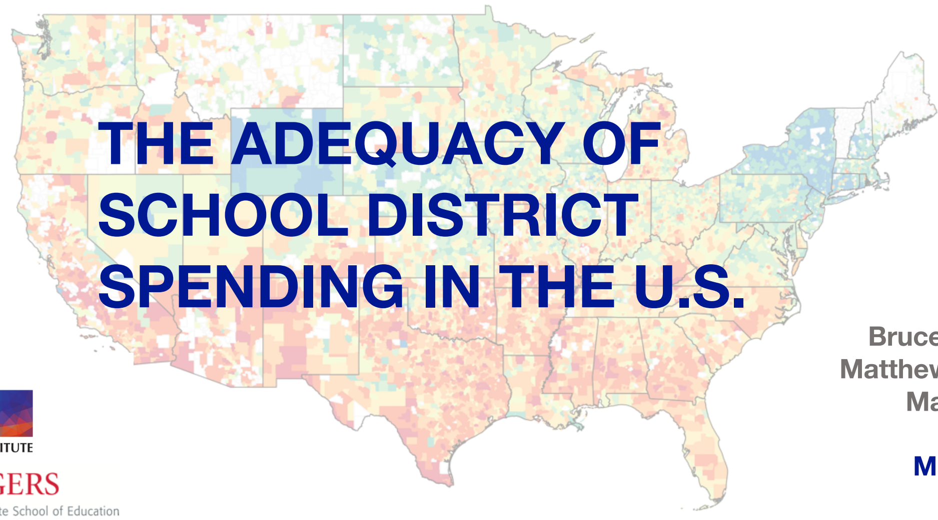
RESEARCH BRIEF



THE ADEQUACY OF SCHOOL DISTRICT SPENDING IN THE U.S.

Bruce D. Baker
Matthew Di Carlo
Mark Weber

ALBERT SHANKER INSTITUTE

RUTGERS Graduate School of Education

March 2021

ABSTRACT

We present an overview of spending adequacy among individual K-12 school districts in the U.S. Our results are from a new database of over 12,000 public school districts that allows users to compare each district's actual per-pupil spending levels to estimates of adequate spending levels—i.e., spending required to achieve the common goal of national average math and reading scores. The data are for the 2017-18 school year. Predictably, we find substantial heterogeneity, with many districts spending well above our estimated adequacy targets and many others spending well below, in some cases shockingly below. Districts with negative (i.e., inadequate) funding gaps are especially prevalent in the southeast and southwest, but they are also found throughout the entire U.S., including in states, such as Massachusetts and Connecticut, which include generally high-spending districts. The sum of these negative gaps across all districts (ignoring districts with positive gaps) is $104 billion, and the average negative gap is $4,254 per-pupil. Conversely, even in states where under-funding is widespread and typically severe, there are numerous districts in which resources exceed our adequate spending estimates. Finally, we show that the extent of funding inadequacy increases with district child poverty rates and with the proportion of Black and especially Hispanic (Latinx) students served by districts. These results illustrate that most states are failing in their job of filling the holes between districts' costs and their capacity to pay those costs, as well as how, even in states that are more successful, many districts slip through the cracks. An effort to rectify these discrepancies could consist of a strategic expansion of the federal role in education finance, as well as a recalibration of how states fund their schools. High-quality district adequacy measures can help guide this process by identifying where resources are needed most.

(ln)**SCHOOL** = b_0 + b_1State$_i$ + b_2LaborMarket$_{ij}$ + b_3CWI$_{ij}$ + b_4**FINANCE**$_{ij}$ + b_5PopulationDensity$_{ij}$ + b_6 Enrollment$_{ij}$ + b_7**INDICATORS**$_{ij}$ + b_8Scale$_{ij}$ + b_9Poverty$_{ij}$ + b_{10}SchlType$_{ij}$ + b_{11}**DATABASE**$_{ij}$ + e

ALBERT SHANKER INSTITUTE

RUTGERS Graduate School of Education

INTRODUCTION

In school finance research, “adequacy” is generally defined as the degree to which funding for schools is enough for students to reach some minimal level of educational outcomes. But adequacy is not just an academic construct. School funding is largely in the hands of states, and the primary job of states' finance systems should be to account for differences between their districts in the cost of providing that minimal level of educational quality, and then to distribute funds in a manner that compensates for the fact that some districts have less ability than others to pay these costs (e.g., via property taxes). For instance, districts serving large proportions of high-needs students will tend to have higher costs; if those districts lack the local capacity to pay those costs, state revenue needs to fill the gaps.

In many respects, school funding adequacy in the U.S. boils down to how well 51 very different state systems accomplish this gap-filling role for a highly diverse group of well over 15,000 school districts.

States allocate K-12 education funds in different ways, often with complex formulas that have evolved via legislation and court decisions over long periods of time. In addition, districts vary widely, within and between states, in terms of the need of the students they serve, structural characteristics (e.g., size), their capacity to raise revenue locally, and other important factors. The end result, predictably, is substantial heterogeneity in the adequacy of school funding in the U.S.

Since 2019, the School Finance Indicators Database (SFID) has included adequacy measures that allow users to compare actual *state* K-12 education spending, by district poverty level, with cost model estimates of spending levels necessary to achieve a common “benchmark” goal: national average math and reading scores.

These data show that, on average, spending in most states’ high-poverty districts is below our estimated required levels, while spending in low-poverty districts is typically above the targets (Baker et al. 2021). But there are exceptions to this aggregate characterization, and even states that conform to it vary widely in terms of degree.

Moreover, hidden underneath these state-level differences is tremendous variation between the districts within each state. For example, even in states where, according to our estimates, funding overall seems to be adequate across poverty groups, there are still districts left behind (and, conversely, there are well-funded districts even in states where resources are low). Looking “under the hood,” so to speak, is essential.

Accordingly, we have just published a new SFID product: the District Cost Database (DCD).[1] The DCD, which is freely available to the public, presents our state-level adequacy measures at the level of districts, which are the key “unit of analysis” in school finance. The database allows users to compare the actual and the estimated adequate spending levels for the majority of individual public school districts in the U.S. Although our measures are necessarily imperfect, we believe they are

[1] A first version of the district database was published last year by the Century Foundation (2020). We are grateful to the Century Foundation for their support in developing these methods. Their dataset and report are available at: https://tcf.org/content/report/closing-americas-education-funding/

reasonable estimates of costs and spending that can be carefully compared within and between states toward the purpose of improving school funding policies in the U.S.

In this research brief, after a quick non-technical discussion of data and methods, we present analyses that illustrate what the DCD results show and how they might be used. These include quick looks at the national school funding situation, comparisons of "similar" and "dissimilar" states, and the relationship between adequacy and student characteristics such as poverty and race/ethnicity. We conclude with a discussion of how our district adequacy database might inform policy.

ABOUT THE DATA

The most important measure included in the DCD is what we call "required spending," which is the estimated amount (per-pupil) each district would have to spend in order to achieve the common goal of national average test scores. This variable is central, of course, because it is the standard against which we assess the adequacy of *actual* district spending. We interchangeably refer to required spending as "adequate spending," "predicted cost," or "cost target."

These district cost estimates come from the National Education Cost Model (NECM), which is part of the SFID, and is perhaps the first education cost model that allows for evaluation of input/output-based adequacy not only within states, but between states as well. In this section, we briefly describe the NECM in accessible terms. For a more thorough technical discussion, see Baker et al. (in press) and Baker et al. (2018).

The NECM itself uses a dataset of district test scores, funding, and numerous other variables between 2009 and 2018.[2] The estimates included in this first release of the DCD pertain to 2018 (i.e., the 2017-18 school year).

The core purpose of the NECM is to account for the fact, long established in the research literature, that the cost of providing a given level of education is not uniform across districts (Duncombe and Yinger 2007). Perhaps most importantly, districts that serve larger shares of high-need students (e.g., higher Census child poverty rates) will have higher costs. In addition, other factors, such as labor costs (e.g., districts in areas with higher costs of living will need to pay their employees more), size (economies of scale), and population density, all affect the "value of the education dollar." The model, therefore, first estimates the relationships between district spending and these important factors, including testing outcomes. Importantly, the model accounts for the fact that school funding both affects and is affected by testing outcomes.[3]

[2] In addition to the SFID's District Indicators Database (SFID 2021), the NECM relies heavily on three additional datasets. The first is the Comparable Wage Index for Teachers (Cornman et al. 2019), an index of regional wage and salary variation developed by researchers at the National Center for Education Statistics (NCES) in collaboration with Dr. Lori Taylor of Texas A&M, who worked with NCES to develop the original version of the index in 2006. The second is the EDGE School Neighborhood Poverty Index, also published by the NCES, which is specifically designed to measure poverty surrounding schools and districts (Geverdt 2019). The third and perhaps most important NECM data source is the Stanford Education Data Archive (SEDA), a groundbreaking database of nationally-normed test scores going back to 2009 (Reardon et al. 2021). The SEDA allows for a better comparison of individual districts' test results across all states, a crucial tool for producing cost model estimates that are comparable across the U.S.

[3] For example, a district with higher test scores will tend to have higher property values than a district with lower scores. This high valuation allows the former district to collect more property tax revenues, which, in turn, boosts spending and positively affects testing outcomes. The NECM uses econometric methods to account for this endogeneity and tease out the causal relationship between spending and outcomes.

This initial model yields a kind of "relationship inventory" of how each factor is related to spending. We then use the "inventory" to predict the cost (spending levels) of achieving a common outcome level (e.g., national average math and reading test scores) for each individual district, based on that district's configuration of characteristics (in a sense, by comparing each district to other similar districts). These "required spending" estimates can then be compared with *actual* spending levels (total spending, direct to elementary and secondary education) in each district (this same basic process also yields our state-level estimates, which are aggregated district-level estimates). The difference between actual and required spending is a measure of adequacy relative to the common goal of national average scores.

A note on missing data: users of the full database will notice that estimates are not available for every single U.S. school district (i.e., the database does not include all districts). Some of these districts are excluded due to missing finance and/or testing data. This includes but is not limited to fiscally-independent charter schools or other types of special schools or service centers. Wherever feasible, data are imputed to maximize our non-missing sample. We have also decided to exclude from the final database estimates for districts that serve fewer than 100 students, as results based on these small samples tend to be less reliable.

Limitations of the model

It is important to interpret DCD estimates with caution. Even if we had a way to calculate perfect estimates of education costs, we would certainly never imply that these spending levels, if put into place in a given state or district, would quickly and certainly raise scores to the national average. This is not only because that implication assumes efficient use of additional funds, but also because real improvement is gradual and requires sustained investment.

And, of course, our estimates are far from perfect. This is true of all cost models, but the NECM contends with particularly daunting challenges insofar as it is estimating education costs across the entire nation. Most basically, no model can control for everything (researchers call this "omitted variable bias"). The NECM includes numerous variables that influence the (bi-directional) relationship between funding and student outcomes, but there are unobserved (i.e., unmeasured or unmeasurable) factors that we cannot include. And estimating costs across all states exacerbates this problem (e.g., comparing costs between, say, Connecticut and Mississippi).

Second, the variables that we *do* have are imprecise. For example, our spending data may be biased by differences between states in how spending is tracked and reported to federal agencies (despite the best efforts of the latter). We have specific concerns about recent federal spending data from Vermont and New York (including New York City), and about testing outcome data in western and upstate New York.

Third and finally, it bears emphasizing that our cost estimates are based on common outcomes defined solely in terms of math and reading scores in grades 3-8. This is a very narrow picture of student performance. Districts may be spending money in ways that benefit students but do not necessarily affect these testing outcomes.

With all that said, we believe the NECM produces reasonable cost estimates that are useful for assessing spending adequacy against a common standard and, ultimately, for improving state and federal school finance policy. We are constantly updating and improving the model to address the issues discussed above.

The DCD includes not only required and actual spending, but also testing outcome gaps (differences between each district's average scores and the national mean), enrollment, and a small group of district-level measures of student characteristics, including Census child poverty rates and the share of each district's students who are special education, English language learners, Black, and Hispanic/Latinx. The full database and user's guide, as well as an online tool that allows users to view the data for each individual district (without downloading the dataset), are available at the SFID website: http://schoolfinancedata.org

RESULTS

In this section we present a few "high-level" analyses that illustrate the heterogeneity of district adequacy as well as aggregate associations between adequacy and district characteristics. A review of individual districts would be burdensome, but many users of the DCD will be interested in assessing spending adequacy in single district or small group of districts. We encourage these users to try the visualization tool at the SFID website (or download the full dataset). However, we also present, in Appendix Table 1, actual and required spending estimates for the 100 largest school districts in the U.S.

A national view of adequacy and outcomes

We start with Figure 1, a "heat map" of per-pupil spending gaps in public K-12 districts in the contiguous U.S. We will be expressing adequacy in terms of these dollar gaps throughout this brief, but using alternative approaches (e.g., actual spending divided by required spending) does not change our conclusions or interpretations.

Districts shaded in orange-to-red in the map spend less than our estimated adequate levels, whereas green-to-blue shading denotes spending above our cost targets. The districts shaded in white ("no data") are those missing from the DCD due to sample size and other factors (discussed above). In addition, the map does not include Hawaii (no estimates available, as the state consists of a single district) and Alaska (excluded for space reasons).[4]

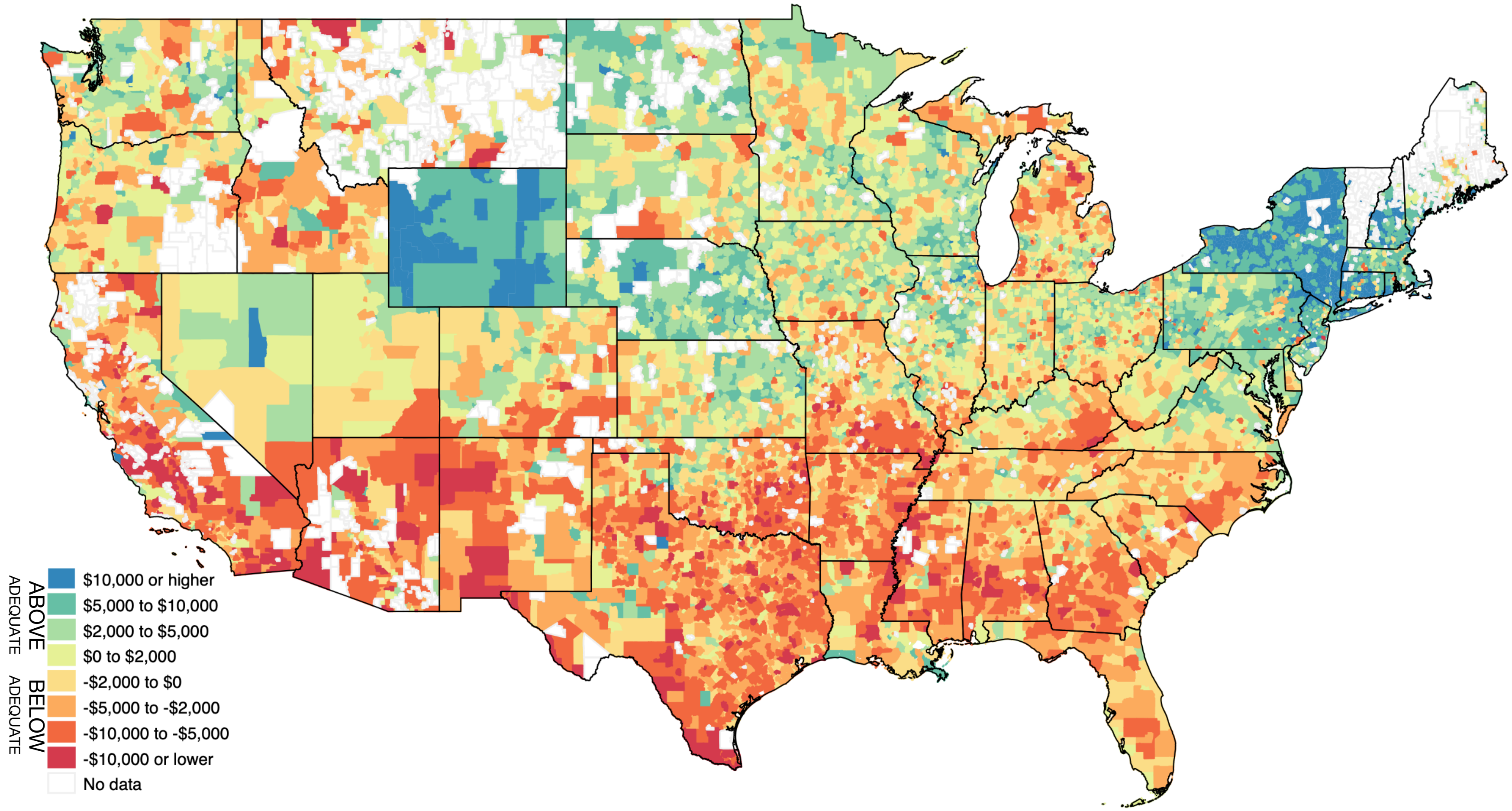
When viewing these maps, keep in mind that many geographically small districts serve large student populations, and vice-versa. For example, most of the geographically large missing (i.e., white-shaded) districts in Montana serve fewer than 100 students (and are therefore excluded from our database), whereas many large districts (as defined by enrollment) in other states are barely visible on the map.

[4] There is also a small group of districts that are not missing from the DCD but are not shaded in the map. These are districts in states where "geographical districts" are unorganized territories (parts of Maine) or where they are defined differently than the units to which school funds are allocated (much of Vermont).

figure 1

Map of district funding gaps

Gap between actual and estimated adequate spending per-pupil, 2018



That said, one thing that jumps out immediately from Figure 1 is the coast-to-coast "belt" of negative funding gaps (orange-to-red shading) across the southeast and southwest and extending into California. Districts in several of these states, such as Arkansas and Mississippi, serve relatively high-poverty student populations (which increases their costs) and, on a related note, have smaller economies from which to draw revenue (which decreases their capacity to pay those additional costs). As a result, while these states devote relatively large shares of these economies to their public schools (making them what we call "high effort" states), they are severely limited in their ability to meet their districts' needs.

Florida, Texas, and California, in contrast, have larger economies but devote relatively small proportions of those economies to K-12 education. These "low effort" levels contribute to negative funding gaps throughout most of these states. For instance, of the 1,006 Texas school districts included in the DCD, 861 exhibit at least nominally negative funding gaps, most of them quite large. These 861 districts serve almost 90 percent of students in the state. In dozens of these districts, including Dallas and Houston, spending would have to more than double to meet adequacy targets. It bears mentioning that Texas, along with several other largely "orange/red" states in the map, such as Arizona and Nevada, have systematically reduced school funding over the past few decades.

On the other hand, we find large areas with generally *positive* gaps (i.e., adequate spending, shaded in green-to-blue) in much of the northeast, and less consistent but still visible areas with positive gaps extending through northern Ohio and the Great Lakes states and into Nebraska and Wyoming, which both exhibit funding consistently above our estimated targets. (Alaska, which is not on the map, also has overwhelmingly positive funding gaps.)

Notice, however, that there are virtually no states in which gaps are exclusively negative or positive. This illustrates that heterogeneity of school funding gaps is not just between states, but within them as well. Even in states with relatively strong funding systems, there are districts left behind.

The sum of all the negative gaps in the U.S. (ignoring all districts with positive gaps) is $104 billion. To put that figure in perspective, it is equivalent to roughly 18 percent of total 2018 spending among all districts included in our dataset. The average district gap (again ignoring positive gaps) is $4,254 per-pupil (or 25.6 percent below adequacy targets).

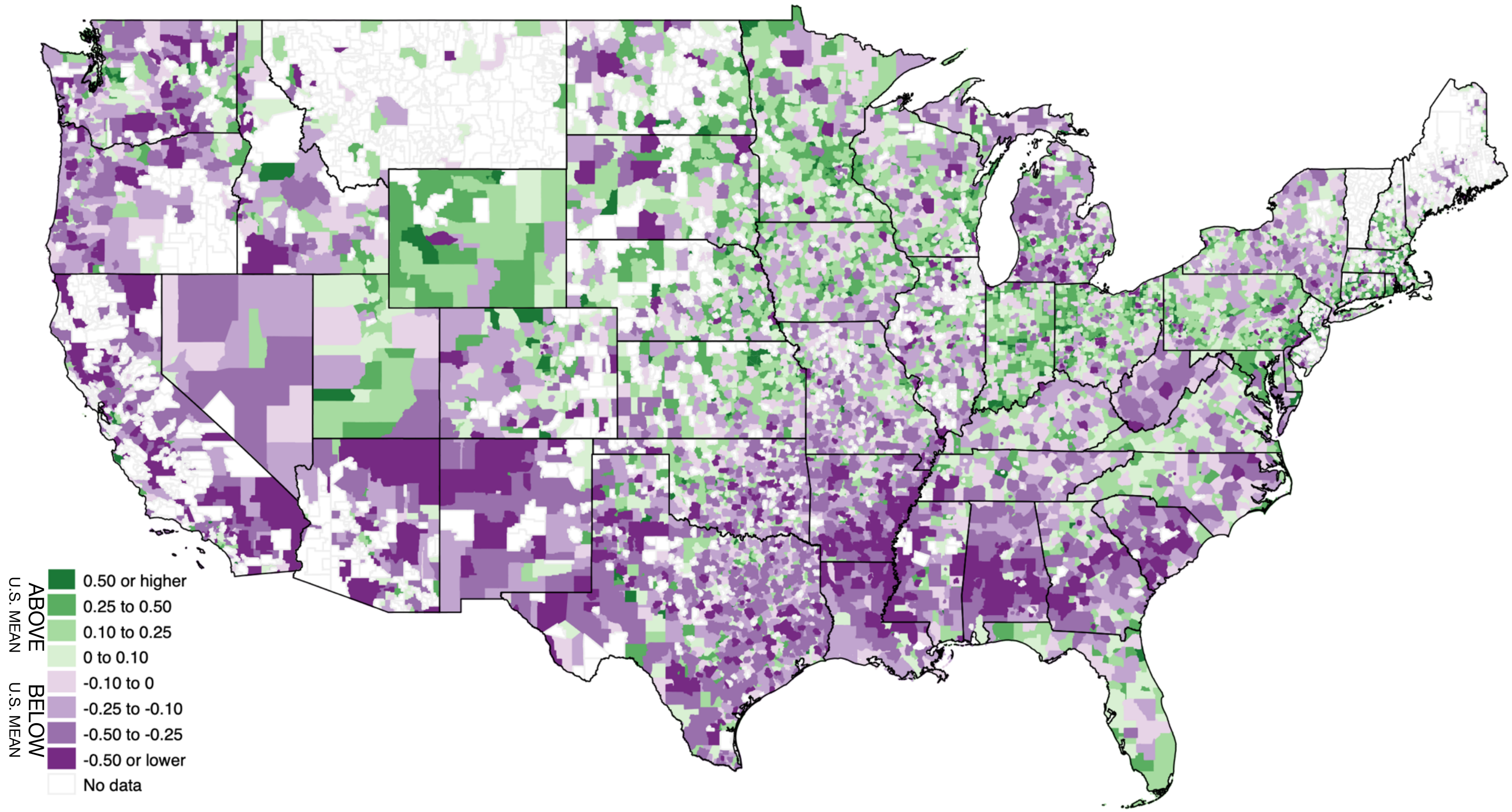
The consequences of these disparities are evident in Figure 2, which is the same type of map, but instead of funding gaps we present testing outcome gaps—that is, differences (in standard deviations) between each district's average test scores (math and reading combined) and the national average in 2018. Districts with purple shading have scores below the mean, whereas green-shaded districts are those in which scores exceed the U.S. average. (Note: there are approximately 800 districts in the DCD, including many in Illinois and Montana, and all of Vermont, with missing testing outcome data but non-missing funding gaps.)

In general, districts with positive funding gaps (from Figure 1), such as those in northeast states, also tend to exhibit above-average scores, while districts that spend below our cost targets, such as those located across the southeast and southwest, have negative testing gaps (the correlation between these two variables nationally is 0.59). State and local investment matters.

figure
2

Map of district testing outcome gaps

Gap between district average and national average test scores (in standard deviations), 2018



Wyoming, for example, stands out as an exemplary state in both maps. School finance reforms in that state during the 1990s, coupled with copious revenue from national resources, have combined to produce funding levels well over our estimated adequate spending targets, with testing outcomes to match. (Yet Wyoming is also another good example of how these maps can be somewhat visually misleading: the entire state serves around 94,000 students, a smaller student population than that of roughly 30 individual school districts across the nation, most of which are barely visible on these maps.)

There are, however, exceptions to the funding/test outcomes relationship. For instance, in Florida, school districts exhibit generally negative funding gaps, but their testing outcomes are more of a mixed bag. These types of discrepancies may to some extent reflect "real" differences in efficiency, but we strongly suspect that they are due largely to the issues of measurement error and omitted variable bias discussed in the previous section. (This same point applies to New York, which also has generally positive funding gaps and negative testing outcome gaps, but the specific issues with that state's spending and outcome data mentioned above are almost certainly a factor as well.)

Comparing "different" and "similar" states

The maps in Figures 1 and 2 illustrate clearly how district funding adequacy and testing outcomes vary not only between but also within states. Figure 3 presents a scatterplot of funding gaps (the first map) by testing outcome gaps (the second map), but here we focus visually on Massachusetts (the blue squares) and Arizona (the red triangles). Funding gaps (the vertical axis) below zero indicate spending below the cost targets while outcome gaps (the horizontal axis) below zero indicate test scores below the U.S. average. The large mass of gray circles in the plot are all other districts in the U.S. (minus a tiny group of outliers that are excluded to keep the plot range from getting too large). In this plot, the size of the markers varies by enrollment (i.e., larger circles are larger districts).

Overall, we see a clear but still somewhat "messy" relationship between funding gaps and testing outcomes, as is evident in the upward slope of the mass of gray circles. Yet even the "best-" and "worst-performing" states exhibit substantial heterogeneity under the district-level hood. The comparison of Massachusetts and Arizona provides an example of this intra-state variation.

Massachusetts is among the highest-spending, highest-scoring states in the U.S., whereas Arizona's scores are well below the national average, and it is also generally the lowest-funding state in the U.S. in terms of our adequacy measures. This contrast could not be clearer in Figure 3. Massachusetts districts (blue squares) are overwhelmingly concentrated in the upper right quadrant of the plot (spending above adequate, scores above U.S. average), while the red triangles representing Arizona districts are found mostly in the lower left quadrant (spending below adequate, scores below average). The two states' markers, which are also sized according to enrollment, almost combine to form a linear relationship that spans the national range of funding and outcome gaps, with Arizona constituting the tail end and Massachusetts up at the front.

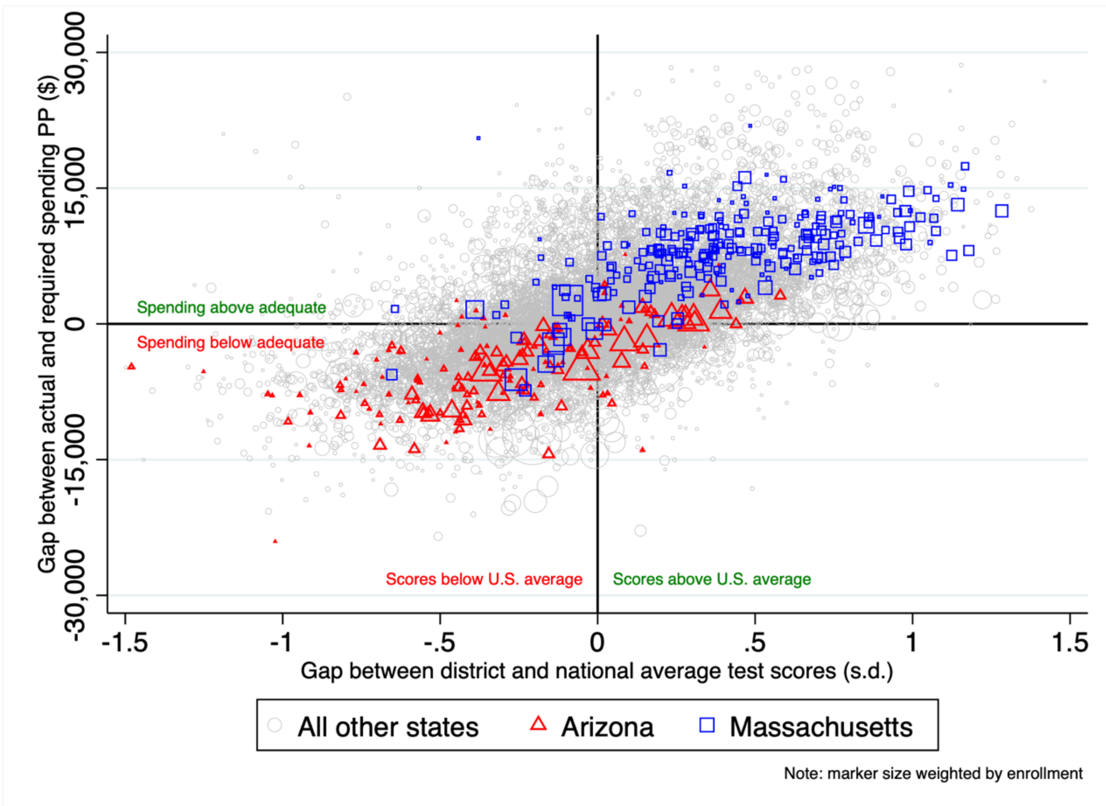
At the same time, there is considerable "overlap" between the sloping groupings of squares and triangles in the middle of the plot. Several Massachusetts districts, including most of the largest in the state in terms of enrollment (the largest squares), have funding below adequate levels and/or test scores below the U.S. mean.

The opposite situation is evident in Arizona, where several medium- and large-sized districts exhibit above-average scores and/or spending above our estimated adequacy levels. This shows how states often held up as models of adequate funding, such as Massachusetts, have considerable room for improvement, while even in severely under-resourced states such as Arizona there are pockets of adequate spending. That's not to say that we should withhold praise from Massachusetts or go easy on Arizona; instead, we should remember that states, like the nation in general, are not uniform in the adequacy of their spending levels.

figure **3**

Funding gaps by outcome gaps (MA/AZ focus)

Gap between actual and required spending per-pupil by gap between district and U.S. average test scores, U.S. school districts, 2018



How do things look if we compare two states that are *similar* in terms of aggregate funding and testing outcomes? We carry out one such comparison in Figure 4, which is the same as Figure 3, but we have replaced Arizona with Connecticut.

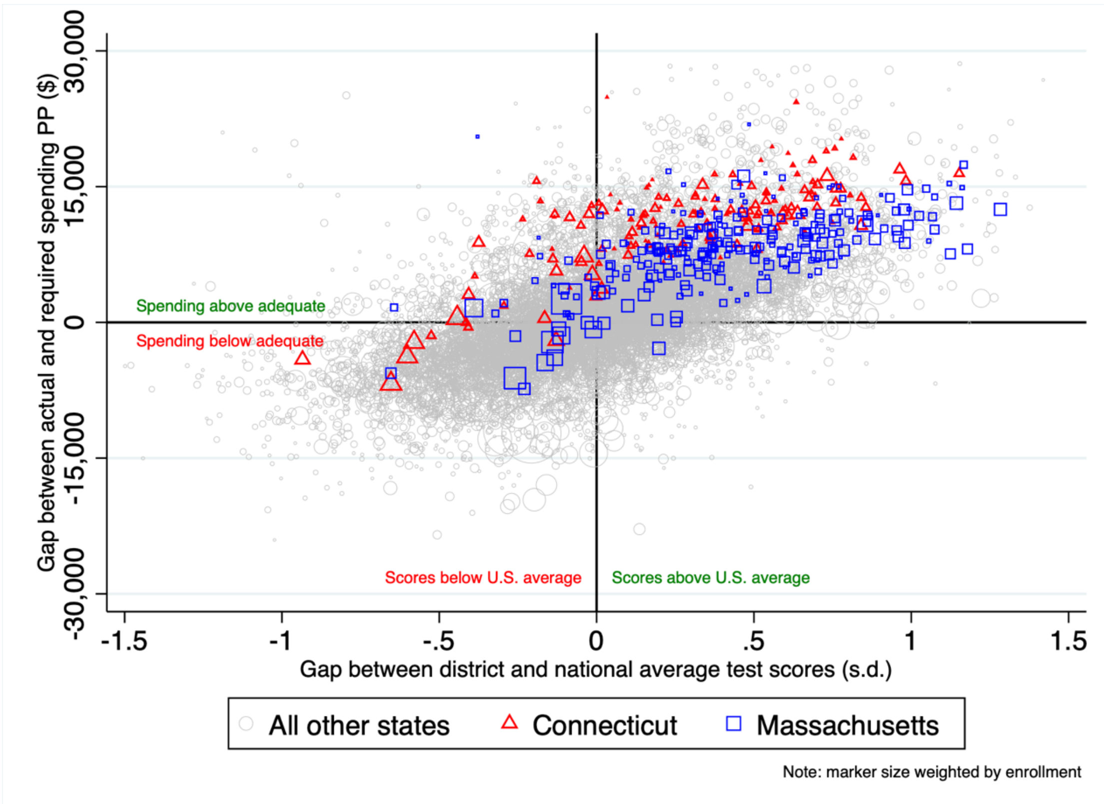
As was evident in the maps in Figures 1 and 2, Connecticut, like Massachusetts, is a generally high-scoring states in which most districts are funded above our estimated adequacy targets. Accordingly, in Figure 4, most of the blue and red markers fall into the upper right quadrant (spending above adequate, scores above U.S. average).

Yet Connecticut, like Massachusetts, is far from uniform in terms of spending adequacy and test scores. In the lower-left quadrant, you can see a group of relatively large Connecticut districts that are both below the horizontal adequate spending line and quite far to the left of the line representing parity with U.S. average testing outcomes. Massachusetts, as we saw in Figure 3, also has several districts with test scores below the U.S. mean and spending below our estimated cost targets. There aren't many of these districts in either state, but they are mostly large districts. In fact, around 19 percent of Connecticut students and 17 percent of Massachusetts attend districts in this quadrant.

figure **4**

Funding gaps by outcome gaps (MA/CT focus)

Gap between actual and required spending per-pupil by gap between district and U.S. average test scores, U.S. school districts, 2018



The typical size of the per-pupil funding gaps in the lower-left quadrant is similar between these two states (the squares and triangles are similarly distributed below the horizontal line in the middle), but the Massachusetts districts, on average, have higher scores relative to the U.S. mean than do their Connecticut counterparts (the blue squares are further to the right than are the red triangles). That is, we find pockets of meaningful spending deficiencies even in these two comparatively high-spending states, including in many of their largest districts, but the Connecticut districts with negative funding gaps are considerably lower-scoring than their Massachusetts counterparts.

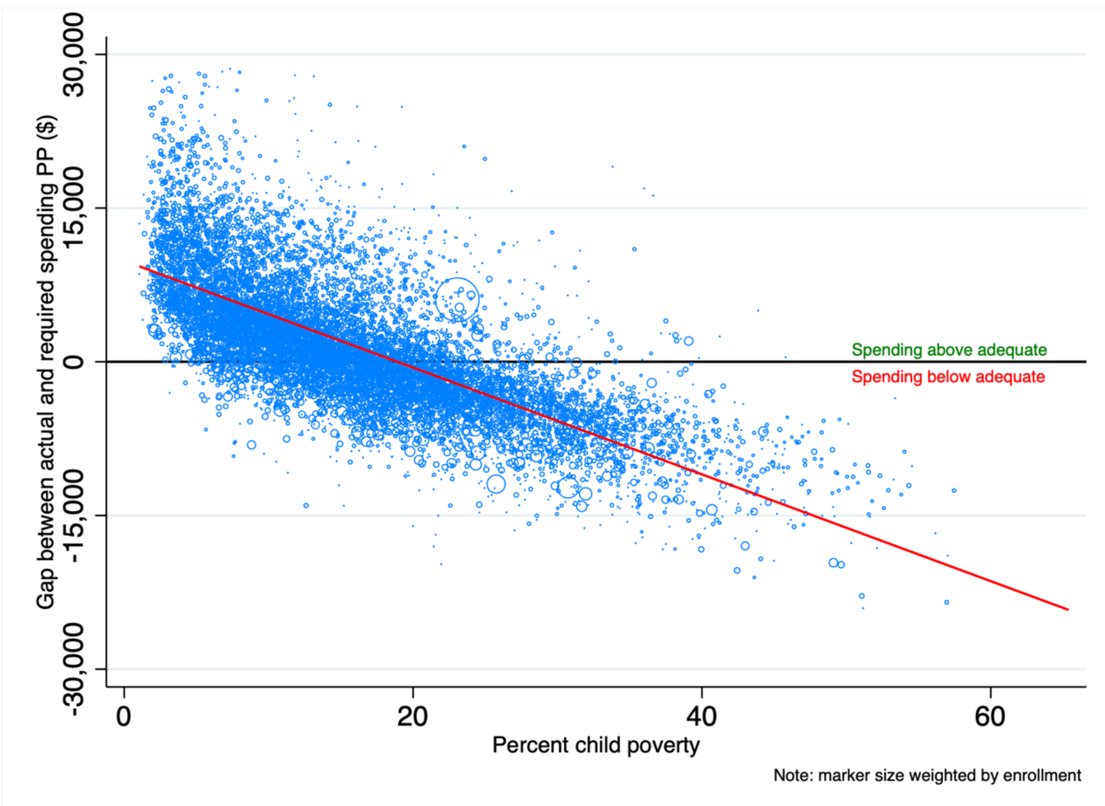
Clearly, both groups of districts should be targeted for additional funding by state (and federal) policymakers, but the Connecticut group, which includes high-poverty districts such as Bridgeport, Hartford, and New Britain, might be viewed as a particularly high priority given their testing outcomes, which are among the lowest in the nation. This also illustrates, once again, how district-level estimates might paint different portraits—and carry different policy implications—even in states that look similar at the aggregate level.

Spending adequacy and student characteristics

Finally, there might be an interest in whether spending adequacy estimates are associated with student characteristics. In Figure 5, we plot spending gaps (again, in dollars per-pupil) by the U.S. Census child poverty rate (ages 5-17) in each district. As above, larger circles indicate larger districts (in total enrollment). The red line in the middle of the plot represents the average relationship between the gaps and poverty.

figure 5 **Funding gaps by child poverty**

Gap between actual and required spending per-pupil by U.S. Census child (5-17 year old) poverty rate, U.S. school districts, 2018



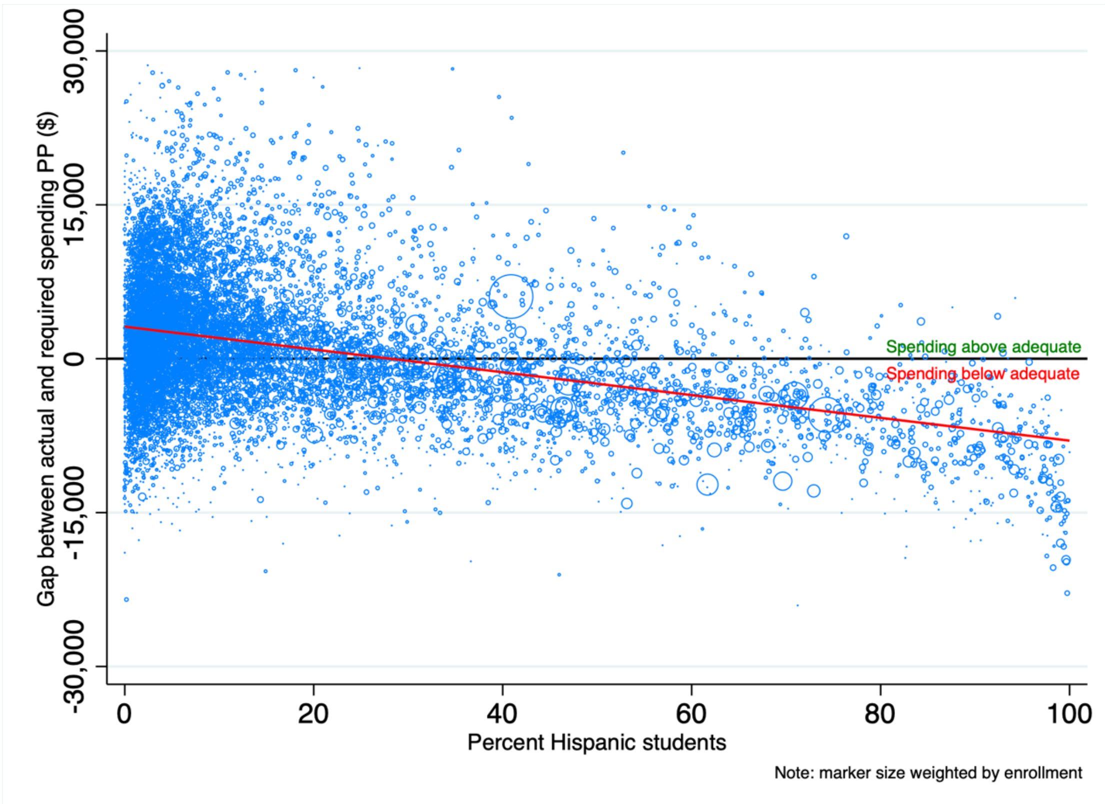
We find a strong negative relationship between district child poverty and funding gaps (i.e., funding is less adequate as poverty increases). This is clear in the downward slope of the red average relationship line (the enrollment-weighted correlation is -0.70). In fact, almost 95 percent of the roughly 2,000 districts with poverty rates above 25 percent also have negative funding gaps. This relationship is not shocking, given the connection between poverty and education costs, but it does reflect a general failure of states to provide equal educational opportunity for their students.

More noteworthy, perhaps, is the relationship between funding gaps and the share of Hispanic/Latinx students, which is presented in Figure 6. Hispanic/Latinx students constitute around 25 percent of the U.S. public school student population, and that share is growing. (Note: henceforth we will use the terms "Black" and "Hispanic" because these are the categories used by the National Center for Education Statistics, the source of our race and ethnicity data.)

Once again, the downward-sloping red line indicates a negative relationship; negative funding gaps increase in size, and positive gaps decrease in size, as the Hispanic share increases. As in Figure 5, once we pass a certain percentage (in the case of Figure 6, beyond 40-50 percent Hispanic), very few districts fall above the adequate spending line. Roughly 86 percent of the over 1,000 districts with majority (50 percent or greater) Hispanic student populations spend below our estimated adequate levels.

figure **6** **Funding gaps by percent Hispanic students**

Gap between actual and required spending per-pupil by percent Hispanic students, U.S. school districts, 2018



On the one hand, this relationship is also not surprising. Negative funding gaps increase with poverty (Figure 5), and poverty in the U.S. is associated with race and ethnicity. On the other hand, there is evidence that these disparities cannot be explained away by poverty (Baker et al. 2020). Moreover, the strength of the relationship in Figure 6 is a bit jarring (the weighted correlation is -0.53), substantially stronger than it is for Black students (-0.21).

This can be attributed in part to the prevalence of negative (i.e., inadequate) funding gaps in the southeast and southwest, where there are large concentrations of Hispanic students (for example, Arizona, California, New Mexico, and Texas all serve student populations that are close to or over 50 percent Hispanic). But it's also because, even in comparatively better-funded states such as Connecticut and New Jersey, Hispanic students are disproportionately located in districts with funding levels below estimated adequacy targets. These results suggest that Hispanic students, like their Black peers, suffer school funding disparities to which policymakers clearly need to play greater attention.

DISCUSSION

Depending on whom you ask, stagnant national test scores and middling U.S. performance on international exams is either evidence that we need to spend more on schools or proof that we are overspending and getting nothing in return. Both of these arguments fail to acknowledge the remarkable heterogeneity of both U.S. school funding adequacy and outcomes not only between states, but within them as well.

The measures introduced and analyzed in this research brief are imperfect and require cautious interpretation. Yet, they provide reasonable and policy-relevant estimates of costs and spending in over 12,000 districts across 49 states and D.C. And there is some good news. Our results show that thousands of districts enjoy funding levels above and beyond our estimates of costs required to achieve national average test scores. For many, funding is two or three times higher than the targets.

Yet these districts co-exist with thousands of other school systems, some located within driving distance or even in the next town over, where investment is so poorly aligned with need that funding levels are a fraction of our estimated costs. Districts with such negative funding gaps, large and small, are found in rich and poor states, big and small states, and in red and blue states.

Making things worse, we show that these negative gaps tend to be larger in districts serving higher proportions of low-income families and students of color, especially Hispanic students. These associations are among the only consistent features underlying the heterogeneity of U.S. school funding adequacy.

The primary job of states' K-12 finance systems is to account for differences among their school districts in the cost of providing some minimal (hopefully desirable) level of educational quality, and to distribute funding in a manner that compensates for the fact that some districts are wealthier than others. Since wealthier districts are better-equipped to pay for schooling costs, it falls to states' finance systems to find a way to achieve equal educational opportunity for all their students.

Virtually no state has succeeded completely in this task, and too many have failed miserably. Nationally, our 2018 negative spending gaps, ignoring all districts with positive gaps, sum to over $100 billion dollars. This is a large number but it is not insurmountable. Meeting this challenge will likely require both a strategic expansion of the federal role in education finance, as well as some fundamental rethinking on the part of state policymakers about how they fund their schools. Our district and state cost data, along with our SFID state effort and progressivity indicators, can help to guide both efforts (Baker et al. in press).

In some states, inadequate funding is partially a product of circumstance. Mississippi and Arkansas, for example, devote a relatively large share of their economies to education (i.e., they put forth high "effort"), but they also serve particularly high-need (i.e., high cost) student populations, and their economies are so small that adequate funding is almost impossible (Baker et al. 2021). Federal funds should be targeted at underfunded districts in these high-need, high-effort states in order to ameliorate the funding gaps presented above.

Yet inadequate funding is to no small extent also a deliberate policy choice. For example, several chronically low-funding states, such as Florida and Texas, do have the economic capacity to increase revenue but choose not to do so (some have dramatically *decreased* their effort and funding levels over time). These states should be incentivized to boost their effort levels in order to raise revenue in-house, perhaps as a precondition for federal assistance (Baker and Di Carlo 2020).

It bears reiterating, however, that even in states where funding is generally adequate and equitable there are districts that fall through the cracks. And this includes "high-performing" states such as Massachusetts, Connecticut, and New Jersey. In these states, actual spending is higher than required spending by an average of $8,000-$10,000, yet small groups of districts just miles away operate with resources well below what they need, usually with low testing outcomes to match. These latter school systems may be few in number but they tend to be large in size; in Massachusetts and Connecticut, for instance, districts with negative gaps serve roughly one in five students. Even in states with comparatively strong systems, drastically underfunded, low-performing districts should be a priority for federal (and state) funding.

School finance policy, of course, is not made by technocrats armed with cost model estimates. It is an intensely political process, and it always will be. Data cannot and should not dictate all policy, but we hope our district database can serve as a starting point for acknowledging and addressing the alarming disparities in school funding in the U.S. Once again, the full DCD dataset, as well as an online visualization tool that allows users to view profiles of spending adequacy and testing outcomes in any district, are available at the SFID website: http://schoolfinancedata.org.

REFERENCES

Baker, Bruce D., and Di Carlo, Matthew. 2020. *The Coronavirus Pandemic and K-12 Education Funding*. Washington, D.C.: Albert Shanker Institute. http://tinyurl.com/66j9bu9e

Baker, Bruce D., Weber, Mark, and Srikanth, Ajay. In press. Informing Federal School Finance Policy with Empirical Evidence. *Journal of Education Finance.*

Baker, Bruce D., Di Carlo, Matthew, Schneider, Lauren, and Weber, Mark. 2021. *The Adequacy and Fairness of State School Finance Systems (third edition).* Washington, D.C.: Albert Shanker Institute/Rutgers University Graduate School of Education. http://schoolfinancedata.org/the-adequacy-and-fairness-of-state-school-finance-systems-2021/

Baker, Bruce D., Srikanth, Ajay, Cotto, Robert Jr., and Green, Preston C. III. 2020. School Funding Disparities and the Plight of Latinx Children. *Education Policy Analysis Archives* 28(135). https://doi.org/10.14507/epaa.28.5282

Baker, Bruce D., Weber, Mark, Srikanth, Ajay, Kim, Robert, and Atzbi, Michael. 2018. *The Real Shame of the Nation: The Causes and Consequences of Interstate Inequity in Public School Investments.* New Brunswick, NY: Rutgers University. http://tinyurl.com/4xcswckc

Century Foundation. 2020. Closing America's Funding Gaps. Washington, D.C.: Century Foundation. Retrieved from: https://tcf.org/content/report/closing-americas-education-funding/

Cornman, Stephen Q., Nixon, Laura C., Spence, Matthew J., and Taylor, Lori L., and Geverdt, Doug E. 2019. Education Demographic and Geographic Estimates (EDGE) Program: American Community Survey Comparable Wage Index for Teachers (ACS-CWIFT) (NCES 2018-130). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from: http://nces.ed.gov/pubsearch/

Duncombe, William, and Yinger, John. 2007. Measurement of Cost Differentials. In Ladd, Helen F., and Fiske, Edward. (eds), *Handbook of Research in Educational Finance and Policy* (pp. 203-221). New York: Routledge.

Geverdt, Doug. 2019. *Education Demographic and Geographic Estimates Program (EDGE): School Neighborhood Poverty Estimates, 2016-2017 (NCES 2019-112).* U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from: http://nces.ed.gov/pubsearch/

National Center for Education Statistics. Common Core of Data (1993-2018). Washington, D.C.: National Center for Education Statistics. https://nces.ed.gov/ccd/

Reardon, Sean F., Ho, Andrew D., Shear, Benjamin R., Fahle, Erin M., Kalogrides, Demetra, Jang, Heewon, Chavez, Belen. 2021. Stanford Education Data Archive (Version 4.0). Palo Alto, CA: Stanford University. http://purl.stanford.edu/db586ns4974

School Finance Indicators Database. 2021. *District Indicators Database Codebook 2021*. Washington, D.C.: Albert Shanker Institute. http://tinyurl.com/stbydbz4

Taylor, Lori I. 2014. Extending the NCES Comparable Wage Index. College Station, TX: Texas A&M University. http://bush.tamu.edu/research/faculty/Taylor_CWI/

Taylor, Lori I., and Fowler, William J. Jr. 2006. *A Comparable Wage Approach to Geographic Cost Adjustment (NCES 2006-321).* Washington, D.C.: National Center for Education Statistics. http://nces.ed.gov/pubsearch/

U.S. Census Bureau. Small Area Income and Poverty Estimates (1993-2018). Washington, D.C.: U.S. Census Bureau. https://www.census.gov/programs-surveys/saipe.html

APPENDIX

Appendix Table 1 **Actual spending, estimated required (adequate) spending, and funding gaps in the 100 largest U.S. school districts, 2018**

District	State	Total enrollment	Actual PP spending	Req. PP spending	Funding Gap ($)	Funding Gap (%)
Albuquerque	NM	89,935	$9,031	$15,376	-$6,345	-41.3%
Aldine ISD	TX	67,331	10,109	22,993	-12,884	-56.0
Alpine	UT	80,548	6,646	5,661	985	17.4
Anne Arundel County	MD	82,777	13,866	10,072	3,794	37.7
Arlington ISD	TX	61,076	9,027	15,233	-6,206	-40.7
Atlanta	GA	52,147	16,402	16,239	163	1.0
Austin ISD	TX	81,650	10,322	15,769	-5,447	-34.5
Baltimore City	MD	80,591	15,793	17,957	-2,164	-12.1
Baltimore County	MD	113,282	14,122	11,629	2,493	21.4
Boston	MA	52,664	24,177	21,598	2,579	11.9
Brevard County	FL	73,524	8,841	9,947	-1,106	-11.1
Broward County	FL	271,956	9,444	11,229	-1,785	-15.9
Capistrano Unified	CA	53,622	9,388	9,883	-495	-5.0
Charleston 01	SC	49,607	11,548	12,384	-836	-6.8
Charlotte-Mecklenburg	NC	147,631	9,360	11,452	-2,092	-18.3
Cherry Creek No. 5	CO	55,699	10,820	8,754	2,066	23.6
Chesterfield County	VA	60,915	9,886	7,956	1,930	24.3
City of Chicago SD 299	IL	373,700	14,134	16,334	-2,200	-13.5
Clark County	NV	329,259	8,976	13,979	-5,003	-35.8
Clayton County	GA	54,530	10,472	15,866	-5,394	-34.0
Cobb County	GA	112,084	10,368	11,796	-1,428	-12.1
Columbus City	OH	50,219	15,461	21,758	-6,297	-28.9
Conroe ISD	TX	61,580	8,380	10,920	-2,540	-23.3
Corona-Norco Unified	CA	53,294	11,351	11,593	-242	-2.1
Cumberland County	NC	50,725	8,989	12,238	-3,249	-26.5
Cypress-Fairbanks ISD	TX	116,401	8,459	13,856	-5,397	-39.0
Dallas ISD	TX	156,832	9,954	21,888	-11,934	-54.5
Davidson County	TN	84,728	11,999	15,460	-3,461	-22.4
Davis	UT	73,982	7,189	5,875	1,314	22.4
DeKalb County	GA	100,144	11,802	15,194	-3,392	-22.3
Denver (SD #1 in Denver County)	CO	91,822	11,888	16,018	-4,130	-25.8
Douglas County	CO	67,597	9,350	6,306	3,044	48.3
Duval County	FL	129,583	9,163	11,298	-2,135	-18.9
El Paso ISD	TX	58,326	9,693	18,898	-9,205	-48.7
Elk Grove Unified	CA	63,297	11,515	14,725	-3,210	-21.8
Fairfax County	VA	188,556	14,932	13,622	1,310	9.6
Fort Bend ISD	TX	75,275	9,399	11,111	-1,712	-15.4
Fort Worth ISD	TX	86,234	9,823	18,717	-8,894	-47.5
Fresno Unified	CA	73,455	13,567	22,057	-8,490	-38.5
Frisco ISD	TX	58,450	8,056	7,597	459	6.0
Fulton County	GA	95,534	11,619	11,251	368	3.3
Garland ISD	TX	56,582	9,272	16,158	-6,886	-42.6
Granite	UT	68,350	8,045	11,268	-3,223	-28.6
Greenville 01	SC	75,500	9,712	10,347	-635	-6.1
Guilford County	NC	73,210	9,609	13,226	-3,617	-27.3
Gwinnett County	GA	179,266	10,292	10,969	-677	-6.2
Henrico County	VA	51,625	9,951	9,639	312	3.2
Hillsborough County	FL	217,072	8,889	11,875	-2,986	-25.1
Houston ISD	TX	214,175	9,505	21,776	-12,271	-56.4
Howard County	MD	56,784	15,595	8,522	7,073	83.0
Jefferson County	KY	98,797	13,972	11,730	2,242	19.1

Appendix Table 1 continued on next page

Appendix Table 1 (continued)

District	State	Total enrollment	Actual PP spending	Req. PP spending	Funding Gap ($)	Funding Gap (%)
Jefferson County	CO	86,146	$9,756	$8,722	$1,034	11.9%
Jefferson Parish	LA	48,750	11,519	14,349	-2,830	-19.7
Jordan	UT	54,511	6,652	6,281	371	5.9
Katy ISD	TX	77,522	9,347	12,009	-2,662	-22.2
Klein ISD	TX	53,068	9,207	14,066	-4,859	-34.5
Knox County	TN	60,802	8,850	8,001	849	10.6
Lee County	FL	93,221	9,680	9,673	7	0.1
Lewisville ISD	TX	52,472	9,786	10,384	-598	-5.8
Long Beach Unified	CA	74,681	12,489	17,730	-5,241	-29.6
Los Angeles Unified	CA	621,414	13,247	18,715	-5,468	-29.2
Loudoun County	VA	80,606	14,208	8,179	6,029	73.7
Manatee County	FL	48,952	9,187	10,802	-1,615	-14.9
Mesa Unified	AZ	62,975	8,032	13,032	-5,000	-38.4
Miami-Dade	FL	354,840	9,542	13,143	-3,601	-27.4
Milwaukee	WI	75,539	14,158	19,889	-5,731	-28.8
Mobile County	AL	55,272	9,502	15,588	-6,086	-39.0
Montgomery County	MD	161,546	16,005	12,667	3,338	26.4
New York City	NY	976,771	26,588	20,527	6,061	29.5
North East ISD	TX	66,101	8,993	12,513	-3,520	-28.1
Northside ISD	TX	106,700	8,870	12,299	-3,429	-27.9
Oakland Unified	CA	50,231	11,195	18,292	-7,097	-38.8
Omaha	NE	52,836	13,124	13,866	-742	-5.4
Orange County	FL	203,982	9,641	12,670	-3,029	-23.9
Osceola County	FL	65,982	8,405	12,456	-4,051	-32.5
Palm Beach County	FL	191,786	10,161	12,629	-2,468	-19.5
Pasadena ISD	TX	54,646	10,233	20,251	-10,018	-49.5
Pasco County	FL	73,682	8,692	9,073	-381	-4.2
Philadelphia City	PA	131,238	12,655	20,047	-7,392	-36.9
Pinellas County	FL	101,824	9,621	8,530	1,091	12.8
Plano ISD	TX	53,952	9,772	11,114	-1,342	-12.1
Polk County	FL	99,892	9,632	12,165	-2,533	-20.8
Portland 1J	OR	48,591	13,540	9,844	3,696	37.6
Prince George's County	MD	132,317	15,334	13,513	1,821	13.5
Prince William County	VA	90,562	11,497	11,316	181	1.6
Round Rock ISD	TX	49,086	8,808	8,802	6	0.1
San Antonio ISD	TX	50,683	11,750	20,626	-8,876	-43.0
San Bernardino City Unified	CA	53,027	13,451	20,968	-7,517	-35.8
San Diego Unified	CA	126,400	11,416	16,082	-4,666	-29.0
San Francisco Unified	CA	60,263	13,640	18,387	-4,747	-25.8
San Juan Unified	CA	50,044	11,096	15,513	-4,417	-28.5
Santa Ana Unified	CA	53,131	12,971	20,599	-7,628	-37.0
Seattle	WA	54,573	15,014	12,016	2,998	24.9
Seminole County	FL	67,915	8,393	7,957	436	5.5
Virginia Beach City	VA	68,986	11,606	6,667	4,939	74.1
Volusia County	FL	62,963	8,541	10,349	-1,808	-17.5
Wake County	NC	161,417	8,897	8,721	176	2.0
Washoe County	NV	67,021	9,294	10,009	-715	-7.1
Wichita	KS	50,375	11,672	12,529	-857	-6.8
Winston Salem/Forsyth County	NC	55,322	9,509	13,733	-4,224	-30.8

Notes: Negative dollar and percentage gaps indicate actual spending below estimated required (i.e., adequate) levels. Table includes the 100 largest U.S. public school districts based on enrollment (with non-missing estimates in the District Cost Database). Some district names are shortened and/or simplified. See text for information on data and methods.

ABOUT THE AUTHORS

Bruce D. Baker is professor in the Graduate School of Education at Rutgers University and author of *Educational Inequality and School Finance: Why Money Matters for America's Students*.

Matthew Di Carlo is a senior fellow at the Albert Shanker Institute in Washington, D.C. He has a Ph.D. in sociology from Cornell University.

Mark Weber is the Special Analyst for Education Policy at the New Jersey Policy Perspective and a lecturer in education policy at Rutgers University, where he earned his Ph.D. He is also a music teacher in Warren Township, N.J.

Acknowledgments
The authors wish to acknowledge the assistance of Burnie Bond, Lauren Schneider, Ajay Srikanth, and Vicki Thomas, as well the Century Foundation and W.T. Grant Foundation for their past support of the data and model development.

ALBERT SHANKER INSTITUTE

The Albert Shanker Institute, endowed by the American Federation of Teachers and named in honor of its late president, is a nonprofit, nonpartisan organization dedicated to three themes—children's education, unions as an advocate for quality, and both civic education and freedom of association in the public life of democracies. Its mission is to generate ideas, foster candid exchanges and promote constructive policy proposals related to these issues.

The institute commissions original analyses, organizes seminars, sponsors publications and subsidizes selected projects. Its independent board of directors is composed of educators, business representatives, labor leaders, academics and public policy analysts. This document does not necessarily represent the views of the members of its board of directors.

RUTGERS
Graduate School of Education

Rutgers University Graduate School of Education (GSE) is committed to ***Advancing Excellence and Equity in Education***. For nearly a century, the GSE has been a national leader in preparing educators, researchers, and leaders who create effective and equitable learning opportunities for diverse learners. Rutgers GSE is consistently ranked among the best schools of education in the country. In partnership with educators, our world-class faculty conduct innovative research to understand a broad range of educational issues and to advance educational practices and policies. GSE alumni have gone on to become effective practitioners, transformative leaders, and accomplished researchers in the United States and throughout the world.