CENTER ON EDUCATION DATA AND POLICY

RESEARCH REPORT

Measuring Differences in School-Level Spending for Various Student Groups

Kristin Blagg
URBAN INSTITUTE

Julien Lafortune
PUBLIC POLICY INSTITUTE OF CALIFORNIA

Tomás Monarrez
URBAN INSTITUTE

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Executive Summary

Understanding how school districts allocate their limited funding and resources across schools is important for designing efficacious and equitable school finance policies. Newly released data on public school spending enables new insights about the level of educational funding a student experiences at school and how spending correlates with student characteristics. We use school-based expenditure data from Georgetown University's Edunomics Lab (National Education Resource Database on Schools, or NERD$, data)—linked with US Department of Education information on school-level race and ethnicity, free and reduced-price lunch (FRPL), and direct certification data—to provide a descriptive analysis of the relationship between spending progressivity and stratification by race and ethnicity and by economic background.

Although state and district funding allocations do not directly rely on a student's race or ethnicity, choices about funding allocations can disproportionately affect students of color, particularly in highly stratified school districts. Documenting these within-state and within-district funding patterns can answer key questions about school finance equity, such as whether there are states or districts that spend less on Black students than they do on white students.

We show that districts' ability to allocate funding for different groups depends on the underlying distribution of students within the district.[1] Our results indicate a trade-off between school- and district-level integration and targeted dollars for certain groups of students via school-level allocations. A perfectly integrated school district cannot be progressive in allocating funding across schools, while a highly stratified district can appear strongly "regressive" or "progressive" if it allocates even small amounts of funding for a given group.

In most states, Black students tend to experience higher school-level spending, on average, than white students. But in seven states, average school spending in large districts (i.e., those with 10 or more schools) is higher for white students than for Black students. Decomposition results show that policies to enact within-district resource targeting would have varying impacts across states: in some states, differences in spending between Black and white students is attributable to between-district factors, while in others, it is attributable to within-district allocations. Federal dollars also play an important role, increasing spending for Black students within nearly every state. Absent federal dollars, eight states that currently allocate more average funding for Black students would no longer do so.

Our results show that accurate measures of resource equity using school-level spending data should account for the fact that more stratified districts can more effectively allocate dollars to students with more need, by directing dollars to public schools educating large shares of high-need students. This logic suggests that policymakers should embrace an approach that views diversity and increased funding as powerful tools to be used in combination. Policymakers can “double down” on educational equity by addressing both within-district and across-district stratification and by expanding funding for schools and districts that have larger shares of students with need. In highly integrated school districts, policymakers may want to further probe the provision of supplemental instruction or services for students with additional needs within schools to ensure all students in a school receive an equitable education.

Differences in School-Level Spending

As racial stratification continues to be widespread in US public education, policymakers increasingly call for policies that decrease the educational inequalities that Black and Hispanic students experience. Stratification into disparate schools and districts raises long-standing concerns about equity in school funding. The extent to which students of different racial, ethnic, or socioeconomic backgrounds receive different levels of funding is central to policy efforts to address differences in educational outcomes.

At the national level, research finds that Black, Latino, and low-income students receive less K–12 spending (Shores, Lee, and Williams 2021). This is largely because of differences in funding levels across states; when computed across districts within the same state, total school district funding is generally progressive or equal (Chingos and Blagg 2017; Shores, Lee, and Williams 2021). There are notable differences across states in the extent of this progressivity. Furthermore, districts need not spend equally across school sites in the same district. Educators at schools with high poverty rates tend to have less seniority and are therefore paid less than those teaching at schools with lower poverty rates who have more seniority within the same district (Lafortune 2019; Levin et al. 2019; Roza et al. 2004). And yet, spending is typically higher at schools with more low-income or nonwhite children within a district (Shores, Lee, and Williams 2021).

These complicated findings can muddle policymakers' efforts to identify inequities in school funding and craft policies to improve funding equity. In this report, we attempt to clarify these questions of resource equity in K–12 school funding. We investigate how student stratification across and within districts affects estimates of resource equity and why it must also be considered when crafting policies to more progressively fund schools. We use new federal site-level spending data to decompose school spending across and within school districts. We seek to answer the following questions:

1. How does racial and socioeconomic stratification relate to the measurement of average spending experienced by historically disadvantaged groups of students within school districts?
2. By state, how much do between- and within-district spending allocations affect overall levels of progressivity for historically disadvantaged groups?
3. How much of observed levels of progressivity for certain groups is produced by federal support, such as the Title I program?

Existing Research on Funding Equity

Although funding for schools has historically come from local property taxes, state and federal dollars now play a substantial role in funding schools and districts, especially as school districts consolidated over the latter half of the 20th century (Kenny and Schmidt 1994; Cornman et al. 2020). State-level equity-focused reforms also increased the role of state funding across much of the country. Beginning with *Serrano v. Priest* (1972) in California, there have been dozens of successful judicial challenges to state school finance systems motivated by inequities driven by differences in local wealth and the reliance on property taxes to fund schools. These reforms reduced spending inequality across districts within states, often by directing additional state funds to districts with less property wealth or other means to provide local funding for schools.

In general, these reforms reduced spending gaps by district income within states, reducing disparities in academic performance, graduation, and adult economic outcomes (Candelaria and Shores 2019; Jackson, Johnson, and Persico 2016; Lafortune, Rothstein, and Schanzenbach 2018). But as state funding was often targeted based on district-level characteristics, such as property wealth, and not student-level family income, need, or race, these reforms did little to affect differences in funding or achievement, on average, between students of different income levels, races, or ethnicities. These reforms did affect differences across districts by average family income or property wealth (Lafortune, Rothstein, and Schanzenbach 2018). Furthermore, evidence from some states shows that additional state funding was sometimes disproportionately targeted to the more affluent schools within a district (Hyman 2017). In other words, the ability of statewide school finance reforms to affect funding differences between specific student groups may be limited by which districts are targeted and by how districts target additional funding across school sites within their district.[2]

Today, a significant portion of nonlocal education funding equalizes or supplements funding for districts with less property wealth and to increase funding for districts that serve high shares of students with specific needs (e.g., students living in poverty, English language learners, or students with special education needs, either through student-centered weights or through program-centered funding). Districts then allocate funding to individual schools. Because most funding data are reported at the district level (and because states deliver funds to districts, not to individual schools), previous research on funding equity has largely focused on documenting differences between districts. But districts vary in size, making cross-state comparisons of equity difficult (Chingos and Blagg 2017). For example, Texas has more than 1,000 school districts, but Nevada has only 17. Some states, like those in New England and the Midwest, tend to have smaller town- or city-based districts. Southern states, and some states in the West, are more likely to have large county-based districts. These size differences can make it difficult to assess equity, as smaller districts are more likely to have substantial differences in student populations (i.e., caused by underlying residential stratification and sorting) relative to larger ones. As a result, states with more heterogeneity across districts (typically, those with smaller districts) tend to be measured as more progressive or less progressive, relative to states with more homogenous districts.[3]

Patterns in School Funding and School Stratification

To fully understand whether funding is equitable—and the extent to which federal funding, state funding, and district practices lead to more progressive allocations of funding across student groups—we need to understand how funding flows to school districts from the state and to schools within districts. On average, students from households earning below the federal poverty level and students of color receive 1 to 2 percent more school-level per pupil funding than their counterparts in the same district (Shores and Ejdemyr 2017). But some within-district differences exist; researchers find that about a third of districts do tend to underallocate funding to these students (Shores and Ejdemyr 2017). Further, districts serving high shares of low-income students are more likely to have inexperienced teachers and lower-quality school facilities (Lane, Linden, and Stange 2018).

When looking at the allocation of funding to low-income students and students of color, we must also engage with the way families sort themselves across school catchment areas and district boundaries. Barriers such as housing prices (Gibbons, Machin, and Silva 2013; Kane, Riegg, and Staiger 2006), fueled by policy decisions that strategically excluded and redlined communities of color (Aaronson, Hartley, and Mazumder 2020), and district borders create residential segregation that is replicated in school student populations.[4] Moreover, evidence suggests that parents choose schools based on the peers their children will be exposed to, more so than on school effectiveness (Abdulkadiroğlu et al. 2020, Rothstein 2006). This literature establishes that school stratification is driven by multiple mechanisms, encompassing aspects of the housing market, local education agency policies, and parents' preferences and beliefs about public education.

Data and Empirical Framework

Our analysis relies on newly available data on public school expenditures for individual schools, which were collected by state educational agencies and compiled by both the US Department of Education and by Georgetown's NERD$ data project. For this study, we use the cleaned data produced by the

NERD$ data project. School-level funding data have previously been collected and reported only by certain states, and previous national data on school-level resources have not been fully public or have been incomplete. For example, average teacher salary data by school (a proxy for funding level) is collected as part of the Office of Civil Rights Data Collection. And the American Recovery and Reinvestment Act of 2009 required Title I districts to report school-level per pupil expenditures for the 2008–09 school year, but school-level data were not released publicly (Heuer and Stullich 2011).

Previous research indicates that school-level expenditures vary within a given district. Within districts, more dollars are allocated for schools that serve more students of color and students from low-income households, though the magnitude of this progressivity is small, and schools with greater need may be more likely to have less experienced teachers and staff members (Ajwad 2006; Heuer and Stullich 2011; Knight 2016; Rubenstein et al. 2007).[5]

Before school-level data became widely available, disaggregated national data on school spending were available only at the district level. District-level data limit our ability to examine how spending varies by student race, ethnicity, and socioeconomic status because different school sites may see higher or lower levels of spending within the same district.

The primary advantage of school-level spending data is that they allow us to examine spending flows within districts. Many districts are stratified by race and ethnicity across school sites (Frankenberg 2013; Richards 2014),[6] and resource equity therefore depends crucially on how districts spend across their school sites. Furthermore, these new data allow us to understand the determinants of school spending progressivity in greater detail: we can understand how different funding allocations (i.e., state, local, or federal) and funding decisions (i.e., within or across districts) separately affect progressivity for certain groups.

Importantly, the school-level spending data are not a panacea for understanding or fully characterizing student access to funding. Because of reporting and structural differences across states, these school-level data may not be fully comparable.[7] States have not only different size districts but different grade formats (e.g., a preference for dividing schools into elementary and middle schools versus a K–8 configuration). And some states may enroll more students in vocational or technical high schools, or alternative high schools, which may have different funding requirements than traditional high schools. We therefore focus on within-state rather than across-state comparisons.

Further, the designation of dollars to specific school sites is complicated when there are centrally administered services. Some central administration services (e.g., the superintendent's office, human resources) can be thought of as truly "central" resources that can be proportionally applied per student.

Others, however, may be paid for centrally but support specific student programs and school sites. Examples include instructional support staff members who split time between school sites or targeted tutoring programs that are district-provided but target specific students or school sites. For such programs, districts may report spending as central rather than site-specific, which would attenuate any differences across school sites if in reality they are targeted. For such a reason, we compute total site-level spending using both site and central expenditures, though this may understate progressivity (or regressivity) in places with high shares of central expenditures.

Twenty-seven states and the District of Columbia report site and central spending separately in the dataset (table 1). These states show substantial variation in how they allocate site and central expenditures in their reporting. Alabama, Florida, Georgia, Louisiana, Maine, North Carolina, and Ohio assign at least 80 percent of their total expenditures to school sites, even when looking only in districts serving more than 10 schools. In contrast, California, Colorado, Hawaii, and Massachusetts assign less than 70 percent of total spending to school sites.

TABLE 1

School Site Spending per Pupil, by State

State	All Districts				Districts with 10 or More Schools Reporting			
	Average site spending per pupil	Average central spending per pupil	Total share of spending, site allocated	Total share of spending, centrally allocated	Average site spending per pupil	Average central spending per pupil	Total share of spending, site allocated	Total share of spending, centrally allocated
AL	$8,222	$1,944	81%	19%	$8,120	$1,957	81%	19%
AK	$16,872	$5,219	79%	21%	$15,772	$4,694	79%	21%
CA	$8,471	$4,210	65%	35%	$7,690	$4,952	61%	39%
CO	$8,198	$3,651	69%	31%	$8,173	$3,464	69%	31%
DC	$14,990	$5,737	71%	29%	$14,625	$6,127	69%	31%
FL	$8,457	$369	96%	4%	$8,464	$352	96%	4%
GA	$8,665	$1,805	82%	18%	$8,644	$1,893	81%	19%
HI	$9,018	$7,522	52%	48%	$9,018	$7,522	52%	48%
ID	$6,885	$2,050	74%	26%	$5,827	$2,260	71%	29%
IL	$8,876	$3,809	71%	29%	$9,568	$3,673	71%	29%
LA	$10,347	$1,707	86%	14%	$10,097	$1,730	85%	15%
ME	$12,093	$3,106	80%	20%	$11,359	$2,786	80%	20%
MA	$9,080	$7,852	53%	47%	$9,106	$9,191	49%	51%
MI	$8,284	$2,916	74%	26%	$8,717	$3,661	71%	29%
MN	$9,479	$3,951	71%	29%	$9,976	$4,011	71%	29%
MS	$7,121	$2,069	78%	22%	$6,980	$2,106	77%	23%
MO	$7,650	$3,081	72%	28%	$8,346	$3,181	73%	27%
NM	$7,589	$3,089	70%	30%	$7,112	$2,912	69%	31%
NY	$16,170	$6,604	71%	29%	$16,669	$7,168	68%	32%
NC	$9,762	$552	94%	6%	$9,649	$517	94%	6%
OH	$10,990	$1,534	88%	12%	$12,261	$2,152	86%	14%
TN	$7,502	$3,049	70%	30%	$7,625	$3,282	69%	31%
TX	$7,619	$2,392	77%	23%	$7,551	$2,054	78%	22%
UT	$6,473	$2,321	73%	27%	$6,210	$2,393	72%	28%
VA	$8,836	$3,322	72%	28%	$9,037	$3,276	73%	27%
WV	$8,202	$4,550	63%	37%	$8,075	$4,598	62%	38%
WI	$8,883	$3,614	72%	28%	$9,432	$3,475	72%	28%
WY	$12,362	$4,768	73%	27%	$11,948	$3,471	76%	24%

Source: National Education Resource Database on Schools data from Georgetown University's Edunomics Lab.
Notes: Average spending at the site and central level is the unweighted average. Share of spending is the share of aggregate spending for all schools or just for districts serving 10 or more schools. The table includes school-level spending data for 2018–19 only.

We also segment out the school-level spending data to assess central versus site spending in districts that have 10 or more schools. We do this to understand whether school districts with larger numbers of schools allocate funding differently than the state overall. These larger districts might be able to centralize more tasks within a central office, potentially lowering centralized costs per student. Because school districts serving larger numbers of schools may also have more variation in per pupil spending, it is also possible some of these differences could be hidden in centralized spending categories. But broadly, the division of central versus site spending looks similar in these districts compared with the state overall. In these larger districts, spending tends slightly more toward centralized rather than site-level dollars, but not by much. Large districts in 14 states have slightly lower shares of funding allocated toward school sites rather than centralized spending, compared with the state overall.

To supplement our analysis of the school-level data, we link to data from the National Center for Education Statistics Common Core of Data, the annual census of public schools, to observe school-level enrollment counts by race and ethnicity. We also conduct an adjustment of the expenditure data using the district-level Comparable Wage Index for Teachers (CWIFT), which accounts for local labor market conditions for bachelor's degree holders and allows for a more level comparison across geographies.[8] Although schools within the same district compete in the same labor market (and therefore do not receive an adjustment), incorporating the CWIFT measure allows for differences in labor markets across and within states (e.g., between Buffalo and New York City or between Seattle and Spokane).

Defining Stratification and School Spending Progressivity for Historically Underserved Groups

We implement a relative measure of racial and socioeconomic stratification using the difference in exposure to peer composition between white and minority students.[9] This measure of stratification captures average differences in the composition of peers experienced by white and minority students, which is why it is often referred to as the "exposure gap." Intuitively, the measure tells us how predictive a student's racial background is of the composition of her peers at school. This index is known as the variance ratio or eta squared and has been used in multiple applications (Card and Rothstein 2007; Graham 2018; Kremer and Maskin 1996).

Stratification between and within school districts varies by state. The measurement of stratification varies depending on the underlying demographic characteristics of public school enrollments and district size. Broadly, larger districts tend to have less *inter*district stratification and more *intra*district stratification, while smaller districts tend to have less within-district stratification and more between-district stratification.

When looking at the exposure gap between Black and white students, Michigan, Missouri, and Tennessee have the most between-district stratification, with an exposure gap higher than 0.40 (appendix table A.2). These states tend to have less within-district Black-white stratification, on average, though this is not always the case. Tennessee, for example, has an enrollment-weighted within-district Black-white exposure index of 0.11, meaning the average student in Tennessee is enrolled in a district with a stratification level that places it among the top quartile of all states. Hawaii, Vermont, Montana, Wyoming, New Mexico, Utah, Idaho, and Alaska have the lowest between-district Black-white stratification (lower than 0.02), which is a function of having larger school districts (Hawaii, for example, has a single school district), few Black students, or both. These states also tend to have low within-district stratification.

Considering the exposure gap between Hispanic and white students, New Jersey, Rhode Island, Illinois, Texas, and Massachusetts have the most between-district stratification on our measure (exposure gap higher than 0.28). Illinois and Texas also have substantial enrollment-weighted within-district stratification (0.13 and 0.09, respectively). Maine, Montana, Vermont, and Hawaii have low between- and within-district stratification.

When we look only at large school districts—those with 10 or more schools—the overall patterns still hold but more so for Black-white stratification than for Hispanic-white stratification. The correlation for Black-white stratification for all districts and for large districts is 0.97 for the between-district stratification measures and 0.94 for the weighted within-district stratification measure. For Hispanic-white stratification, the correlation is 0.95 for between-district stratification and 0.54 for weighted within-district stratification.

Stratification and Spending Progressivity

When defining school spending progressivity, we borrow from the same exposure measurement framework used to measure racial stratification. We compute average per pupil expenditure experienced by each racial group and take the difference between groups to generate a metric of spending progressivity that is easy to compare with our school stratification index. As such, this measure of progressivity is scaled in dollars and interpreted as the difference in per pupil school expenditures between Black and Hispanic and white students, measured in dollars.

Previous research using school-level spending data has identified that districts tend to spend more on Black, Hispanic, and low-income students within districts (Shores, Lee, and Williams 2021). This holds in our data: the average school site spending for a Black student is $32 per pupil higher than for a white student in the same district.[10] This indicates that, on average, most districts are allocating funding *progressively*, targeting additional spending to school sites with higher shares of Black students.

Of course, the extent of this progressivity varies across districts. Figure 1 shows data for four example districts, with either unusually high levels of progressivity (top two panels) or unusually high levels of *regressivity* (bottom two panels). School District A shows a high degree of progressivity, spending several thousand dollars more per student in majority-Black schools. Similarly, spending is much higher in majority-Black schools in School District B: schools where at least 80 percent of students are Black spend roughly $14,000 per student, while schools where less than 10 percent of students are Black spend closer to $10,000 per pupil.

FIGURE 1

Examples of Large Districts with Progressive and Regressive Spending across Schools

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Sources: Data from the National Center for Education Statistics Common Core of Data and from Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: Total spending per pupil includes both site and central expenditures. The figure includes school-level spending data for 2018–19 only.

Conversely, although many districts show similar or slightly higher spending in schools with more Black students, some districts do not. School District C spends slightly more on schools with fewer Black students, roughly $10,000 per pupil in schools where less than 10 percent of students are Black compared with around $9,000 in schools where at least 30 percent of students are Black. Similarly, schools in District D have slightly lower spending in schools with higher shares of Black students, though the gradient is smaller, and all schools are less than 20 percent Black.

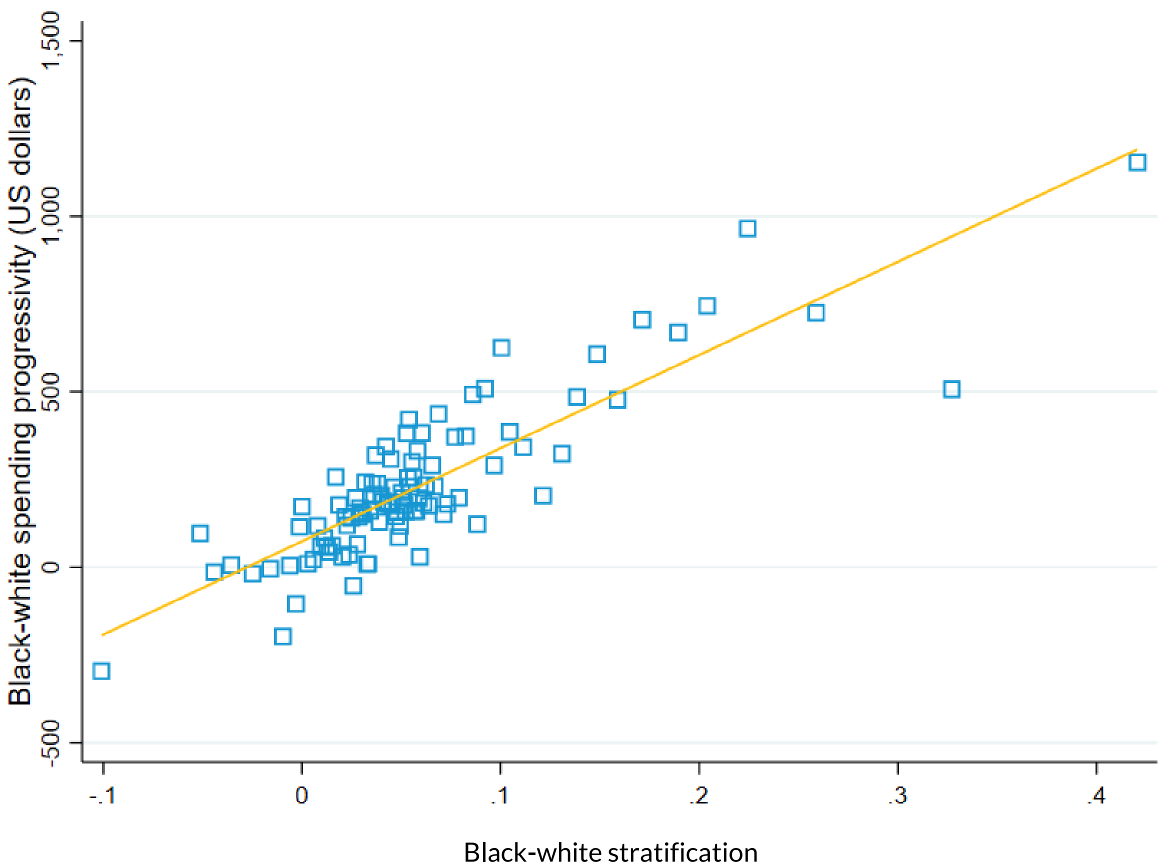
It is important to point out that we are referring to the relationship between spending and student composition *on average* in these districts. Districts A and B show patterns of progressive spending for Black students across school sites, but both districts have majority-Black school sites that report lower spending than majority-white schools. Although these outliers may also be worthy of further inquiry, we focus only on districtwide and statewide average relationships. We do so because analyzing spending at a small number of sites in a district could be influenced by specific circumstances not visible in the data; focusing on districtwide average relationships reduces the influence of any outliers driven by school-specific circumstances.[11]

Any difference in spending between Black students and white students, on average, will require some difference in racial composition across schools (figure 1). Both Districts A and B report high levels of spending progressivity, but they are also stratified, with many schools that have either very high shares or very low shares of Black students. More generally, school site–level spending gaps by student group—either progressive or regressive—are partially determined by stratification levels in a district.

To demonstrate the relationship between stratification and progressivity nationally, figure 2 presents a binned scatterplot of district Black-white school stratification against school spending progressivity for Black students. For this analysis, we look only at districts that have 10 or more schools, though the trend for all districts looks similar. Stratification is clustered in a region just above 0 (the horizontal axis), because districts with fewer schools—which are more numerous and mechanically homogenous—tend to have lower levels of stratification (appendix figure A.1).

There is a strong positive relationship between racial stratification and spending progressivity, indicating that districts with more stratified schools tend to have more progressive school spending. Although perhaps counterintuitive (one may hypothesize that districts with more racial inequality in enrollment may also spend less on students from marginalized backgrounds), this result is in part a mechanical feature of how progressivity is defined and the way school spending gets distributed across schools. Because districts cannot target dollars directly to students and can target only schools, a more stratified school system facilitates progressivity by making it easier to target dollars to specific student groups via school-level allocations. If schools were perfectly integrated, progressivity would be zero by construction; because all schools have the same student body composition, it is impossible for the district to target dollars to any one student group via school-level allocations.

FIGURE 2
Black-White Stratification and Spending Progressivity in Districts with 10 or More Schools



Sources: Data from the National Center for Education Statistics Common Core of Data and from Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).
Notes: The data are adjusted for differences across states and by district enrollment. These data are not adjusted for local labor costs (according to the Comparable Wage Index for Teachers), but results are qualitatively similar and available from the authors upon request. The figure includes school-level spending data for 2018–19 only.

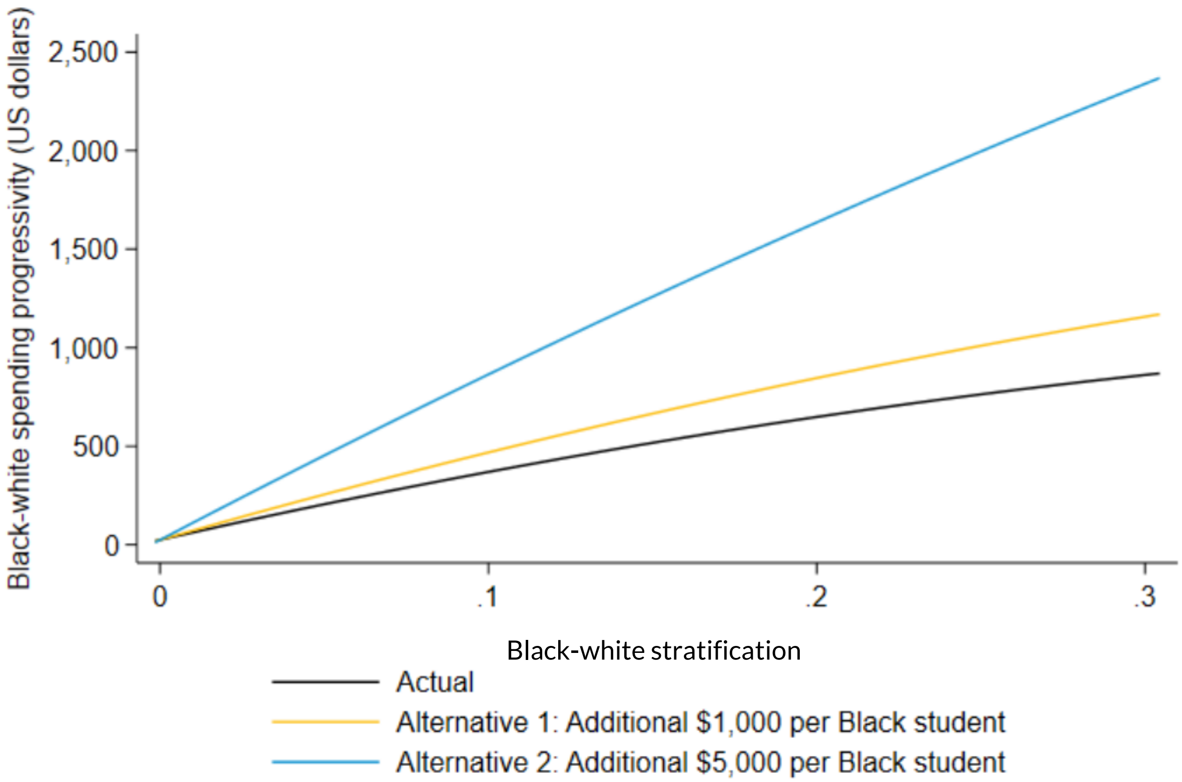
Figure 2 shows that highly stratified districts (which are predominantly urban and large) tend to allocate more funding to schools serving large shares of Black students relative to white students. This is an important finding at a national scale. Importantly, the structure of a state's districts and schools matter. Large school districts encompassing many schools tend to have more leeway to allocate funding progressively for minority or low-income students. Small districts (with just one or a few schools) have less (if any) leeway, and in states with many small districts, allocation to districts may matter more. One important implication of this result is that measures of within-district spending progressivity should account for the potential range for progressivity generated by student stratification. In districts with high levels of integration, the ability to spend progressively by targeting certain school sites is limited. This is an important limitation when considering policies that attempt to target specific student groups, even when they mandate spending at the specific school site that generates the additional funding.

Consider two hypothetical state or federal[12] policies targeting additional resources to Black students. In the first, policymakers allocate an additional $1,000 per Black student in a district; in the second, they allocate $5,000. Furthermore, policymakers require that school districts spend this additional funding at the specific school site attended by the student that generates it; such a policy would address concerns over ineffective targeting within districts, as has been found in some settings (Hyman 2017; Lafortune 2021; Lee, Fuller, and Rabe-Hesketh 2021; Roza, Coughlin, and Anderson 2017).

Figure 3 compares the spending progressivity generated by these policies with their actual levels, for districts with varying degrees of stratification. Notably, in districts with below-average Black-white stratification,[13] the additional $1,000 per Black student would increase progressivity by less than $100 per student. Even at the 90th percentile of stratification, the additional funds would increase progressivity only by less than $400 per student. Similarly, a larger policy where an additional $5,000 is targeted to each Black student at their school site would yield proportionally similar effects and would increase progressivity by far less than half of the "intended" amount in nearly all districts nationally.

FIGURE 3

Impact of Hypothetical Spending Policies, by District Stratification



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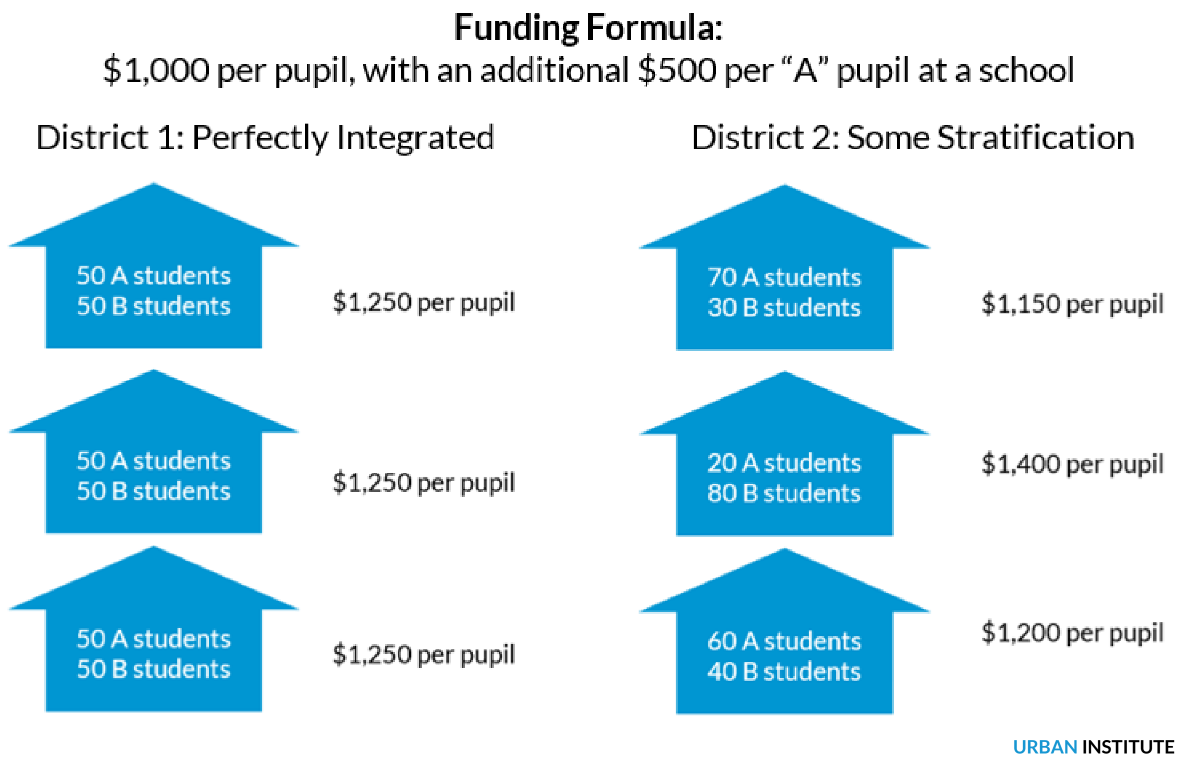
Sources: Data from the National Center for Education Statistics Common Core of Data and from Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: The figure reports quadratic regression lines from a regression of district-level spending differences between Black and white students and district stratification (the Black-white exposure gap). The line for alterative 1 (2) depicts a hypothetical where the district spends $1,000 ($5,000) more per Black student at their school site above what they already allocate. These data are not adjusted for local labor costs, but results are qualitatively similar and available from the authors upon request. The figure includes school-level spending data for 2018–19 only.

What does this mean for policy? Most importantly, efforts to increase funding on specific student groups, even if such efforts target spending to specific school sites, will have a smaller impact on progressivity in districts with lower levels of stratification. Of course, this does not mean funding is "wasted" or the policy is ineffective; rather, it means that any spending policy to progressively allocate resources will have an attenuated impact on measurements of spending progressivity, insofar as resources are targeted to a specific school site, not within that school site. Figure 4 shows an example of this relationship for two hypothetical districts that target additional school spending to students of a given group. This mechanical point is important for policymakers and researchers to consider when evaluating the impact of progressive spending policies on differences in student outcomes (e.g., test scores or graduation rates) across student groups; progressive spending policies in general have a smaller impact on student-level spending gaps, even when perfectly targeted to the school site. Additional discussion of the mechanical relationship between stratification and progressivity is in the appendix.

FIGURE 4

Sample Funding Formula



Source: Authors' calculations for illustrative purposes.

Decomposing Spending Progressivity, by State

Overall, spending progressivity depends on levels of stratification and student enrollment patterns[14] within and across districts. Progressivity is also a function of local, state, and federal education finance decisions. How much is spending progressivity shaped by within- and between-district factors in each state?[15]

To understand this dynamic further and to isolate school-level progressivity by state, we propose a decomposition framework to understand how school spending progressivity at the state level splits between and within school districts. We first compute the progressivity of school-level spending for different groups in each state, for all school districts and then only for districts with 10 or more schools. Statistics for all districts explain how district structure, as well as intradistrict allocation, can shape progressivity. Statistics for large districts only (10 or more schools) helps us understand the extent of allocations for schools serving large shares of minority students in instances when they have leeway to do so. To account for differences across states, we use per pupil expenditures adjusted for labor costs using CWIFT values (we can provide charts with expenditures unadjusted for labor costs upon request). Cost-adjusted student-weighted average spending for Black and white students is presented in appendix figure A.4.

First, we present results for all school districts. In seven states, the average Black student is exposed to substantially less school-level per pupil funding than the average white student: 500 or more cost-adjusted dollars' difference (appendix figure A.4). How much of these differences within states are caused by between- versus within-district spending allocations?

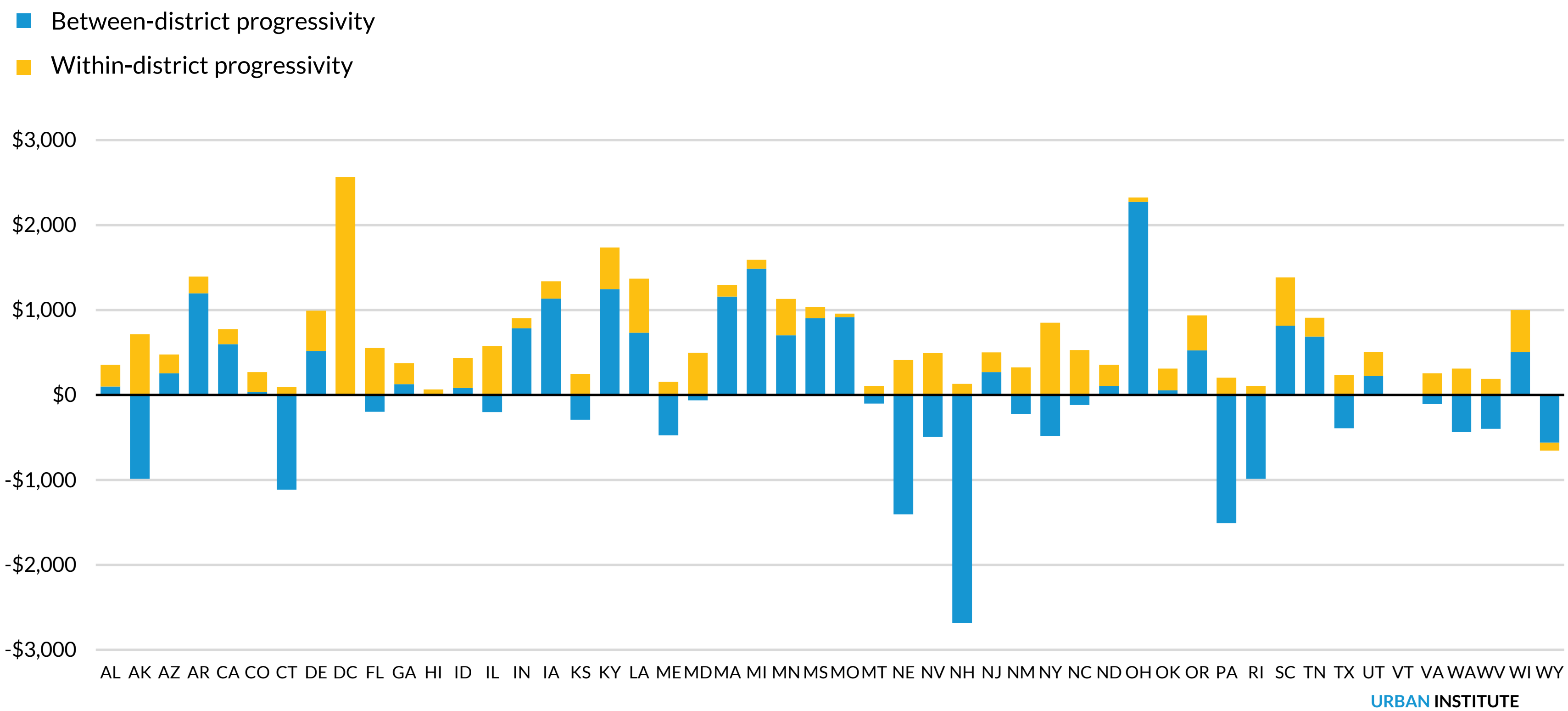
To decompose the Black-white difference in average state spending into between- and within-district components, we measure how much progressivity would be left if districts were to spread school funding exactly evenly across schools. Under such a counterfactual, there is zero within-district progressivity, and any remaining progressivity must be attributable to differences in spending across school districts. Figure 5 shows the result of this analysis, indicating that much of this difference is caused by interdistrict differences (blue), rather than differences in spending on schools within the same district (yellow).

In nearly all states, the allocation of funding within school districts contributes to progressivity, though the degree to which this happens varies substantially. When we find regressive allocations for Black students versus white students, it tends to be across districts within a state. The regressivity of cross-district school spending for Black and white students could be caused by several factors. Local spending amounts, for example, might be higher in property-wealthy school districts, which may be more likely to have higher shares of white students because of the aftermath of redlining that devalued communities of color. This could also be because of differences in the geography of where students live; for example, if white students are more likely to live in sparse or rural districts, they may be exposed to higher per pupil spending because of factors related to economies of scale.

FIGURE 5

Total School Spending Progressivity between Black and White Students, by State

Total school-adjusted spending progressivity



Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable.

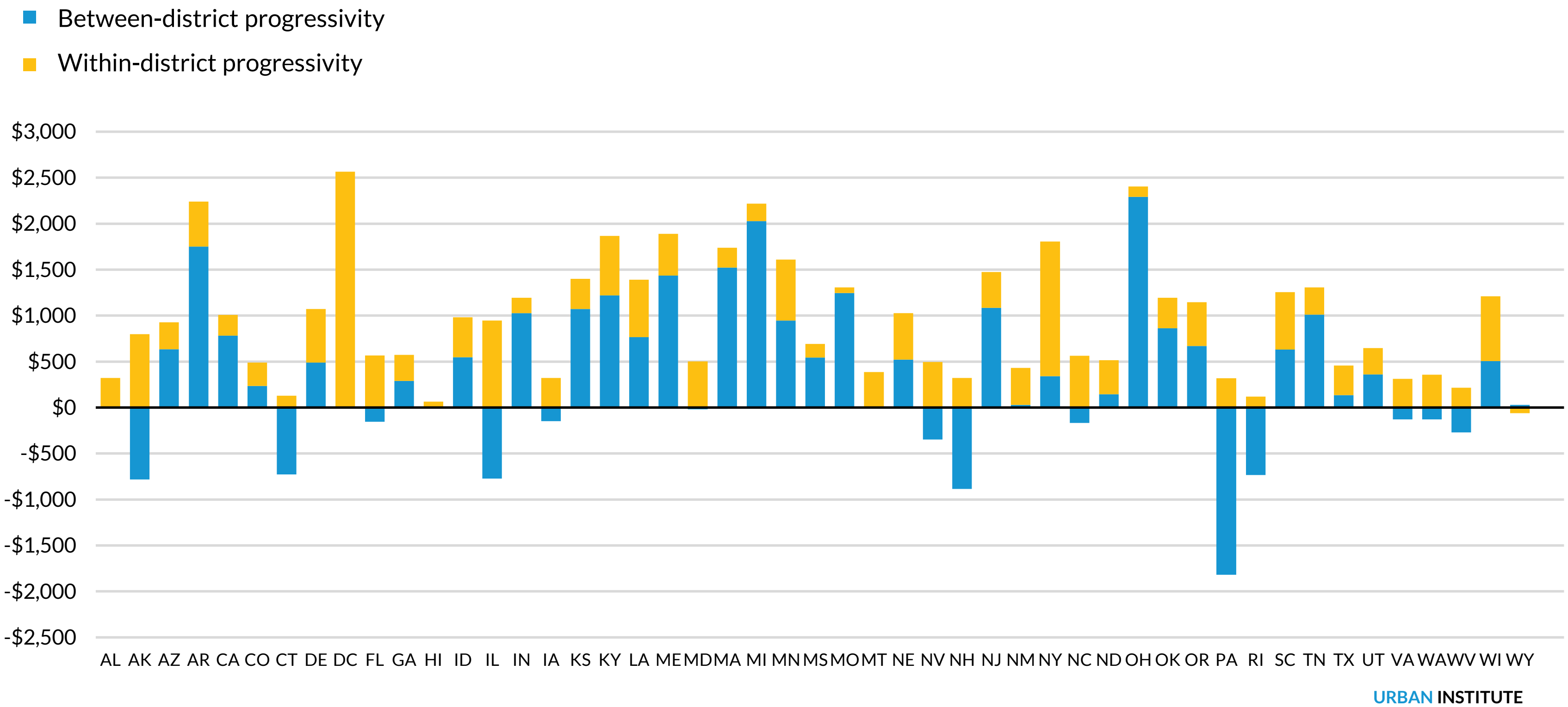
To disentangle these structural issues further, we run a second analysis limited only to schools in districts with at least 10 school sites. Only Vermont is fully excluded from the analysis because of this 10-school limitation, though several states have only a few districts that can be part of the analysis.

Even among large school districts, it is differences across, rather than within, school districts that appear to drive funding differences between Black and white students. Only in one state is the within-district allocation regressive for Black students relative to white students and only by a small amount. Based on our measures of differences in spending between Black and white students, Massachusetts, Michigan, and New York are some of the most progressive states. In Massachusetts and Michigan, progressivity is mostly caused by spending differences between school districts with different racial compositions. But in New York, the bulk of progressivity is within district, borne out of the decisions local districts make when splitting funding across schools (figure 6).

FIGURE 6

Decomposition of Total School Spending Progressivity between Black and White Students, by State, for Large Districts

Total school-adjusted spending progressivity



Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable. Large districts refers to districts with 10 or more schools.

Progressivity for Hispanic and White Students and for Students Who Are Eligible and Not Eligible for FRPL

We conduct similar decomposition analyses for the differences in average cost-adjusted school spending between Hispanic and non-Hispanic white students and for reported shares of students eligible for FRPL (appendix figures A.5 through A.8).

In our analysis across all school districts, we find varying degrees of progressivity for Hispanic students relative to white students (appendix figure A.5). Five states spend substantially less, on average, by school per pupil, for Hispanic students. But 20 states have regressive cross-district allocations. Some of these regressive allocations are made up for by within-district progressivity, but in three states, within-district allocations contribute to regressivity, on average. When we limit our Hispanic-white analysis to only districts with 10 or more schools, the results show overall more progressivity for Hispanic students, though the differences vary by state, and some deep funding inequities remain (appendix figure A.6).

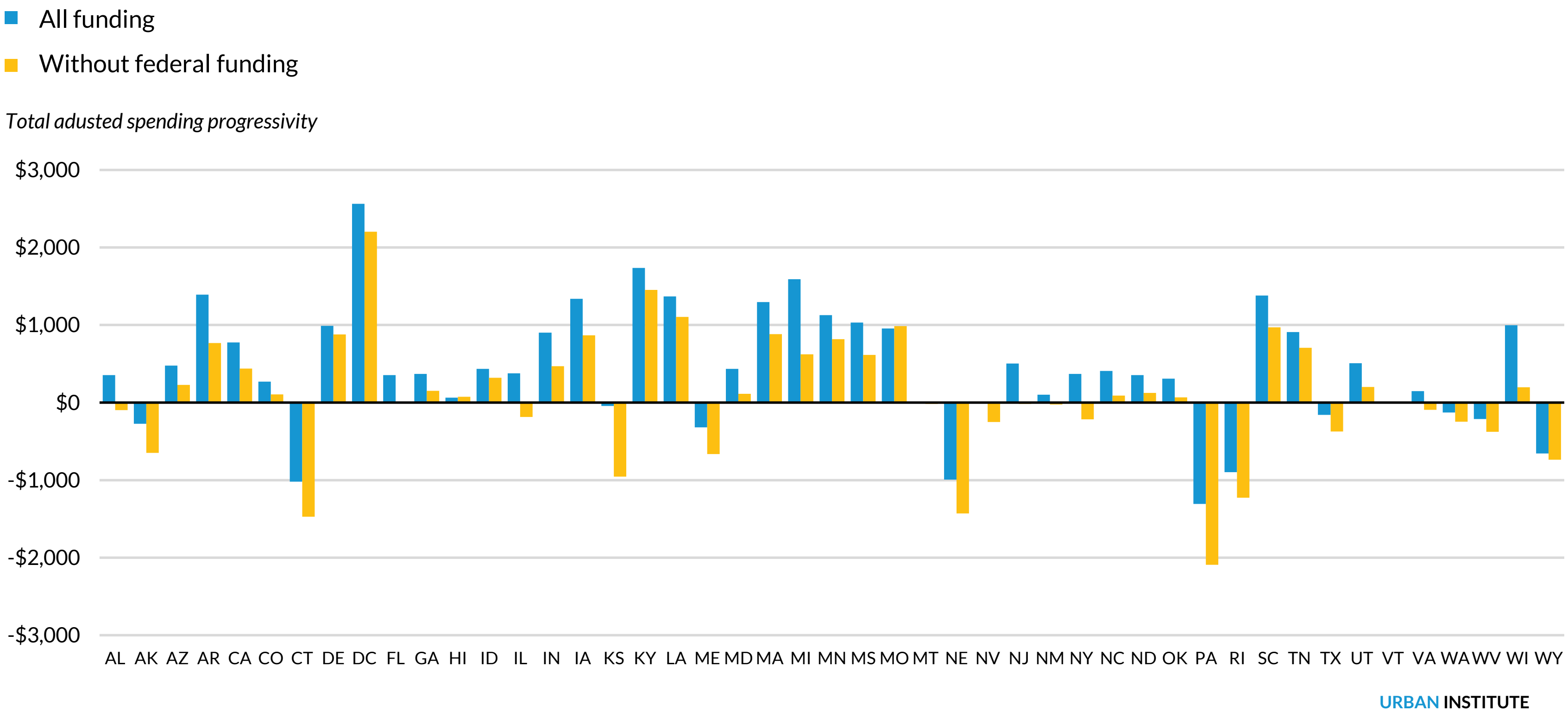
Although the school-level share of students eligible for FRPL is reported differently across districts and states (and is no longer reported in a few states), this measure can be a useful (albeit imperfect) benchmark for looking at funding allocations for students from low-income households. In general, states allocate more funding to schools with higher shares of FRPL-eligible students, with some exceptions (appendix figure A.7). Within- and between-district progressivity are aligned more frequently than in the race and ethnicity decompositions. This may be because most states allocate additional funds based on economic disadvantage in their district funding formulas. In large districts, we find more evidence of school-level progressivity for FRPL-eligible students (appendix figure A.8). Only two states have substantially regressive (at least 500 fewer cost-adjusted dollars per pupil) funding for FRPL-eligible students relative to their non-FRPL-eligible peers.

How Does Federal Funding Affect Progressivity within and across Districts?

So far, we have examined progressivity over all funding sources, including local, state, and federal sources. Although the data do not allow us to separate state and local revenues, 47 states report school site spending separately for federal funding versus state and local funding. As a large share of federal funding comes through the Title I Program and National School Lunch Program, it is progressive with respect to student income, particularly within states.[16] How much of the observed progressivity in total funding across states is because of these federal dollars? To explore this question, in figure 7, we juxtapose the total spending progressivity for Black versus white students (reported in figure 6) with total spending progressivity, excluding federal funding.

FIGURE 7

Total Progressivity of Spending between Black and White Students, by State, with and without Federal Funds



Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: 2018–19 spending is adjusted for differences in labor costs across districts. The figure excludes states that do not separately report federal spending by school site. South Dakota data are unavailable.

In nearly every state, spending is less progressive by race and ethnicity when federal dollars are excluded. Of the 35 states that are progressive for Black students (i.e., they spend more on the average Black student than on the average white student), 8 would not be progressive absent federal funding. Notably, these states are not clustered geographically or politically, and they include both high- and low-spending states.

Federal funds also account for a large share of overall progressivity in several states, even those that are progressive without federal funding. For example, in Wisconsin, we estimate (cost-adjusted) total spending progressivity is $1,000 per pupil but is only $196 per pupil once federal funds are excluded. On the other hand, spending funded through state and local dollars is still progressive in most states, a function of the progressivity in many state formulas and within-district allocations. This also depends on stratification patterns across districts. Where schools and districts are less stratified, the progressivity emanating from federal Title I and National School Lunch Program allocations is attenuated when comparing average school site spending per pupil.

Implications

Our findings echo previous work on school-level progressivity, finding that most states and districts allocate relatively more per pupil dollars to schools that enroll larger shares of minority or low-income students. Although these data are new and data collection methods are still being refined, some states have school-level spending patterns that are distinctly regressive for at least two of the groups we study (Black students, Hispanic students, and students who are eligible for free and reduced-price meals). And some of the progressivity we observe is because of federal funds, which are aimed at supporting students from low-income households or who have special education needs. Absent federal funds, nearly all states would be more regressive, and an additional eight states would have regressive Black-white spending gaps.

But our results also indicate that progressivity is in part a function of the structure of school enrollment patterns, the size of school districts, and the underlying distribution of student groups. To be a "highly progressive" district or state for low-income or minority students also means being a highly economically or racially stratified one. A perfectly integrated school district or state, on the other hand, could not allocate funding in a way that advantaged one group or another.

To address the implications of this finding, we turn to literature that suggests that additional school funding, as well as integration, provide both short- and long-run returns for students (The Century

Foundation 2019). Our results suggest that, whenever possible, policymakers should embrace an approach that views integration and increased funding as powerful tools to be used in combination. Policymakers can "double down" on educational equity by addressing both within-district and between-district stratification and by expanding funding for schools and districts that have larger shares of students with need. In highly integrated school districts, policymakers may want to further probe the provision of supplemental instruction or services for students with additional needs *within schools* to ensure all students in a school receive an equitable education.

Our examination of the first year of school-level spending data also brings substantial cautions for researchers. First, we reiterate the caution that the extent of disparities within school districts is tempered by the degree to which spending is allocated to a central office versus specific school sites. Among the 27 states that reported this division of spending, we see wide variation across states. Centralized spending, as a share of overall spending, can take up anywhere from 4 percent to 48 percent of per pupil spending. Within states, central expenditure shares look more similar across all school districts and within only large school districts, though there are still differences across districts in some states.

The second caution is the subject of this report. We find that measures of progressivity are necessarily dependent on how much districts and schools are economically or racially stratified. In more integrated schools, the scope for targeted funding is limited, and measures of funding allocations will reflect this limitation as well.

The limitations of spending data hold lessons for policymakers as well. Having school-level expenditure data for nearly all public schools across the country is a substantial accomplishment, and it is unlikely we will see even more granular resource data. Nationally, we do not have data to see which students have the most effective teachers, which students receive supplemental instruction, or which students have access to high-quality instructional materials. There are other ways to ensure dollars get earmarked for students with greater need within a school district, but they are difficult to measure, and these policies should be used sparingly, as they can hinder the flexibility of schools to provide services.

Appendix

Understanding the Relationship between Stratification and Between- and Within-District Student-Weighted Progressivity

A large portion of our findings on school-level progressivity are influenced by the mechanical relationship between stratification and progressivity measures. This mechanical relationship occurs in all measures of funding progressivity. A perfectly integrated school district that allocates more funding or less funding for students with need would still appear neutral in allocating dollars, while a highly stratified district would appear substantially progressive even with small shifts toward allocating additional dollars for students with more need.

To better illustrate the mechanical nature of progressivity in our measure, we built a set of five simulated states, each with 100 school districts of 500 students each and 10 schools within each district. We randomly assigned students in a way that ensured some schools (and districts and states) had more stratification than others. The average between- and within-district stratification for each state is listed in table A.1.

TABLE A.1

Between- and Within-District Exposure Gap for Simulation States

State	Between-district exposure gap	Within-district exposure gap
1	0.106	0.284
2	0.039	0.305
3	0.018	0.312
4	0.006	0.322
5	0.001	0.306

Source: Authors' calculations for illustrative purposes.

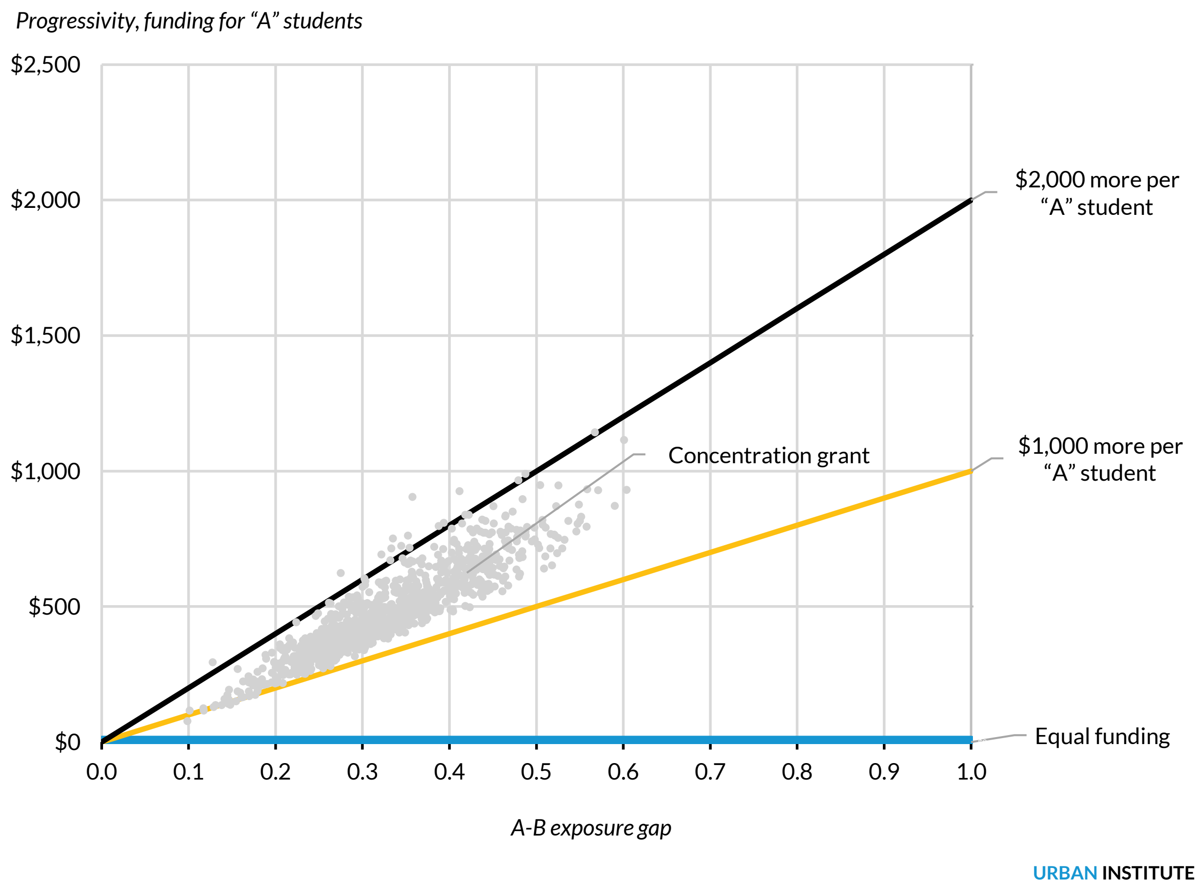
To keep the model simple, we assumed a world with two student types: A and B. We assume that a progressive policy is one where A students receive average funding equal to or higher than B students.

In this simple binary world, if district policymakers allocate more funding per A student in a school (independent of any state allocation), our measure of progressivity for that district is a linear function of the district's stratification and the amount of funding. For example, if A students are allocated $1,000 more than B students, the slope is a $100 increase in progressivity from every 0.1 increase in stratification (figure A.1). Two districts can have the same funding policy, but a district with more stratification will appear to allocate more, on average, because of the stratification of students.

Under more complex scenarios, the relationship is more dependent on the underlying distribution of students. Imagine a concentration grant that allocates incrementally more per A student as the number of A students increases. For example, A students get $100 more in funding for every 10 percentage-point increase in the share of A students. In this case, results are aligned on a similar positive slope (a $100 increase in progressivity for every 0.1 increase in stratification) but are dependent on the direction of the exposure gap. If stratification is a result of the underrepresentation of A students within the district (relative to an even split of the two groups), the progressivity falls below the trendline. If the stratification is a result of overrepresentation, progressivity is above the line.

FIGURE A.1

Illustration of Progressivity under Different Simulated Funding Schemes



Source: Authors' calculations for illustrative purposes.

Differences in stratification across states also affect our analyses of the degree of progressivity attributable to differences in allocation within school districts versus between school districts. To illustrate this, we modeled five states, some with relatively high levels of between-district stratification (state 1), and then with increasingly lower levels of between-district stratification (state 5). For our model states, our exposure index values between districts are generally lower than within districts, varying from 0.001 to 0.106. District stratification ranges from 0.045 to 0.662, with average within-district stratification fairly constant across the five states.

Figure A.2 models the effects of four policies:

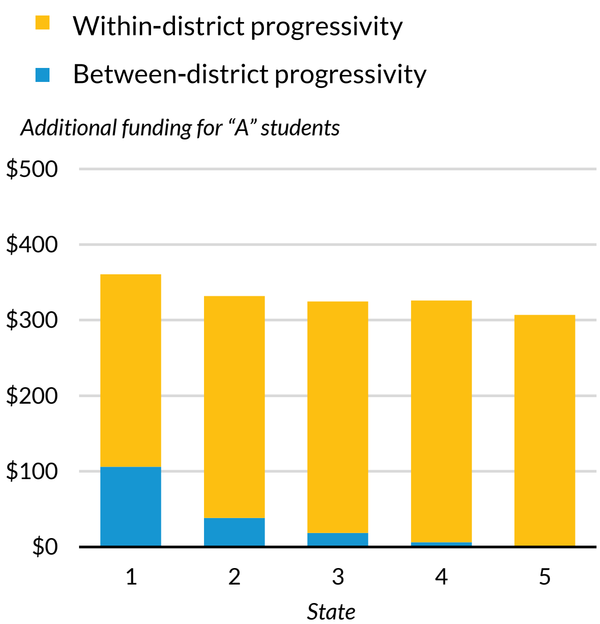
1. **Progressive state and progressive district.** State allocation provides $1,000 more per A student (on a base of $1,000), a policy each district maintains such that each school receives $1,000 more per A student.
2. **Progressive state and neutral district.** State allocation provides $1,000 more per A student (on a base of $1,000), but districts allocate funding without consideration of student type.
3. **Regressive state and progressive district.** State allocation provides $1,000 more per B student (on a base of $1,000), but districts allocate 50 percent more per A student.
4. **Progressive state and regressive district.** State allocation provides $1,000 more per A student (on a base of $1,000), but districts allocate 50 percent more per B student.

These policies show the advantages of our approach in adequately capturing district and state policy, but they highlight some downsides. The amount of progressivity is dependent on within-district stratification, which is relatively constant, on average, across the states. When between-district stratification increases, the effects of between-district progressivity also increase, providing a slight boost to overall progressivity when both state and district allocations are progressive (policy 1). When districts do not ensure the progressive allocation of a state formula is carried down to the school level, all the progressivity is correctly attributed to the between-district allocation (policy 2). Because of the degree of stratification within school districts, a progressive within-district allocation can counteract a regressive state (policy 3). And similarly, a progressive state can counteract some district regressivity, though in our example, the levels of within-district stratification are such that the overall allocation is regressive for A students (policy 4).

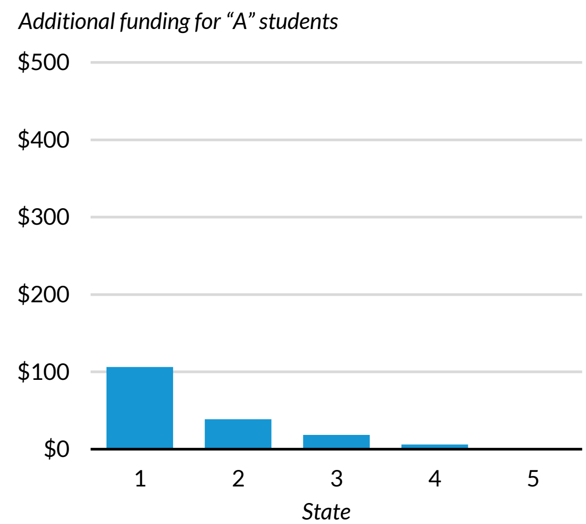
FIGURE A.2

Between- and Within-District Progressivity under Four Funding Policies

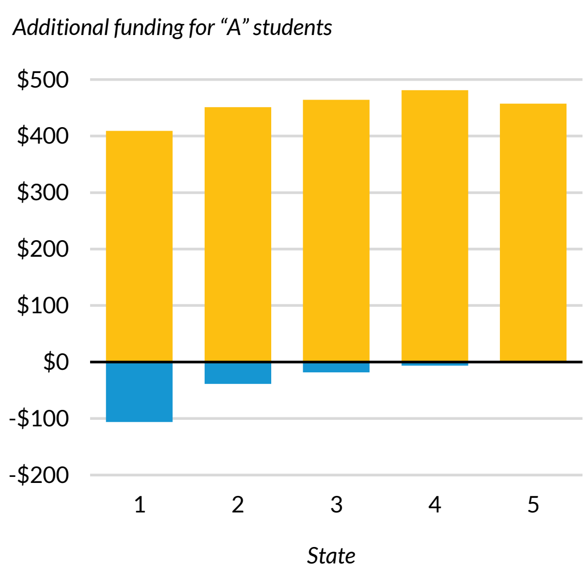
Policy 1. Progressive state and progressive district



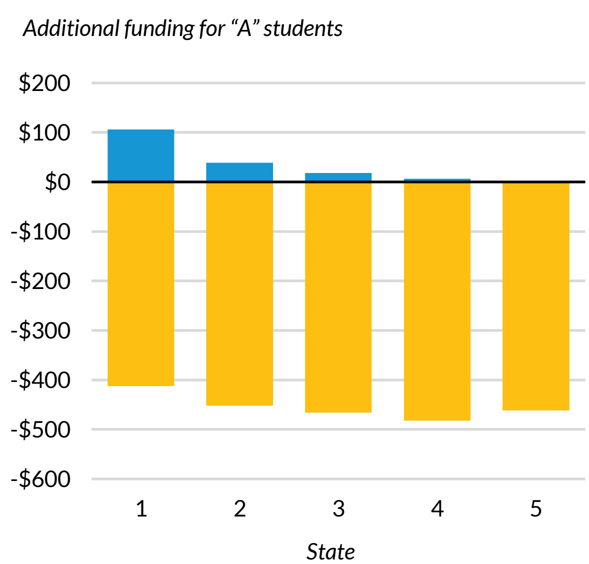
Policy 2. Progressive state and neutral district



Policy 3. Regressive state and progressive district



Policy 4. Progressive state and regressive district



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Source: Authors' calculations for illustrative purposes.
Note: On the horizontal axis, 1 indicates the state with the most stratified districts, and 5 indicates the state with the least stratified districts.

TABLE A.2

Race and Ethnicity Exposure Gap between and within Districts, by State

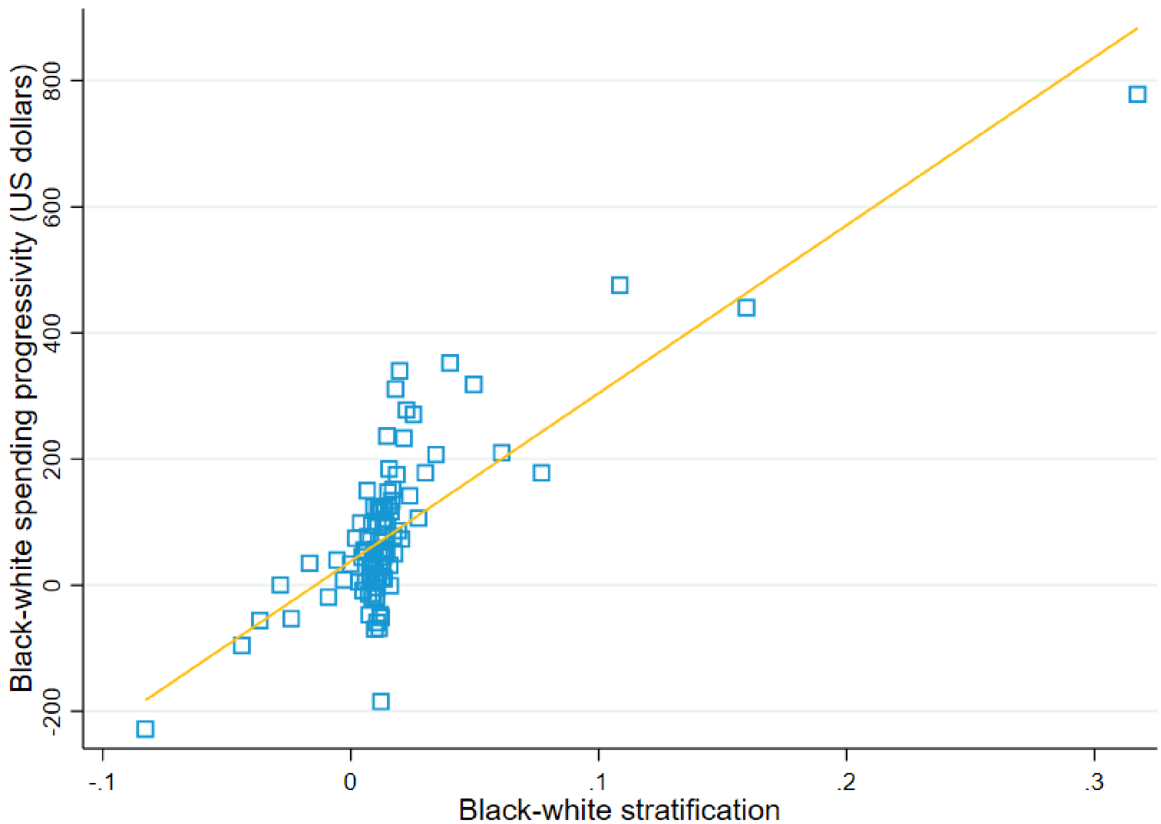
	All Districts						Districts With 10 or More Schools					
	Black-White Exposure Gap			Hispanic-White Exposure Gap			Black-White Exposure Gap			Hispanic-White Exposure Gap		
State	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)
AK	0.01	0.01	0.02	0.03	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.02
AL	0.33	0.06	0.12	0.08	0.02	0.04	0.32	0.12	0.16	0.04	0.05	0.16
AR	0.38	0.01	0.03	0.16	0.01	0.03	0.32	0.07	0.06	0.12	0.06	0.06
AZ	0.04	0.01	0.02	0.22	0.04	0.08	0.03	0.02	0.02	0.20	0.08	0.02
CA	0.07	0.01	0.02	0.25	0.05	0.09	0.06	0.01	0.02	0.22	0.09	0.02
CO	0.07	0.01	0.03	0.16	0.03	0.13	0.07	0.02	0.03	0.16	0.10	0.03
CT	0.18	0.01	0.02	0.23	0.01	0.03	0.14	0.03	0.04	0.16	0.05	0.04
DC	0.11	0.09	0.38	0.02	0.05	0.23	0.09	0.18	0.43	0.00	0.10	0.43
DE	0.06	0.04	0.06	0.06	0.03	0.05	0.06	0.07	0.08	0.05	0.05	0.08
FL	0.07	0.10	0.22	0.18	0.05	0.09	0.07	0.12	0.23	0.18	0.07	0.23
GA	0.23	0.05	0.17	0.09	0.02	0.09	0.23	0.12	0.20	0.06	0.06	0.20
HI	0.00	0.03	0.03	0.00	0.02	0.02	0.00	0.03	0.03	0.00	0.02	0.03
IA	0.11	0.01	0.04	0.03	0.01	0.01	0.02	0.09	0.09	0.00	0.03	0.09
ID	0.01	0.00	0.01	0.13	0.01	0.02	0.01	0.01	0.02	0.06	0.02	0.02
IL	0.29	0.01	0.19	0.29	0.02	0.13	0.20	0.05	0.33	0.23	0.07	0.33
IN	0.27	0.01	0.03	0.14	0.01	0.02	0.19	0.04	0.05	0.11	0.03	0.05
KS	0.08	0.01	0.03	0.20	0.01	0.05	0.06	0.02	0.04	0.16	0.06	0.04
KY	0.19	0.01	0.06	0.05	0.01	0.04	0.10	0.05	0.11	0.02	0.05	0.11
LA	0.16	0.19	0.23	0.07	0.02	0.04	0.15	0.22	0.23	0.07	0.03	0.23
MA	0.18	0.01	0.02	0.29	0.01	0.03	0.19	0.02	0.05	0.24	0.05	0.05
MD	0.23	0.14	0.19	0.10	0.07	0.14	0.23	0.15	0.19	0.10	0.08	0.19
ME	0.18	0.01	0.01	0.01	0.00	0.00	0.14	0.03	0.04	0.02	0.01	0.04
MI	0.47	0.01	0.04	0.13	0.01	0.02	0.44	0.05	0.10	0.10	0.03	0.10
MN	0.17	0.01	0.03	0.10	0.01	0.03	0.09	0.05	0.07	0.03	0.04	0.07
MO	0.44	0.01	0.03	0.10	0.01	0.01	0.41	0.04	0.06	0.05	0.02	0.06
MS	0.33	0.07	0.09	0.04	0.01	0.02	0.28	0.14	0.14	0.02	0.02	0.14
MT	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.02	0.01
NC	0.13	0.06	0.12	0.04	0.05	0.08	0.12	0.08	0.13	0.03	0.06	0.13
ND	0.05	0.01	0.02	0.04	0.01	0.01	0.02	0.04	0.04	0.01	0.01	0.04
NE	0.13	0.01	0.03	0.19	0.01	0.08	0.11	0.02	0.05	0.13	0.07	0.05

	All Districts						Districts With 10 or More Schools					
	Black-White Exposure Gap			Hispanic-White Exposure Gap			Black-White Exposure Gap			Hispanic-White Exposure Gap		
State	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)	Between districts	Within districts (straight average)	Within districts (weighted average)
NH	0.04	0.00	0.01	0.11	0.00	0.01	0.03	0.01	0.01	0.07	0.02	0.01
NJ	0.29	0.01	0.05	0.31	0.01	0.02	0.28	0.06	0.11	0.33	0.03	0.11
NM	0.01	0.01	0.01	0.09	0.03	0.09	0.01	0.01	0.01	0.07	0.05	0.01
NV	0.04	0.02	0.07	0.03	0.09	0.20	0.04	0.02	0.07	0.02	0.11	0.07
NY	0.17	0.01	0.15	0.24	0.01	0.13	0.09	0.04	0.28	0.12	0.04	0.28
OH	0.37	0.01	0.04	0.07	0.01	0.02	0.27	0.07	0.12	0.05	0.03	0.12
OK	0.13	0.01	0.03	0.17	0.01	0.04	0.08	0.04	0.07	0.14	0.06	0.07
OR	0.04	0.01	0.02	0.10	0.03	0.08	0.04	0.02	0.03	0.07	0.07	0.03
PA	0.29	0.01	0.05	0.26	0.01	0.03	0.31	0.04	0.14	0.30	0.03	0.14
RI	0.10	0.01	0.01	0.30	0.02	0.04	0.08	0.02	0.02	0.25	0.05	0.02
SC	0.13	0.07	0.12	0.03	0.02	0.06	0.12	0.11	0.13	0.02	0.04	0.13
TN	0.41	0.03	0.11	0.08	0.02	0.06	0.43	0.07	0.15	0.07	0.05	0.15
TX	0.13	0.01	0.06	0.29	0.02	0.09	0.10	0.05	0.07	0.26	0.07	0.07
UT	0.01	0.01	0.01	0.08	0.05	0.09	0.01	0.01	0.01	0.08	0.08	0.01
VA	0.18	0.03	0.08	0.10	0.02	0.08	0.17	0.07	0.10	0.07	0.05	0.10
VT	0.00	0.00	0.00	0.01	0.01	0.01	-	-	-	-	-	-
WA	0.06	0.01	0.02	0.20	0.02	0.04	0.05	0.02	0.03	0.13	0.04	0.03
WI	0.30	0.01	0.06	0.11	0.01	0.05	0.27	0.04	0.14	0.09	0.04	0.14
WV	0.03	0.02	0.04	0.03	0.01	0.01	0.03	0.04	0.05	0.03	0.01	0.05
WY	0.01	0.00	0.01	0.05	0.01	0.02	0.00	0.01	0.01	0.03	0.03	0.01

Source: Authors' calculations.

FIGURE A.3

Black-White Stratification and Spending Progressivity, All Districts



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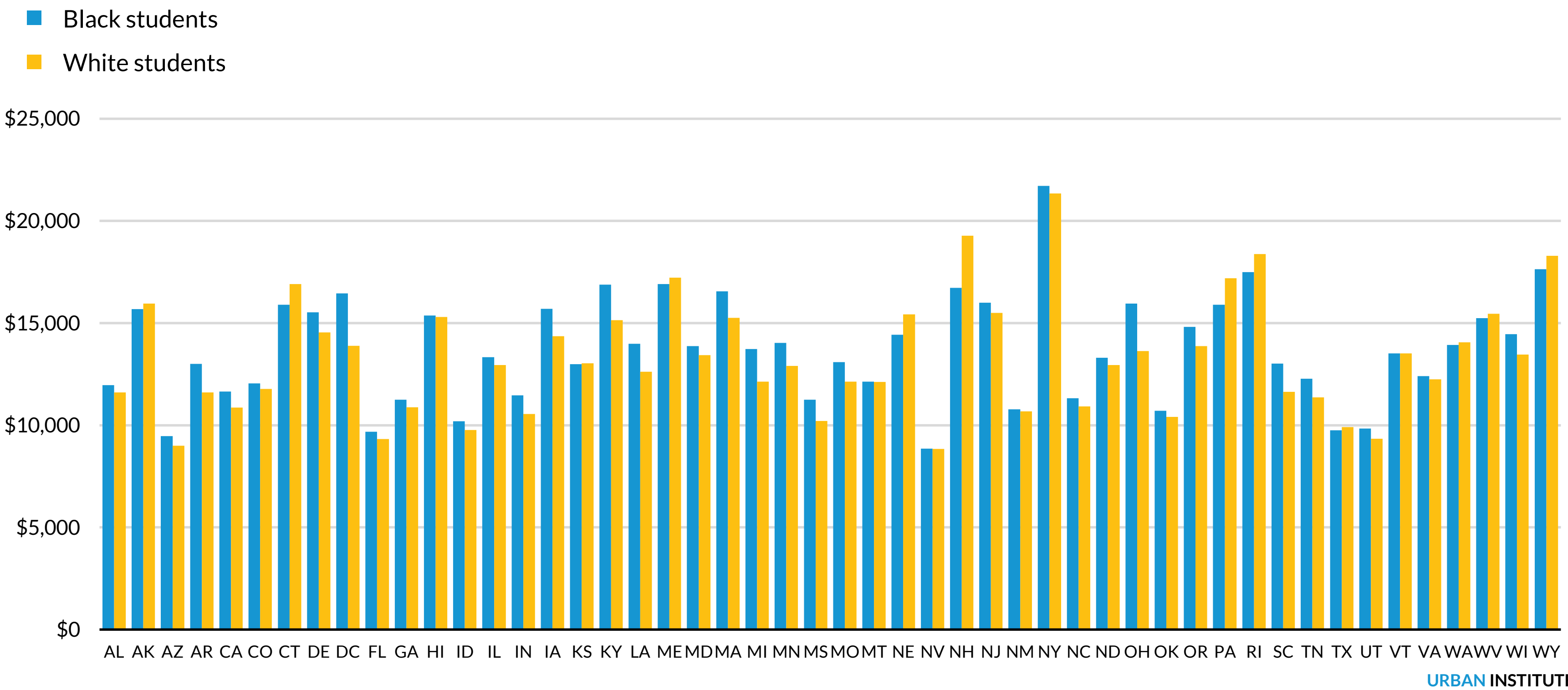
Sources: Data from the National Center for Education Statistics Common Core of Data and from Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: The data are adjusted for differences across states and by district enrollment. These data are not adjusted for local labor costs (according to the Comparable Wage Index for Teachers), but results are qualitatively similar and available from the authors upon request. The figure includes school-level spending data for 2018–19 only.

FIGURE A.4

Total School Spending Progressivity between Black and White Students, by State

Average total adjusted spending per pupil

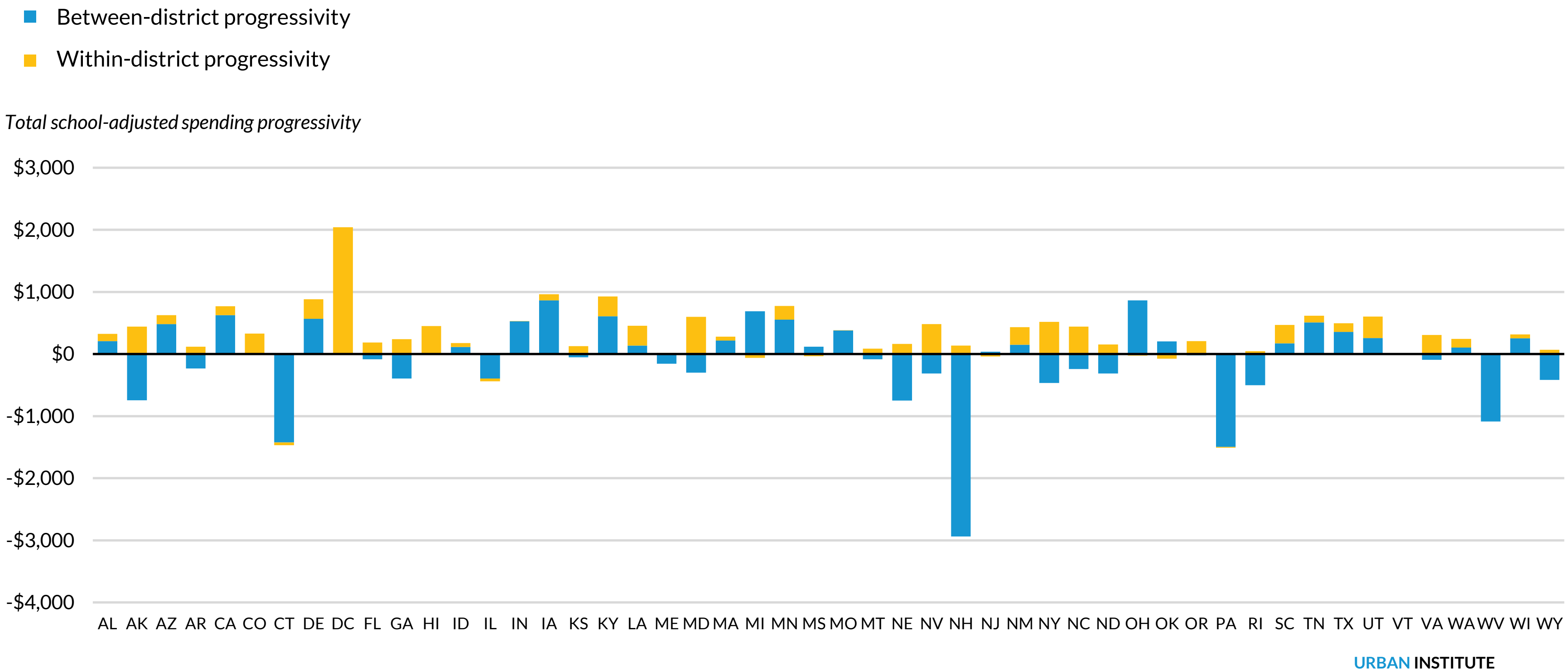


Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable.

FIGURE A.5

Decomposition of Total School Spending Progressivity between Hispanic and White Students, by State

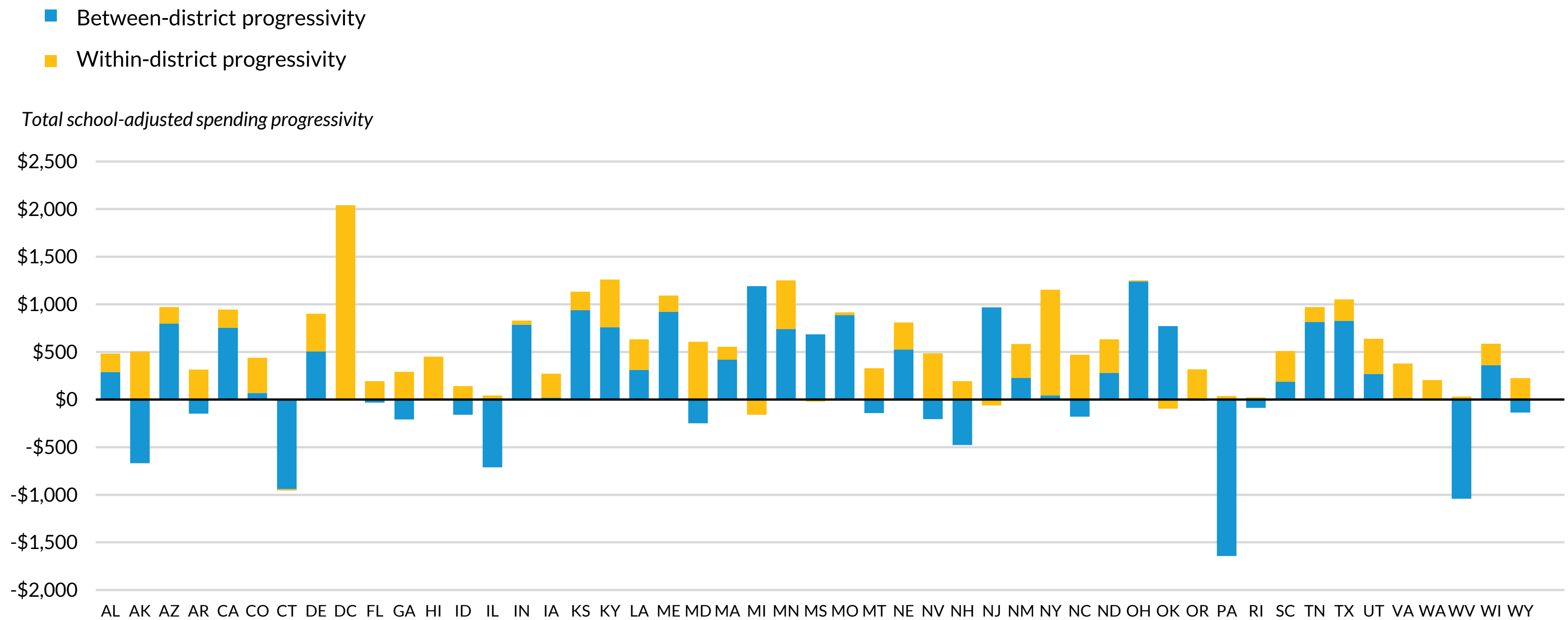


Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable.

FIGURE A.6

Decomposition of Total School Spending Progressivity between Hispanic and White Students, by State, for Large Districts



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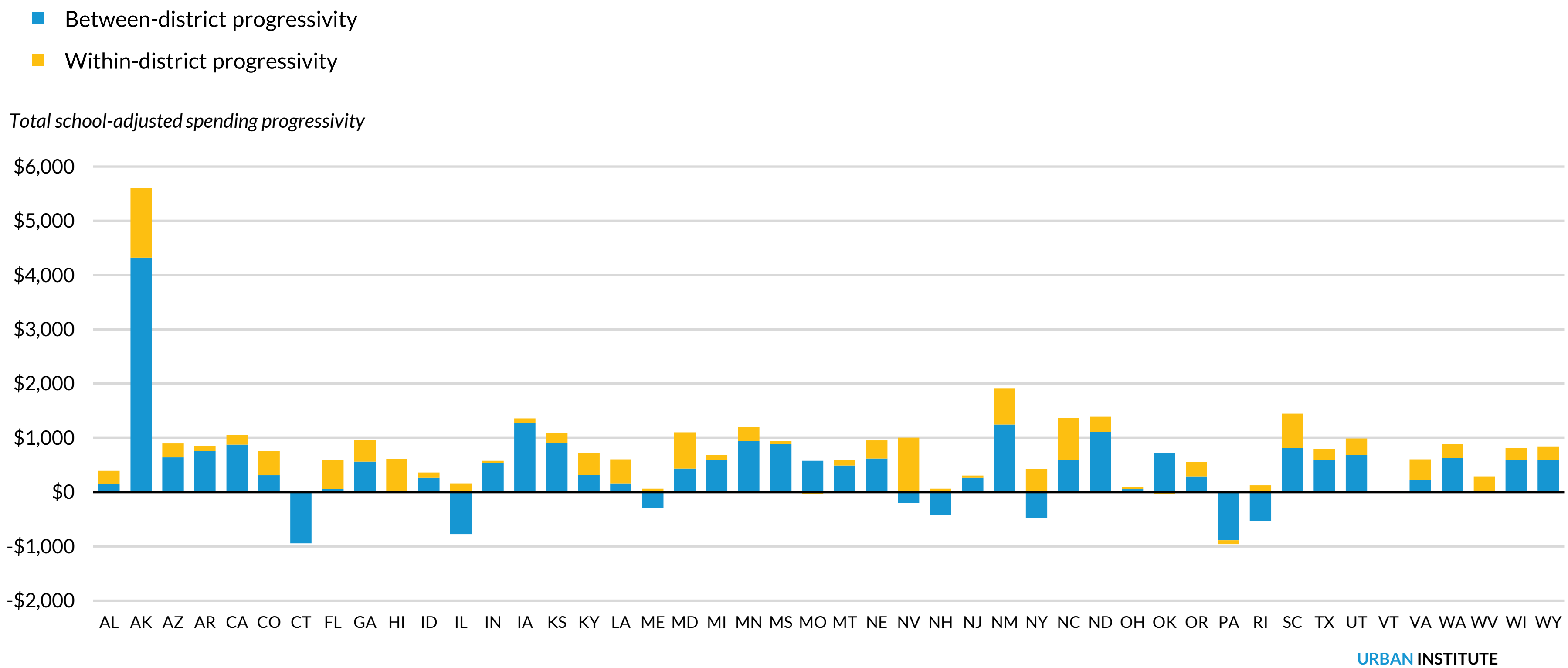
Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).
Notes: 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable. Large districts refers to districts with 10 or more schools.

FIGURE A.7

Decomposition of Total School Spending Progressivity between FRPL and Non-FRPL Students, by State

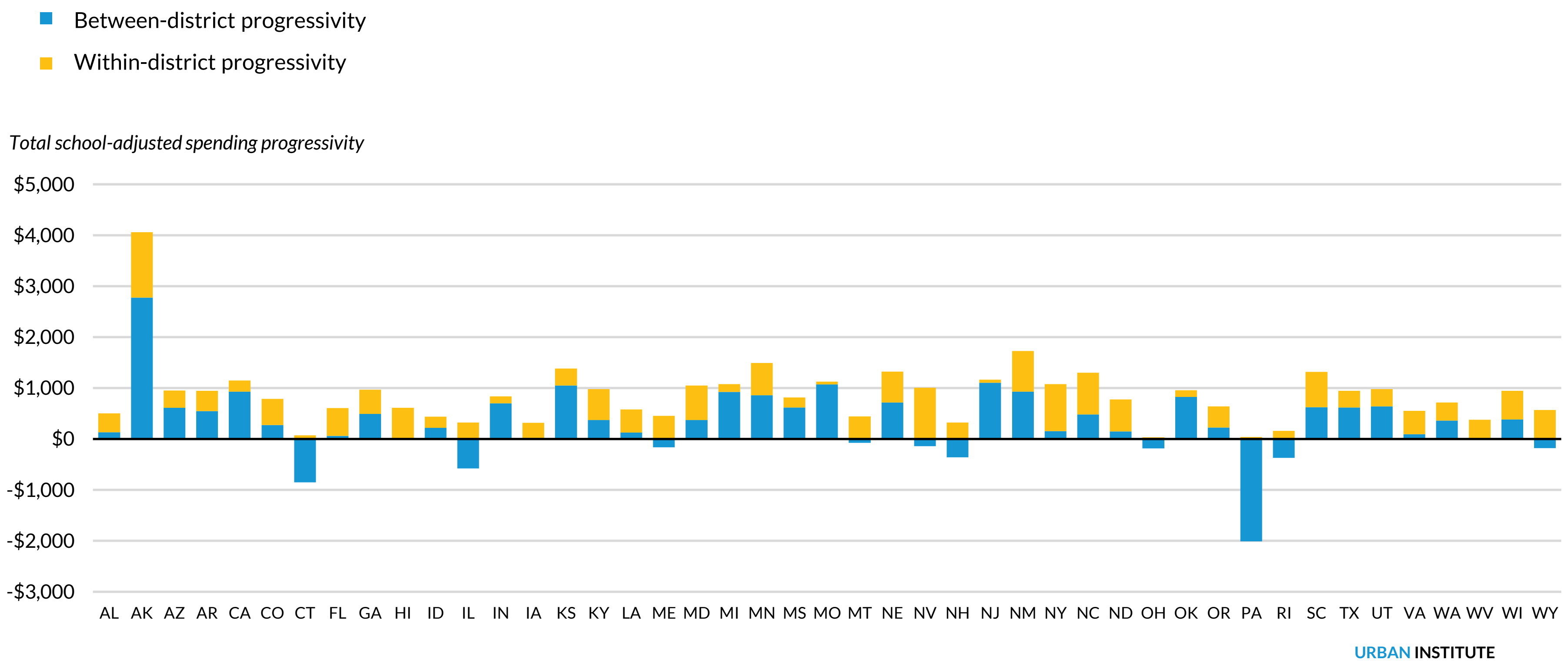


Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: FRPL = free and reduced-price lunch. 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable. Data are not presented for states and cities that no longer report FRPL eligibility (Delaware, Massachusetts, Tennessee, and the District of Columbia).

FIGURE A8

Decomposition of Total School Spending Progressivity between FRPL and Non-FRPL Students, by State, for Large Districts



Source: Authors' calculations using data from the National Center for Education Statistics (NCES) Common Core of Data, the NCES Comparable Wage Index for Teachers, and Georgetown University's Edunomics Lab (National Education Resource Database on Schools data).

Notes: FRPL = free and reduced-price lunch. 2018–19 spending is adjusted for differences in labor costs across districts. South Dakota data are unavailable. Data are not presented for states and cities that no longer report FRPL eligibility (Delaware, Massachusetts, Tennessee, and the District of Columbia). Large districts refers to districts with 10 or more schools.

Notes

[1] Importantly, we can look only at school-level results; districts could also target groups of students within schools through funding for specific programs.

[2] How schools target resources within the school to different students and classrooms is also important. We know of no such data that would enable a detailed analysis of within-school spending differences across student groups, though we acknowledge it as an understudied area of potential policy interest.

[3] Kristin Blagg, "District Size Affects Estimates of Equity in K–12 Funding, but Better Measures Might Be on the Way," *Urban Wire* (blog), Urban Institute, March 11, 2019, https://www.urban.org/urban-wire/district-size-affects-estimates-equity-k-12-funding-better-measures-might-be-way.

[4] Tomás Monarrez, Carina Chien, and Wesley Jenkins, "Dividing Lines: How School Districts Draw Attendance Boundaries to Perpetuate School Segregation," Urban Institute, September 14, 2021, https://apps.urban.org/features/dividing-lines-school-segregation/.

[5] See also Nathaniel Malkus, "Beneath the District Averages: Intradistrict Differences in Teacher Compensation Expenditures" (PhD diss., University of Maryland, College Park, 2012).

[6] Monarrez, Chien, and Jenkins, "Dividing Lines."

[7] NERD$ documentation notes, "Because the Every Student Succeeds Act (2015) did not prescribe a uniform accounting procedure for expenditures but instead assigned the responsibility to each state, there are differences in how states compute per pupil expenditures, categorize various expenditures, and make decisions on inclusions/exclusions. Additionally, some states allow for some flexibility in how expenditures are categorized, so there may even exist some differences across districts within a state (e.g., for site-based portions of the spending)."

[8] "Comparable Wage Index for Teachers (CWIFT)," US Department of Education, Institute of Education Sciences, National Center for Education Statistics, Education Demographic and Geographic Estimates, accessed July 30, 2022, https://nces.ed.gov/programs/edge/Economic/TeacherWage.

[9] A notable insight from the stratification literature is that different methods of measuring stratification can lead to different conclusions (reardon and Owens 2014). Two common approaches to stratification measurement are absolute measures and relative measures (Iceland 2004). Absolute measures describe the extent to which students from one demographic group are exposed to another group within individual schools. Common absolute measures are the isolation and exposure indexes, which measure the average share of minority students' classmates that are from varying ethnic backgrounds. Although useful, a drawback of absolute measures is that they reflect both racial stratification across schools and the school system's underlying racial composition. On the other hand, relative stratification measures focus on sorting by describing how evenly the population of a given group of students is distributed across schools, adjusting for system-wide demographic composition. Because they adjust for underlying compositional differences across districts, relative measures facilitate comparisons of stratification patterns across districts, which is especially beneficial for national analyses, given the huge amount of variation in district demographics and stratification across the country.

[10] Weighted by district enrollment. If weighting districts equally, the average gap increases to $58 per pupil.

[11] Special education costs can vary significantly across schools, depending on the share of students with special needs and the extent of services required for these students. But available data do not allow us to consider differences in special education spending.

[12] For this example, the distinction between whether the additional dollars come from state or federal funds is inconsequential, as we posit only that the funding comes from sources outside a district's control.

[13] Across all districts, the weighted average Black-white exposure gap is 9 percent. For districts with 10 or more schools, the gap is 12 percent.

[14] Including special education, limited English proficiency, student income, school size, and school grade span.

[15] In this report, we build on the work of Shores, Lee, and Williams (2021) and focus on the decomposition of spending into between and within components.

[16] Because of the formula's complex nature, the amount of Title I funding per eligible student varies by state (Gordon 2016). Likewise, allocation within districts may vary depending on state policy and the designation of Title I schools.

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About the Authors

Kristin Blagg is a senior research associate in the Center on Education Data and Policy at the Urban Institute. Her research focuses on K–12 and postsecondary education. Blagg has conducted studies on student transportation and school choice, student loans, and the role of information in higher education. In addition to her work at Urban, she is pursuing a PhD in public policy and public administration at the George Washington University. Blagg holds a BA in government from Harvard University, an MSEd from Hunter College, and an MPP from Georgetown University.

Julien Lafortune is a research fellow at the Public Policy Institute of California, where he specializes in K–12 education. His primary areas of focus include education finance, school capital funding policy, and educational tracking and stratification. He has published research on the impacts of school finance reforms on student achievement in the *American Economic Journal: Applied Economics*. He holds a PhD in economics from the University of California, Berkeley.

Tomás Monarrez is a research associate in the Center on Education Data and Policy. His research focuses on education policy topics as they relate to economic and racial inequality. Monarrez received bachelor's degrees in economics and mathematics from the University of Texas at Austin and earned his doctoral degree in economics from the University of California, Berkeley.

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