20 districts similar to our WSF districts in terms of size (total enrollment), per-pupil spending, demographics, and geography, as illustrated in Table 2. All 20 comparison districts distribute resources using a traditional centralized funding approach. We compared districts using NCES Common Core of Data, Census Bureau district finance data, Small Area Income and Poverty Estimates (SAIPE), and district and state education department websites.

Table 2 illustrates the median characteristics of the WSF and comparison districts. The cohorts are closely matched on student poverty rates, community poverty rates, racial/ ethnic demographics, total per-pupil spending, and urbanicity. However, WSF districts tended to be some of the largest urban districts within a state, so using in-state comparisons meant that we were often necessarily selecting smaller districts for the matching cohort. For example, one of the WSF districts is the nation's largest school system, the 1.1 million-student New York City Department of Education. But, since our analysis was focused on within-district equity, we balanced selecting districts with comparable student and community demographics along with similar per-pupil spending levels.

Table 2

WSF Districts Versus Comparison Districts on Key Characteristics

Six comparison characteristics for district-level matching	WSF districts	Comparison districts
% Economically disadvantaged[a]	65%	60%
Small Area Income Poverty Estimates (SAIPE)	24%	19%
% Historically Underserved Students of Color (HUSC)	76%	60%

Enrollment	71,511	37,781
Per-pupil expenditure	$13,718	$13,369
Urbanicity - Census-defined urbanicity category	City: Large (15); City: Midsize (1); City: Small (1); Suburb: Large (3) Suburb: Small (0)	City: Large (6); City: Midsize (5); City: Small (3); Suburb: Large (5); Suburb: Small (1)

Note. Numerical categories reflect the median of the respective groups. The urbanicity measure contains a complete list of how many districts fall into each category represented in each cohort.

[a] States use different measures of economic disadvantage, including the number of students who qualify for free or reduced-price lunch, students directly certified, and other such metrics.

We considered going outside of state borders to build the comparison group, but ultimately chose in-state comparisons for several reasons. Many of the next-largest non-WSF districts classified as "City: Large" by NCES were county-level districts disproportionately clustered in a few states with different school configurations than other cities. When we sought other seemingly relevant comparisons, we found that some of the districts on the list had once used WSF formulas but since discontinued their use or were in the process of transitioning to a WSF. We also found that out-of-state comparisons were complicated by state policies and data quality issues. One, state funding formulas vary in terms of both how much the state provides as well as how the funds are distributed across schools and districts. Two, states have different policies and prescriptions for spending, including class size policies, staffing prescriptions, salary and benefits rules that can complicate comparisons across states. Three, even though all states are required to report school-by-school spending data, and many do so in similar ways, they often include or exclude different categories of funds that make cross-state comparisons difficult. And four, states report varying definitions for "low-income" students, and we relied on each

state's definition.

While we did not have sufficient data to offer a true longitudinal analysis, we conducted two sub-analyses to determine if WSF districts became more or less progressive over time. First, we bucketed the WSF districts based on when they adopted their WSF model. We categorized states as "recent WSF adopters" if they began using their WSF formula in our last three years of data (school year 2015-16 through 2017-18), "medium-term WSF adopters" if the district adopted its WSF formula in the last 4-9 years (school year 2008-2009 through 2014-15), and "long-term WSF adopters" if the district first implemented its WSF formula 10 or more years ago (school year 2007-08 or earlier). Additionally, we were able to find comparable longitudinal data for three WSF districts that allowed us to examine whether those districts have become more or less progressive over time. We present the findings of these analyses below.

Results

Looking at resource equity within the full population of WSF districts, we find that 18 of the 20 WSF districts (90%) drive more dollars per pupil to schools attended by the average low-income student. As shown in Table 3, the WSF districts spend an average of $336 (3.9%) more per pupil at schools attended by the average low-income student. The most progressive WSF district, Denver, spends $1,485 (19.6%) more per pupil on these students; the most regressive WSF district, Orleans Parish, spends $593 (5.6%) less.

Table 3

On Average, WSF Districts Are Slightly More Progressive than Comparison Districts

	% of districts that allocate resources progressively	Average progressivity (%)	Average progressivity ($)	Range of progressivity (%)	Range of progressivity ($)

WSF districts	90% (18 of 20)	3.9%	$336	-5.6% to 19.6%	-$593 to $1,485
Comparison districts	85% (17 of 20)	2.3%	$207	-1.4% to 5.8%	-$94 to $572

Looking at resource equity among within-state comparison districts, we find that 17 out of 20 (85 percent) comparison districts spend more per pupil for low-income students. On average across the entire cohort, the non-WSF districts spend $207 (2.3%) more on their low-income students as compared to all other students. (See Appendix Table A1 for the results of all 20 WSF districts and the 20 comparison districts.)

Turning to our analyses of how district spending equity might change over time, we find that districts that have been using WSF longer are more progressive. As Table 4 shows, recent adopters are the least progressive among all WSF districts. In fact, the only two WSF districts that are regressive are those that have begun using a WSF formula within the last three years. In contrast, all other WSF districts are progressive, and the long-term WSF districts are the most progressive group. This could be suggestive evidence that WSF districts become more progressive over time, although we cannot definitively assume the progress is due to the duration that the district has used WSF.

Table 4

Long-Term WSF Districts Are More Progressive than More Recent Adopters

WSF Districts, By Time Since Adopted			
	# of districts	**Average progressivity ($)**	**Average progressivity (%)**

Recent WSF adopters	5	-$41	0.1%
Medium-term WSF adopters	7	$338	3.2%
Long-term WSF adopters	8	$546	6.4%

In addition, we received historical expenditure data directly from three districts. These data are necessarily more limited, but they did allow us to examine how progressive these districts were around the time of WSF implementation and after. The 2018-2019 school year marks 1-3 years post-adoption for the recent adopter, Indianapolis Public Schools, 4-10 years post-adoption for the mid-range implementer, Metro Nashville Public Schools; and 10-plus years post-adoption for the veteran WSF user, Denver.[11] In the year of WSF adoption and subsequent two years after, the recent adopter, Indianapolis Public Schools, became more equitable in driving a greater share of per-pupil dollars to low-income students. That said, Indianapolis was already becoming steadily more equitable by this metric, although still regressive overall, in the two years prior to adoption (the years where data were available for us to analyze). The district became progressive two years after implementation (school year 2018-19). The mid-range WSF user, Metro Nashville Public Schools, also became more equitable each year, increasingly spending more per-pupil on low-income students than it did on other students, although that was not true in our last year of data, 2018-19.

The veteran WSF district, Denver Public Schools, has seen large equity gains from the

[11] Given the general unavailability of school-level expenditure data for prior years, we narrowed our analysis to three districts with varying years of implementation that did have data available. Due to differences in calculation methods and included expenditures, financial data from earlier years may not be directly comparable to school year 2018-19 data.

year before it implemented WSF.[12] The year prior to adopting WSF, Denver spent about $50 more on its low-income students than other students. In school year 2018-19, over a decade after adopting its WSF formula, Denver is now allocating over $1,400 more to low-income students than it is to all other students.

Discussion

Do at-risk students in districts that currently allocate dollars under a WSF model receive more funding than their peers in the same district? Our findings suggest the answer is yes. Do districts currently using an iteration of this decentralized school funding method distribute dollars *more* equitably on average than districts using traditional, centralized staff-based allocation models? That picture is more nuanced, but our findings suggest that this answer is also yes: WSF districts do appear slightly more progressive than comparison districts with traditional budgeting models.

It's noteworthy that the findings show that most of the districts in our study did distribute their combined state and local dollars in a way that was considered progressive: Across all 40 districts included in this study, 35 spent more on low-income students as compared to all other students. While these districts are hardly representative of all districts, our findings challenge the popular narrative that districts systematically give disadvantaged students less than their peers[13] (Martin, 2016; Sargrad, 2016).

Our findings highlight the importance of including all dollars districts allocate to schools and analyzing actual expenditures rather than budget numbers. Simply examining the weights in the WSF student formula does not necessarily predict which students will actually receive

[12] Reliable data were not available for all years between implementation in 2006-07 and 2018-19.
[13] Although, importantly, this study does not address adequacy, or the question of how much more is enough.

additional resources, or how much. For example, while progressive, the magnitudes of the spending differences were typically quite small ($336 per pupil for WSF districts, and $207 for centralized staffing-based districts) relative to a total average spending of roughly $13,000 per pupil. Given the scale of the differences, many will argue that districts could or should do more to ensure that funding is deployed to properly meet the needs for low-income students. To put the dollar differences in perspective, spending $336 more per pupil means that, for an average school that enrolled 500 students, a school with all low-income students would receive $168,000 more than a school of the same size with zero low-income students. Roughly speaking, that might translate to two additional full-time staff members for the low-income school.

Overall, our findings suggest the importance of a long-term commitment to equitable spending, and WSF formulas may be one tool to accomplish that. Comparing WSF districts by when they first adopted a WSF formula, more recent adopters were on average less progressive in allocating their dollars than other WSF districts. The *most* progressive WSF districts were long-term WSF users that have been allocating student-based budgets to schools consistently for 10 years or more. While our analyses cannot account for other changes in the districts during these years, our examination of three districts representing different stages of WSF implementation offers preliminary but promising evidence that switching from a traditional, centralized staffing-based allocation model to a decentralized, WSF allocation model may potentially allow for both immediate gains in progressivity as well as long-term increases over time. This is an area for further study when longitudinal data is available for more districts.

It's possible, and even likely, that districts are intentionally shaping their WSF formulas over time to improve resource equity. Given that equity concerns are the top reason districts adopt WSF in the first place (Roza et al., 2020), it is possible these districts adopted the WSF

allocation strategy precisely to combat stubborn pre-existing resource equity issues. As these WSF districts hone their formula, or if they allocate a higher share of their expenditures through the weighted formula, their spending patterns may become even more progressive. WSF may offer a relatively expedient—and therefore practical—way to promote the equitable allocation of resources. In the absence of a WSF formula, districts seeking to target resources to low-income students face options such as redirecting program dollars or rejiggering staffing formulas. These could prove politically challenging as constituents of current programs and staffing patterns resist efforts at redistribution.

While this study is focused on the equitable distribution of financial resources, WSF systems are also implemented to give the leaders closest to the students, namely principals, more flexibility and autonomy in choosing how to spend their funds on behalf of those students. Of course, these mechanisms are in service of a larger goal--to improve student outcomes--and continued research is needed to shed light on the relationships between district decisions, funding allocations for schools, the equitable distribution of resources, and the resulting student outcomes.

Perhaps most importantly, this paper establishes a new approach to investigating equity at the district level. Because each district has a different makeup of poverty across schools, this analysis applies a methodology not used before at the unit of the school to investigate and compare intra-district equity with the use of the progressivity analysis. It's a method that districts and state leaders, advocacy groups, and others can apply in any district with uneven poverty enrollments across schools. The newly available ESSA financial transparency data will undoubtedly raise interest in how well districts are doing when it comes to directing a disproportionate share of dollars to higher needs schools. The methodology we use in this paper

could help district leaders begin to explore their newly emerging school-by-school financial data.

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Appendix

Table A1: Full results of progressivity analyses, WSF districts and matched comparison districts

WSF district	Progressivity ($)	Progressivity (%)	Comparison district	Progressivity ($)	Progressivity (%)
Atlanta Public Schools	$400	3.6%	Savannah-Chatham County Public School System	$67	0.8%
Baltimore City Public Schools	$211	1.8%	Wicomico County Public Schools	$154	1.2%
Boston Public Schools	$196	1.9%	Worcester Public Schools	$82	1.3%
Chicago Public Schools	$491	6.3%	SD U-46 (Elgin)	-$83	-1.1%
Cleveland Metropolitan School District	$262	2.2%	Columbus City Schools	$194	1.5%
Denver Public Schools	$1,485	19.6%	Aurora Public Schools	$405	5.8%
Douglas County School District	$217	2.7%	Adams 12 Five Star Schools	$334	4.5%
Houston Independent School District	$384	6.6%	Dallas Independent School District	$49	0.7%
Indianapolis Public Schools	$93	1.4%	Fort Wayne Community Schools	$119	2.1%
Jefferson County School District	$254	3.6%	Cherry Creek School District	$396	4.5%
Milwaukee School District	$377	4.6%	Madison Metropolitan School District	$568	5.5%
Metro Nashville Public Schools	$101	1.4%	Hamilton County Schools	$156	2.5%
Newark Public School District	$818	5.30%	Elizabeth School District	$191	1.70%
Norwalk School District	-$296	-2.1%	Danbury Public Schools	-$89	-1.1%
New York City Department of Education	$1,186	8.2%	Buffalo Public Schools	$572	5.6%

Orleans Parish School Board	-$593	-5.6%	East Baton Rouge Parish School System	$369	3.7%
Poudre School District	$430	6.1%	St. Vrain Valley Schools	$279	4.3%
Prince George's County Public Schools	$245	1.9%	Baltimore County Public Schools	$371	3.1%
San Francisco Unified School District	$278	4.8%	San Bernardino City Unified School District	-$167	-2.5%
Shelby County Schools	$191	3.2%	Jackson-Madison County School District	$92	1.7%