THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

BRUCE D. BAKER
MATTHEW DI CARLO
MARK WEBER

FIRST EDITION
APRIL 2019

FINDINGS FROM THE SCHOOL FINANCE INDICATORS DATABASE

SCHOOL YEAR 2015-2016

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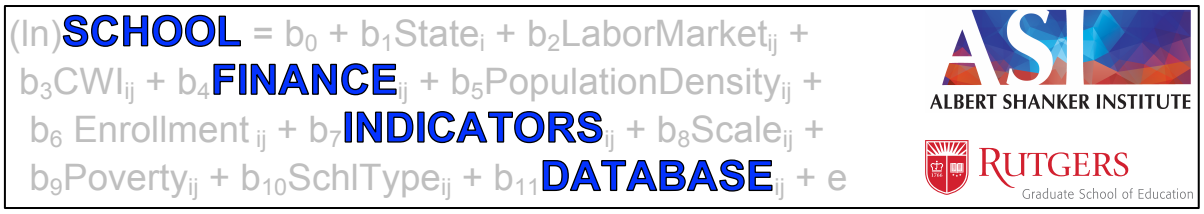

THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

ABSTRACT

When it comes to American education, few policy areas are as misunderstood — or as crucial — as school finance. Over the past several years, a political and empirical consensus has emerged about the importance of equitable and adequate school funding for high-quality K-12 education. Certainly, there are plenty of contentious debates about how education funds should be spent. But regardless of one's opinions on specific education policies, virtually all of the options for improving America's schools require investment --- particularly for disadvantaged students. We introduce in this report an updated, public database of state school finance measures, and present results for three key measures in this system: effort, adequacy, and progressivity. Our results indicate, as would be expected, that states vary widely on all three measures. There are several states in which educational resources are comparatively adequate and distributed equitably. In general, however, resources in most states tend to be allocated non-progressively or even regressively, That is, higher-poverty districts do not receive more funds — and in some cases receive substantially less — than do lower-poverty districts, even controlling for factors that affect costs, such as regional wage variation, district size, and population density. Moreover, using models that estimate the spending levels required to achieve common outcome goals, we find that the vast majority of states spend well under the levels that would be necessary for their higher-poverty districts to achieve national average test scores. We do not provide state rankings or grades in this report, as the interplay between effort, adequacy, and progressivity is complex. We do, however, include recommendations on how researchers, policymakers, and the public can use our findings, as well as our database, to evaluate state systems and inform debates about improving school finance in the U.S.

INTRODUCTION

Over the past decade, there has emerged a political consensus regarding schools, money, and state school finance systems. This consensus — that money does, indeed, matter — is supported by a growing body of high-quality empirical research regarding the importance of equitable and adequate financing for providing high-quality schooling to all children (Baker 2017; Jackson 2018; Baker 2018).

There is, of course, serious and often contentious debate about how education funding should be spent, with an ideologically diverse group of policymakers and advocates supporting a wide range of substantive policy options. These debates are important. In education, money can be, and frequently is, used poorly. How money is spent — and on which students — is no less important than how much money is spent.

Yet virtually all potentially effective policies and approaches require investment, often substantial investment. And there is now widespread agreement, backed by research, that we cannot improve education outcomes without providing schools — particularly schools serving disadvantaged student populations — with the resources necessary for doing so. Put simply: We can't decide how best to spend money for schools unless schools have enough money to spend.

This consensus is the impetus for the **School Finance Indicators Database** (schoolfinancedata.org), a new and improved collection of data and measures on state and local school finance systems. In building and presenting this system, we rely on the following principles:

1. **Proper funding is a necessary condition for educational success**: Competitive educational outcomes require adequate resources, and improving educational outcomes requires additional resources.

2. **The cost of providing a given level of educational quality varies by context**: Equal educational opportunity requires progressive distribution of resources, targeted at students and schools that need them most.

3. **The adequacy and fairness of education funding are largely a result of legislative policy choices**: Good school finance policy can improve student outcomes, whereas bad policy can hinder those outcomes.

U.S. public school finance remains primarily in the hands of states. On average, about 90 percent of funding for local public school systems and charter schools comes from state and local tax sources. How state and local revenue is raised and distributed is a function of seemingly complicated calculations, usually adopted as state-level legislation. The stated goal of these formulas is to achieve an adequate and more equitable system of public schooling for the state's children.

The purpose of this project overall is to provide data and analysis that are both empirically rigorous as well as accessible and useful to policymakers, parents, and the public. By partnering with other scholars, and with organizations from across the ideological spectrum, it is our hope that we can eventually reach a consensus on the best methods and data to employ when analyzing school finance systems.

In this report, we provide results from three of the indicators included in our State Indicators Database: **effort**, **adequacy**, and **progressivity**. We refer to these as our "core indicators," as we believe that they, as a group, provide a concise summary of how much states spend on education and how those resources are distributed.

All of our state indicators data, including those from past years, are freely available to the public, in Excel and Stata format. The state dataset is accompanied by documentation that includes non-technical descriptions of all variables, and is designed to be accessible to non-researchers. In addition to the full state database (roughly 130 variables), we have also published a "reduced dataset," which includes only the variables presented directly in this report (i.e., the "core indicators"). Download these materials at: http://schoolfinancedata.org.

MEASURING FUNDING ADEQUACY AND FAIRNESS

Outside of arcane academic journals, the vast majority of school finance discussions and comparisons use simple measures, such as raw per-pupil spending. The problem with this approach is that the cost of providing a given level of education quality depends on context, including the students a district serves, the labor market in which it is located, its size, and other factors.

Consider, for example, two hypothetical school districts, both of which spend the same amount per pupil. The simple approach to comparing these two districts might conclude that they invest equally in resources, such as teachers, curricular materials, facilities, and so on, that have been shown to improve student performance.

If, however, one of these districts is located in an area where employees must be paid more due to a much more competitive labor market, or that district maintains a larger number of school buildings per student due to population density differences, or serves a larger proportion of students with special needs, then this district will have to spend more per pupil than its counterpart to achieve a given level of education quality.

Our basic model therefore controls statistically for the following characteristics (see Appendix Table A for a list of data sources):

1. **Student poverty**: Percent of children (ages 5-17) living in the district with family incomes below the federal poverty line (data source: U.S. Census Bureau);

2. **Regional wage variation**: An index of variation in the salaries of college-educated professionals who are not educators (data source: Education Comparable Wage Index (ECWI), developed by Lori Taylor [2016]);

3. **District size**: Number of students served, which accounts for economies of scale in providing services such as transportation (data source: National Center for Education Statistics, Common Core of Data);

4. **Population density**: Population per square mile of land area (data source: U.S. Census Bureau).

Although no model can account for every factor that influences the costs of education, this approach permits the estimation of per-pupil spending and revenue estimates that are more comparable across states.

Specifically, our model calculates, in each state, current spending and revenue for a "typical" district that has: at least 2,000 pupils; average population density; a labor market with national average (within year); external labor cost pressures; and a given poverty rate (i.e., 0, 10, 20, or 30 percent). As such, our adjusted spending and staffing levels account for:

- Labor cost variation that affects the value of the education dollar;
- Quantities of staff who might be employed at any given spending level;
- The reality that spending levels and staffing levels are generally higher in states serving large shares of children in remote rural schools.

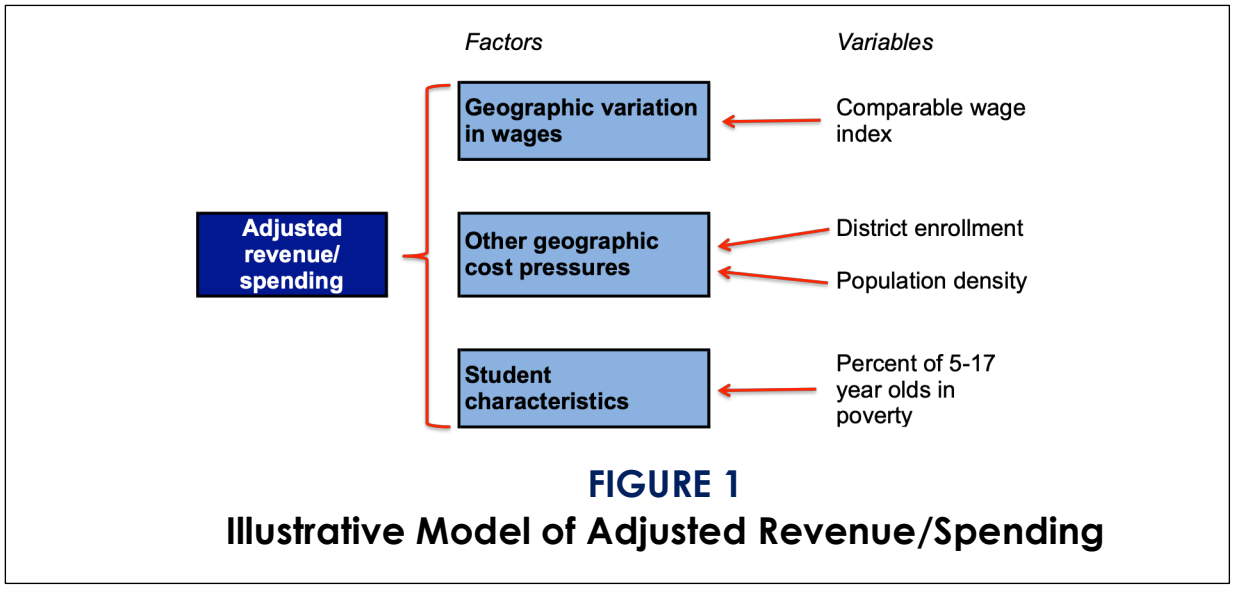

FIGURE 1
Illustrative Model of Adjusted Revenue/Spending

We call this measure **adjusted (or predicted) spending** or **adjusted (or predicted) revenue** (per-pupil). These estimates are used in our measures of adequacy and progressivity, both discussed below. For more detailed information on the model and variables, see our State Indicators Database User's Guide and Codebook.

The most important of the factors we use in this model is poverty (using data collected by the U.S. Census Bureau). Poverty is highly significant not only because it exerts strong influence on the cost of providing education, but also because there is now broad agreement among scholars and organizations across political and disciplinary spectra that school districts serving higher-needs student populations — those with higher poverty rates in particular — require not the same, but *more* resources per pupil than districts serving lower-needs student populations.

Of course, poverty is not the only measurable characteristic associated with student outcomes. So too are other variables, such as those measuring whether students are English language learners or on special education plans. We use Census poverty as an imperfect but acceptable proxy, one which is correlated with many other factors, measured and unmeasured, that influence outcomes.

Given this consensus about the need to account for student characteristics, it is clear that state school finance systems should strive to be *progressive*: They should channel more funds toward districts with higher levels of student poverty, because that is where those funds are needed the most. The equity measures produced in our report, as well as those produced by the Urban Institute and the Education Trust, all acknowledge this basic goal of state school finance systems and framing of equal educational opportunity.

And progressiveness alone is not sufficient. Progressive distributions of funding must be coupled with sufficient overall levels of funding to achieve the desired outcomes. Put simply, even the most progressive school funding systems will not produce results if they provide insufficient resources for students in both poor and more affluent districts.

RESULTS: CORE INDICATORS

We propose the following three "core indicators" for comparing and evaluating state (and district) school finance systems.

1. **Effort**: how much of a state's total resources or capacity are spent directly on K-12 education;

2. **Adequacy**: whether states provide sufficient resources to districts, relative to other states or to common outcome goals (e.g., test scores);

3. **Progressivity**: whether states allocate more resources to districts serving larger proportions of disadvantaged children.

In this section, we discuss each of these core indicators in turn, and present results using the most recent data (the 2015-16 school year).

Within the notes for each figure in which data are presented, we also provide the names of the specific State Indicators Database variables that are used to create the figures, so that readers can replicate our results or use the same variables in different analyses.

The database also includes more than 100 additional variables, not presented in this report, that users can download and analyze themselves, including variables that can be used to construct alternative versions of the three core indicators, as well as other types of measures (these additional variables are discussed below, in the section "Resource allocation indicators").

One additional note: in the figures below, and in all our datasets, years refer to the *spring* semester of the school year. For example, 2016 means that the data pertain to the 2015-16 school year (the most recent year available).

EFFORT

Effort (fiscal effort) indicates how much of a state's total resources or capacity are spent directly on K-12 education.

In our system, effort is calculated simply by dividing total expenditures (state plus local, direct to education) by either:

1. Gross state product (GSP); or
2. State aggregate personal income.

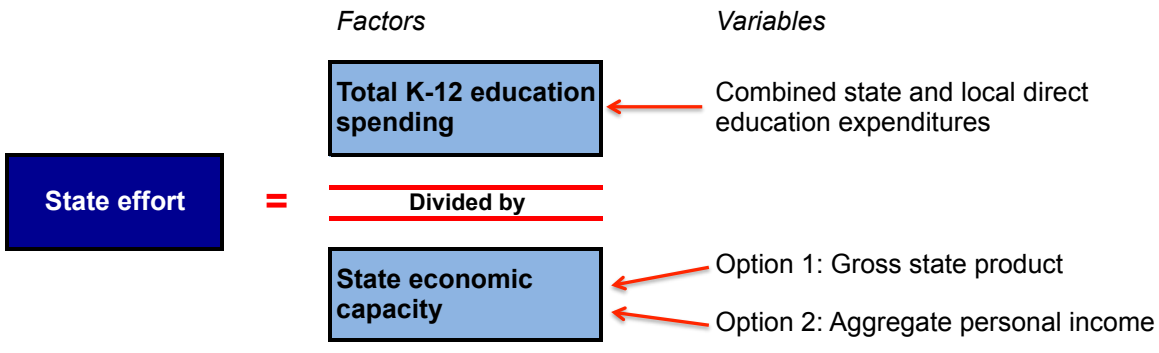

FIGURE 2
Illustrative Model of State Fiscal Effort Indicator

Both of these denominators are measures of a state's economic capacity; in the simplest terms, how much "money" does a state have? In this sense, effort measures how much revenue each state spends as a percentage of how much it *might* spend.

In other analyses, effort has been measured by dividing total education spending by total state and local spending. We believe this is problematic, however, because some states choose not to levy sufficient taxes to support *any* high-quality public services. These states may expend a large proportion of their total governmental spending on schools, but their effort compared to their capacity to spend is still low.

In Figure 3 we present each state's effort as a percentage of its gross state product.[1] The results for the alternative version of effort (using aggregate personal income) are not presented in this report, as they are very similar (the correlation between the two is roughly 0.90), and can be downloaded as part of our State Indicators Database.

Figure 3 indicates that effort ranges from more than 5 percent in Wyoming and Vermont to approximately 2.5 percent in Hawaii and Arizona. In other words, the amount Wyoming spends on its schools is equal to 5 percent of its annual gross state product, while Arizona and Hawaii spend about half as much as a proportion.

Most states cluster around the unweighted state average of 3.5 percent. Note, though, that even small differences in effort can represent substantial increases or decreases in education resources, particularly in high-capacity states.

It bears reiterating that effort is measured in terms of spending as a proportion of capacity; states with large economies and relatively high-income residents have larger "pies" from which education might be funded (via taxation). New York and New Jersey, for instance, are high-capacity states that also put forth above-average effort. California and Massachusetts, on the other hand, are relatively low-effort states, but their low effort will have less deleterious implications for education resources in these high-capacity states than it would in lower-capacity states.

Conversely, Mississippi exhibits rather strong effort, but its relatively small capacity means that students in that state will be under-resourced vis-à-vis states that put forth similar effort but have greater capacity.

That said, effort, as we define it (using state "capacity"), is in large part a policy choice, representing both the decision to levy sufficient taxes and how the state prioritizes public education. Combined with the adequacy of spending levels, discussed below, the effort indicator allows us to determine which states lag behind in school resources because they lack capacity, as opposed to those that lag behind because they don't expend the effort.

[1] The results presented in this report do not include the District of Columbia. The full State Indicators Database, however, does include results for the District of Columbia on some of the variables discussed below.

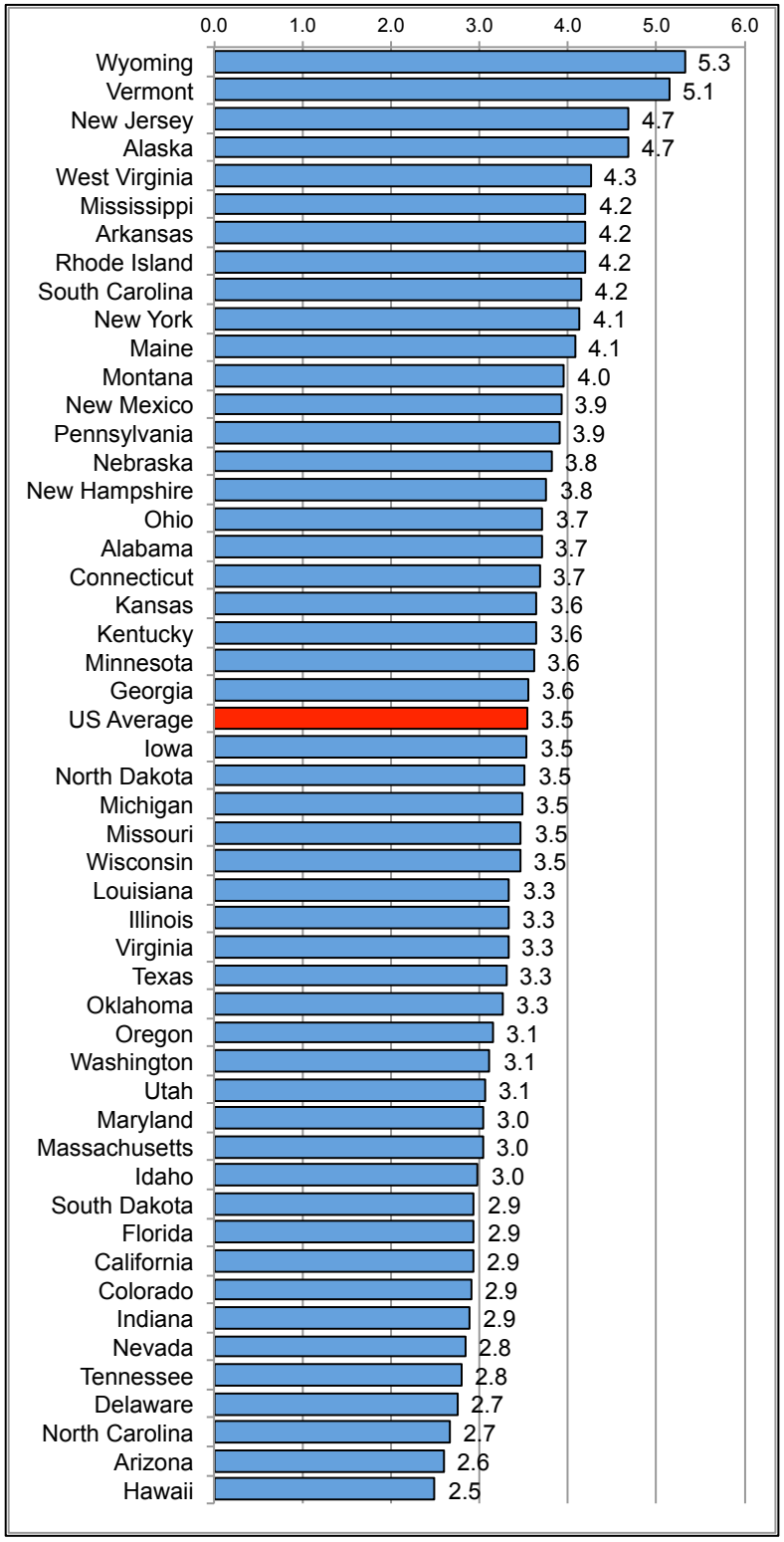

FIGURE 3
State Fiscal Effort

Direct expenditures as a percentage of gross state product, by state, 2016

Notes: U.S. average is unweighted.

Variables used:
effort

Effort can also be measured as a percentage of states' aggregate personal income; this variable (*inc_effort*) is included in our State Indicators Database.

States with higher values in the graph invest more of their total economy (gross state product or GSP) in K-12 education – that is, they put forth more "effort." However, states with larger economies might exhibit less effort than states with smaller economies, but still achieve the same funding levels.

ADEQUACY

In school finance scholarship, *adequacy* has come to be defined as a measure of whether the amount of funding for schools is enough for students to reach a minimal level of education outcomes.

Measuring adequacy involves the complicated evaluation of whether a given state or district spends "enough" on public education. It considers both inputs into the school system, as well as the outcomes those schools achieve.

In our system, adequacy is measured using two indicators, which entail different types of comparisons:

1. **Equated spending levels**: Comparing a state's adjusted spending, described above, to that of other states at a given poverty level;

2. **Equated spending relative to common outcome goals**: Comparing a state's adjusted spending, at a given poverty level, to the estimated (modeled) spending level that would be required to achieve national average test scores in the previous year.

We might interpret the first approach as addressing the question: Does this state spend *a lot,* compared with other states? For example, how much do districts spend in New York versus Mississippi, when those districts are equivalent in terms of size, population density, labor market differences, and student poverty?

This first version of the indicator evaluates adequacy entirely in reference to other states, rather than to some "tangible" outcome. These estimates are presented in Appendix Table B.[2]

We do not present them here so as to focus on our second measure, which is perhaps better-suited to capture "adequacy" per se, as it addresses the question: "Does this state spend enough?" For this measure we use a similar but modified version of adjusted spending by poverty quintile.[3] In addition, instead of comparing spending among states, we compare how much each state spends to how much *it would have to spend* for its students to achieve a common goal.

We define this goal in terms of test scores, specifically how much states would have to spend for their students (in each poverty quintile) to achieve the national average scores from the previous year. We do not intend to suggest that standardized test scores provide a comprehensive picture of the value of schools or investment in those schools. They are, however,

[2] Our State Indicators Database includes not only adjusted spending, but also variables for adjusted revenue (by source — state/local/federal). These too can be used as the first type of adequacy measure. We focus on spending because it is more appropriate in the context of adequacy: Spending is the most direct measure of the resources that are put into the school system.

[3] Poverty quintiles are different for each state. In other words, the lowest-poverty quintiles are the 20 percent of lowest-poverty districts *in that state*. It may be those districts have poverty levels higher than those in the lowest quintile in another, more affluent state.

a common benchmark of student performance that can be used to assess, however imperfectly, adequacy. Moreover, we contend that increases in spending would benefit not only test scores, but other meaningful student outcomes as well.

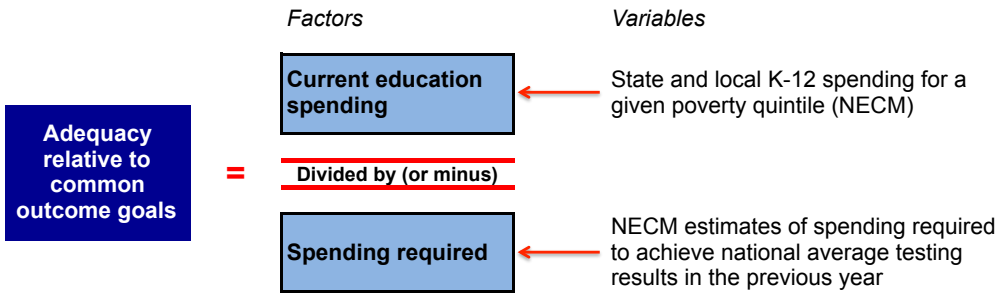

FIGURE 4
Illustrative Model of Adequacy Relative to Common Outcome Goals

These comparisons come from the National Education Cost Model (NECM), which is part of our system. For testing data, the NECM relies on 2013-2015 estimates from the Stanford Education Data Archive (Reardon et al. 2017), a database of testing outcomes that are made comparable across states. In simplified terms, the NECM does the following:

1. Calculates adjusted spending by poverty quintile (using many of the same variables as the original version of adjusted spending);

2. Calculates how much each state would be required to spend for students in each poverty quintile to achieve the national average test score (average for all students); and

3. Compares the difference between actual spending and required spending.

The NECM estimates are therefore measures that define adequacy in terms of actual student outcomes. We can, for example, assess how much more a state would have to spend for students in its highest-poverty districts to achieve average testing outcomes, and then compare this to lower-poverty districts. For more technical details on the NECM, see Baker et al. (2018).

In Figure 5 we present a rough snapshot of adequacy across 49 U.S. states (Hawaii is eliminated from NECM estimates because the state contains only one school district). Note that NECM estimates are calculated state-by-state, as are the thresholds for poverty quintiles and the gaps between actual and national average test scores. This means that the estimates in Figure 5, which are averaged across states, should be interpreted with caution. They do, however, provide a general sense of the national situation when it comes to outcome-based adequacy.

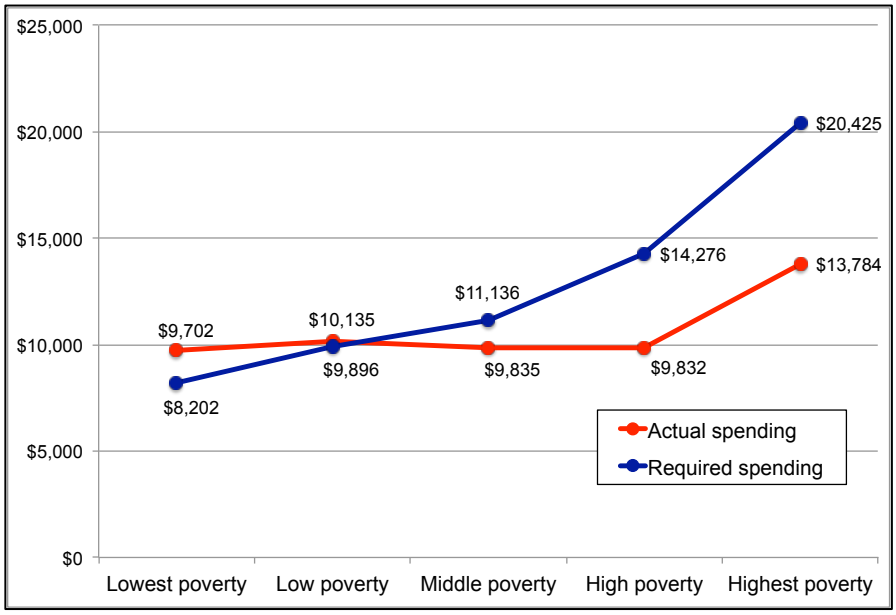

FIGURE 5
Adequacy of U.S. Education Spending

Predicted current per-pupil spending and predicted spending required to achieve national average test scores, by poverty quintile, 2016

Notes: Averages are weighted by state-level enrollment.

Variables used:
necm_predcost_q1 – q5
necm_ppcstot_q1 – q5
necm_enroll_q1 – q5

In the lowest-poverty districts (0-20th percentile), average spending is higher than required to achieve national average test scores (and, as shown below, in all but three states, test scores for this group are higher than the national average). In the low-poverty quintile (20-40th percentile), required and actual spending are roughly equal. This means that, on average, states are spending enough for their lower-poverty districts to achieve national average test scores, and these districts are achieving that result.

Moving into the middle- and high-poverty quintiles, the gap between required and actual spending increases rapidly, from about $1,300 per pupil (88 percent of the estimated required amount) for the middle quintile to $6,600 (67 percent) among the highest-poverty districts. In other words, on average, the highest-poverty U.S. districts spend only about two-thirds of how much they would have to spend in order for their students to achieve national average test scores (again, this means the national average for all students, regardless of poverty).

These overall averages, of course, mask quite a bit of variation by state. Figure 6 presents current spending as a percentage of the spending that would be required for each state's highest-poverty districts to achieve national average test scores from the previous year. We focus this state-level graph on the highest poverty districts, rather than on the other four quintiles, because these are the districts serving the students most in need of resources. The full set of estimates for each quintile can be downloaded as part of our State Indicators Database.

To reiterate, this measure defines adequacy in terms of *national* average test scores for all poverty quintiles. This is a very high bar indeed, particularly for high-poverty districts. Our adequacy measure is not meant to imply that if a state or states were to spend a certain amount that the test scores in that state would increase to the average in the short term. The goal of getting students in high-poverty districts in most states to score at current national averages would require many years of sustained investment and improvement, and would likely be a multi-generational effort. The purpose of this measure is simply to evaluate adequacy based on a concrete reference point that is educationally meaningful.

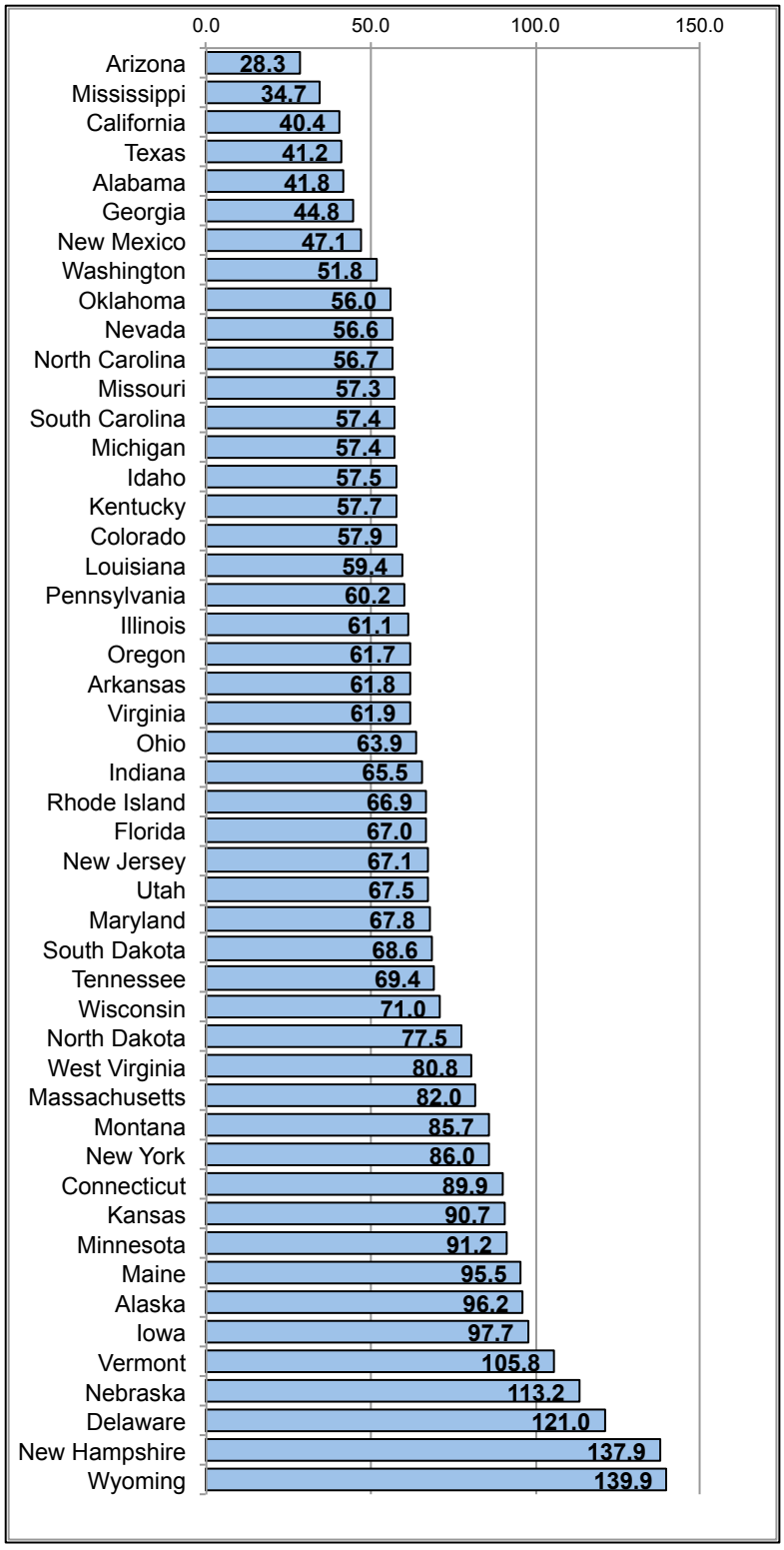

FIGURE 6

Adequacy of State Education Spending on Highest Poverty Districts

Current spending as a percentage of predicted spending required to achieve national average test scores, highest poverty districts, by state, 2016

Notes: Highest poverty districts are those in the fifth quintile (i.e., the top 20 percent highest poverty districts in each state). Estimates from the National Education Cost Model (NECM), part of our State Indicators Database.

Variables used:
necm_predcost_q5
necm_ppcstot_q5

States with values close to (or greater than) 100% are those in which spending on the highest poverty districts approaches (or exceeds) a level adequate to achieve national average test scores.

That said, somewhat surprisingly, there are five states with "adequate" spending levels (i.e., actual spending is greater than 100 percent of predicted required spending), even in their highest-poverty districts. And there are another four within 10 percentage points of the required amount. In only one of these nine states — Wyoming — are the actual test scores among the highest-poverty districts higher than the national average (these outcome gaps are not presented in Figure 6, but are presented in Figure 7). In the majority of states, in contrast, actual spending is far short of predicted requirements, including seven states in which actual spending is less than half of the estimated required amount. In other words, in most states, the resources expended by the highest-poverty districts are well below what would be required for these students to perform at average levels, and in some states, actual spending is but a small fraction of the estimated requirement.

It bears repeating, however, that these predicted required increases apply to outcome gaps that vary by state. States in which actual testing outcomes among the highest-poverty districts are further below the national average will, according to the model, obviously have to spend more to achieve those outcomes (as will, on a highly related note, states in which districts in each poverty quintile are poorer than their counterparts in other states in the same quintile).

It follows, then, that even states which spend relatively high amounts on education might still have to spend more to achieve average test scores than states that spend less, if the testing outcomes in the former states are further below the national average. The typical district in the highest-poverty quintile in Wyoming and Vermont, for instance, still serves students who are, on average, less poor and score higher than their peers in the highest-poverty districts in New York or California. The spending gaps in the former states will therefore tend to be higher even if those states spend copiously on education.

In other words, adequate spending levels in one state may not be adequate in another state — adequacy is a relative concept.

To getter a better sense of the actual "distances" involved here, we take a look at the relationship between spending gaps (the difference between required and actual spending) and outcome gaps (the difference between national average and actual test scores) in Figure 7. Here we present three scatterplots: one for the lowest-poverty districts, one for the middle-poverty districts, and one for the highest-poverty districts. Instead of expressing funding gaps as a percentage, as in Figure 6, the scatterplots present the gaps in U.S. dollars (on the horizontal axis). On the vertical axis in each scatterplot is the outcome gap – that is, the gap, expressed in standard deviations, in average test scores between the students in each poverty quintile and the national average for all students. Each state is represented by a red dot.

States located above the horizontal blue lines have test scores that are higher than the national average (for that specific poverty quintile), while dots below the lines have sub-average scores. Similarly, states to the right of the vertical blue line spend more than required for districts in that poverty quintile to achieve average scores, and states to the left spend less. Note that the scales of the axes differ between the three scatterplots.

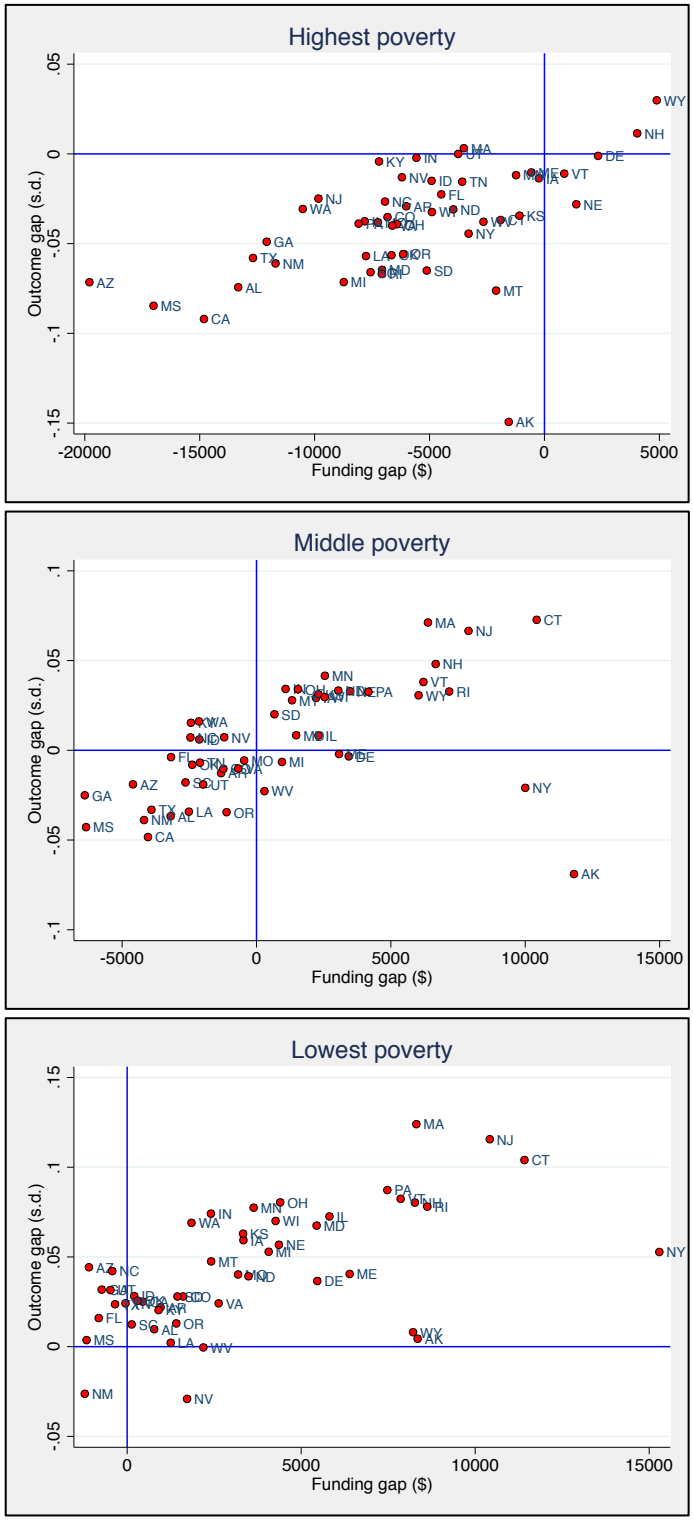

FIGURE 7

Outcome Gaps by Spending Gaps

Scatterplot of gap between state average test scores and national average test scores **AND** gap between predicted required spending and actual spending, by selected poverty quintile, 2016

Notes: Blue lines within gaps represent zero gaps. Poverty quintiles defined state-by-state. Estimates from National Education Cost Model (NECM), part of the State Indicators Database.

Variables used:
necm_outcomegap_q1
necm_outcomegap_q3
necm_outcomegap_q5
necm_fundinggap_q1
necm_fundinggap_q3
necm_fundinggap_q5

In each scatterplot, states in the top right quadrant of the blue lines spend more than the predicted requirement and achieve better than national-average test scores. The bottom left quadrant includes states that spend less and get below-average results. Note that axis scales vary between the three scatterplots.

As would be expected, given the research on school funding, the dots in all three graphs exhibit an upward sloping pattern, indicating a positive relationship between funding gaps and outcome gaps. That is, states that spend more than required achieve higher test scores relative to the national average.

Consequently, looking at the horizontal and vertical blue lines, the vast majority of states in all three scatterplots fall into either: 1) the bottom-left quadrant (spending below predicted requirements and test scores below the national average); or 2) the upper-right quadrant (spending above requirements and test scores above the average). In the highest-poverty scatterplot (the plot on top), most states are in the former quadrant. In the lowest-poverty scatterplot (the bottom plot), most states are in the latter. And in the middle-poverty scatterplot, there is a roughly equal split.

This indicates, as was also suggested by Figure 5, that most states provide sufficient resources to their lowest-poverty districts and achieve above-average outcomes. The opposite is true, however, of the highest-poverty districts: they are underfunded vis-à-vis predicted requirements, and their students perform accordingly. For instance, Massachusetts, New Hampshire, and New Jersey tend to spend above requirements and achieve above-average outcomes, while other states, such as Mississippi and Alabama, spend less than required and exhibit accordingly low outcomes.

There, however, are exceptions to the general finding that states spend adequately on their lowest-poverty districts and inadequately on their highest-poverty districts. New Mexico spends so little on its lowest-poverty districts that students in these districts do not even achieve national average test scores. Spending in Mississippi's lowest-poverty districts is similarly low, and its students barely exceed the average.

Conversely, in New York's lowest-poverty districts, funding is far above the predicted requirement, but testing outcomes are much lower than would be expected from the overall relationship. This may be due in no small part to the fact that many suburban New York districts with relatively low-needs students spend exorbitantly, but do not achieve testing outcomes commensurate with this spending (a possible "ceiling effect"). Similarly, Alaska's middle-poverty districts spend far more than the predicted requirements but still have test scores far below the national average. This may be attributed to the uniqueness of Alaska, where transportation, facilities, and other basic needs not accounted for by the variables available to researchers cost far more than they do in other states. As a result, spending is higher but outcomes are not.

On the whole, though, our measure of adequacy relative to common outcome goals indicates that the highest-poverty districts in most states spend substantially less than required to achieve average test outcomes, and perform accordingly, while the opposite is true of the lowest-poverty districts.

PROGRESSIVITY

A *progressive* school finance system is one in which districts serving higher shares of children from low-income family backgrounds (all else equal) are provided greater resources than their counterparts serving students from higher-income families.

Progressivity is therefore the comparison of resources between higher- and lower-poverty districts. In our system, it is calculated in one of two ways:

1. **Substantial progressivity**: The ratio of adjusted state and local revenue in higher-poverty districts (10, 20, or 30 percent poverty) to that of the lowest-poverty districts (0 percent poverty) within a given state.

2. **Systematic progressivity**: The correlation between revenue and poverty (labor market centered) among all districts within a given state.

Substantial progressivity compares adjusted revenue, within a given state, between otherwise similar districts at two different levels of poverty. As an example: The highest-poverty districts in a state may receive 30 percent more revenue than the lowest-poverty districts, while in another state, the highest-poverty districts may only receive 5 percent more revenue. We would say, then, that the first state is more substantially progressive than the other.[4]

In Figure 8, we present substantial progressivity ratios, by state. There are three ratios for each state: The ratio of adjusted revenue in districts with 10 percent poverty to districts with 0 percent poverty, the ratio of 20 to 0 percent poverty, and the ratio of 30 to 0 percent poverty. Ratios larger than 1 indicate progressivity — that is, states allocate more revenue to their higher-poverty districts than they do to their lowest-poverty (0 percent) districts.

Note that the three values in each bar represent progressivity ratios at the 10:0, 20:0, and 30:0 poverty levels. The total length of each bar is simply the sum of the three, a rough measure of "total progressivity" that takes into account all three ratios.

Half of the states exhibit at least nominal progressivity, although, in several cases, such as New York, Oklahoma, Oregon, and Idaho, the ratios are so close to 1 that they are more accurately described as non-progressive (i.e., neither progressive nor regressive). In Alaska, Wyoming, and Utah, adjusted revenue among the highest-poverty districts is at least 60 percent more than it is for districts at 0 percent poverty.

At the other extreme, in Illinois and Nevada revenue is extremely regressive, with the highest-poverty districts receiving only a fraction of the revenue provided to districts with 0 percent poverty.

We might cautiously compare these ratios to the results presented in Figure 5, which provides estimates of how much spending would be required to achieve national average test scores. In Figure 5, required spending in the highest poverty districts is, on average, about 150 percent higher than in the lowest-poverty districts. From this perspective, even states that exhibit progressive revenue in Figure 8 may not be progressive enough.

[4] Once again, our State Indicators Database includes progressivity measures not only for revenue, but also for other variables, such as spending and student/teacher ratios.

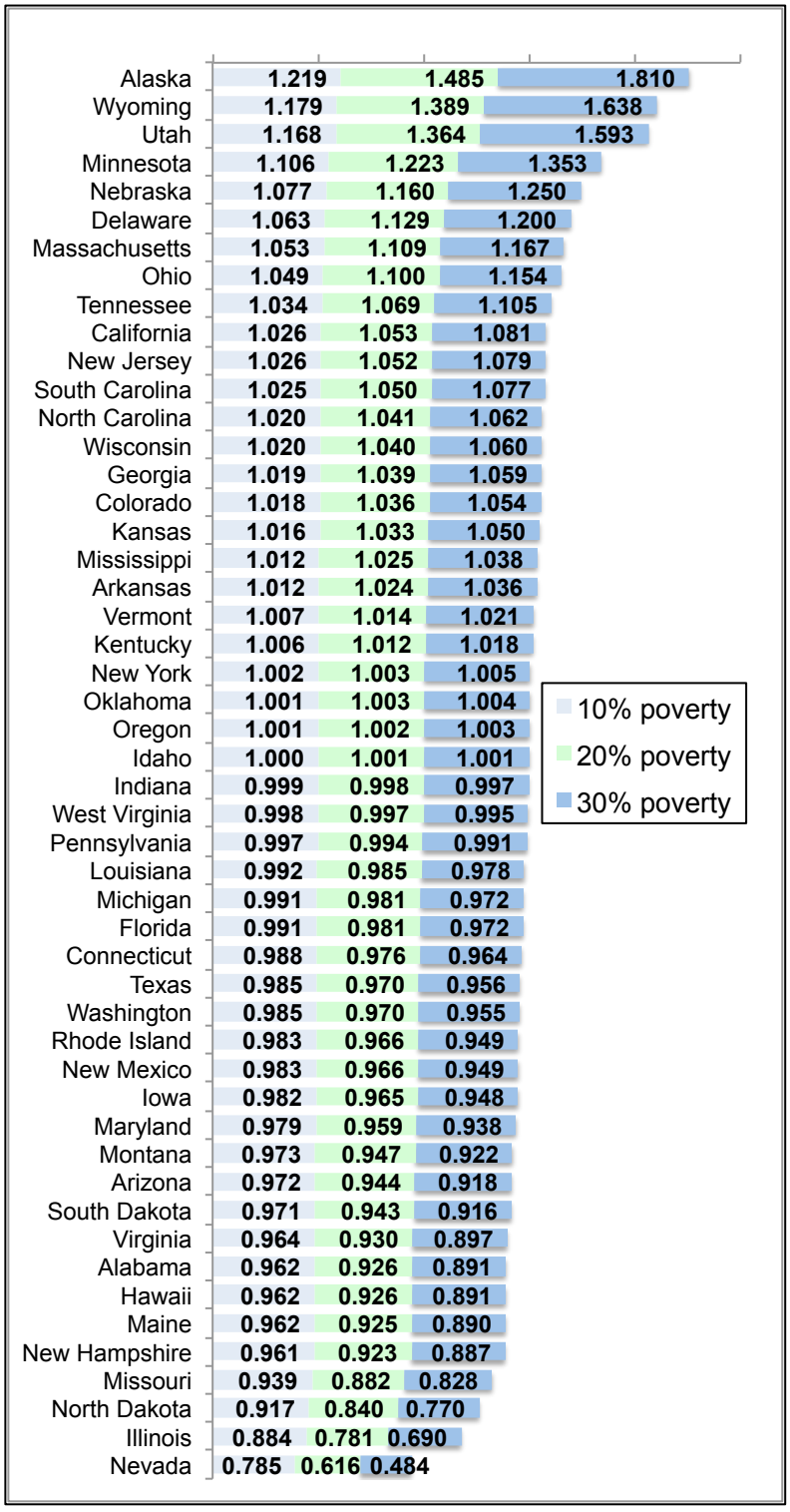

FIGURE 8
Substantial Progressivity Ratios

Ratio of adjusted state and local revenue in 10/20/30 percent poverty districts to adjusted state and local revenue in 0 percent poverty districts, by state, 2016

Notes: Values within the bars are progressivity ratios at each poverty level (vis-à-vis 0 percent poverty). Total length of bar is the sum of the three ratios.

Variables used:
*predicted_slocrev0_*
*predicted_slocrev10_*
*predicted_slocrev20_*
*predicted_slocrev30_*

Values over one indicate progressive education funding – that is, moderate and high poverty districts receive more revenue than zero percent poverty districts, all else being equal. The states toward the bottom fund education regressively – zero percent poverty districts actually receive more revenue than moderate and higher poverty districts.

This aggregate state-level relationship, however, might hide underlying variation between districts. It is possible, for example, that a subset of the highest-poverty districts in a state receives extremely high revenue, while another subset receives only moderate revenue – that is, revenue is progressive overall but not for many districts. These variations might play out in complex ways across districts that have similar characteristics but receive different levels of school funding.

Systematic progressivity measures the *consistency* of the relationship between poverty and funding, as represented by the correlation between revenue and poverty across all districts (revenue and poverty are centered around the labor market average to account for variation in labor costs and poverty). These correlations are presented, by state, in Figure 9.

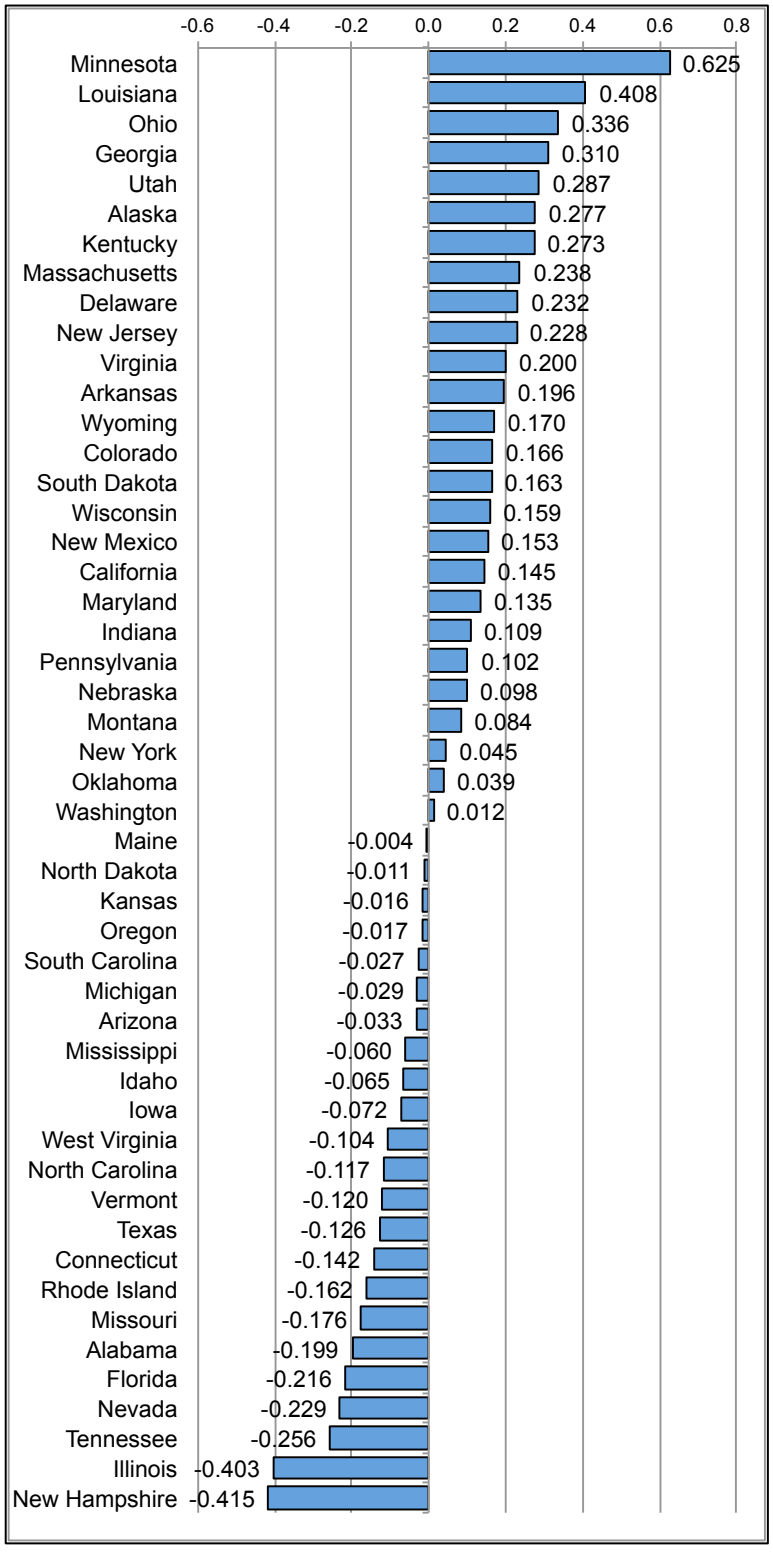

FIGURE 9
Systematic Progressivity

Within-state correlations between district state and local revenue and district poverty, by state, 2016

Notes: Hawaii not included due to its having only one school district. Revenue and poverty are centered around (i.e., divided by) the average of the district's labor market.

Variables used:
syst_prog

Positive numbers in the graph indicate that higher poverty districts tend to receive more revenue (progressivity), whereas negative numbers denote the opposite (regressive funding). The higher the number, the greater the strength of this positive or negative relationship.

As was the case in Figure 8, roughly half of the states exhibit at least a nominally positive relationship between district revenue and poverty. Most states with relatively high substantial progressivity also exhibit relatively high systematic progressivity.

Even where the relationship is positive, however, virtually all of the correlation coefficients are modest at best – i.e., the relationship between revenue and poverty is generally weak. Part of this is due to the fact that school finance is, for lack of a better term, messy -– even in states where revenue is distributed progressively, on average, the association is far from tight. But it is also consistent with the results in Figure 8, which show that most states' funding systems tend not to allocate revenue in a consistently progressive fashion.

In order to examine this generalization, in Figure 10 we present a rough illustration of national average progressivity in 2016. Each bar represents average state and local revenue (centered around the labor market mean) by poverty quintile. Once again, poverty quintiles are defined state-by-state, so this graph requires cautious interpretation, but it provides a good idea of the national picture when it comes to progressivity.

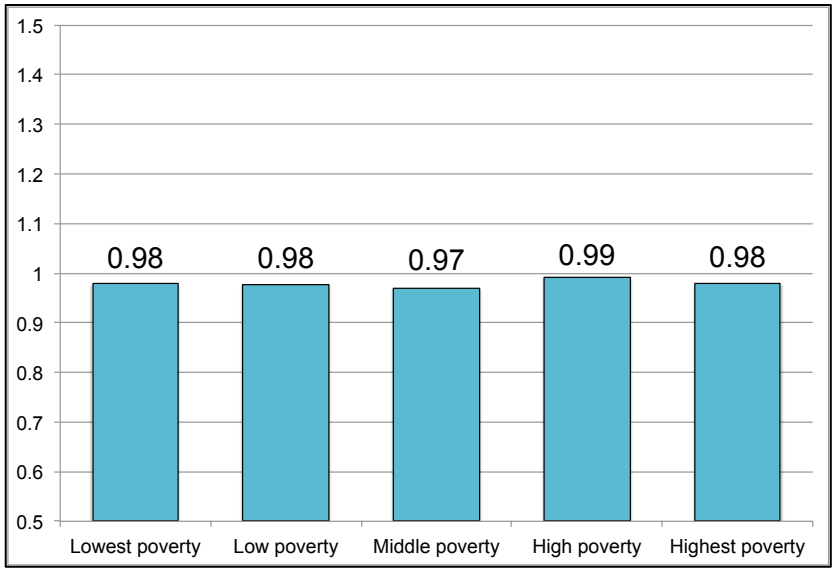

FIGURE 10
Progressivity of U.S. Education Funding
Average (labor market-centered) state and local revenue to districts, by poverty quintile, 2016

Notes: Revenue centered around each district's labor market's average. Averages weighted by quintile enrollment. Poverty quintiles defined state-by-state.

Variables used:
(District Indicators Database)
ctr_slocrevpp

If revenue were distributed progressively, the bars would slope upward, whereas regressively-distributed revenue would be indicated by downward sloping bars. Instead, we see that the relationship between district revenue and poverty is almost perfectly flat.

It is important to note that the allocation of revenue is a state-level policy decision, and so national averages represent the results of 50 separate systems. That said, it is clear that the distribution of district revenue in the U.S., on average, is not progressive.

Moreover, unlike adequacy, in which capacity plays a significant role, progressivity is almost entirely a function of the policy choices that states make. The fact that so many states are either non-progressive or regressive is *by design*. Given the well-established fact that districts serving

larger proportions of disadvantaged students will require more resources than more affluent districts to provide the same level of education quality, these results are troubling.

DESCRIBING STATE SCHOOL FINANCE SYSTEMS

We now use our three core state measures to paint a simplified picture of the relationship between funding and outcomes:

1. State effort, combined with states' capacity, drive state and local education revenue;

2. The progressivity of state and local systems allocates revenue depending on student need (e.g., poverty), which in turn determines per-pupil expenditures for districts at different poverty levels;

3. How these resources are spent, and whether they are sufficient to provide high-quality education to students in each district, determines adequacy.

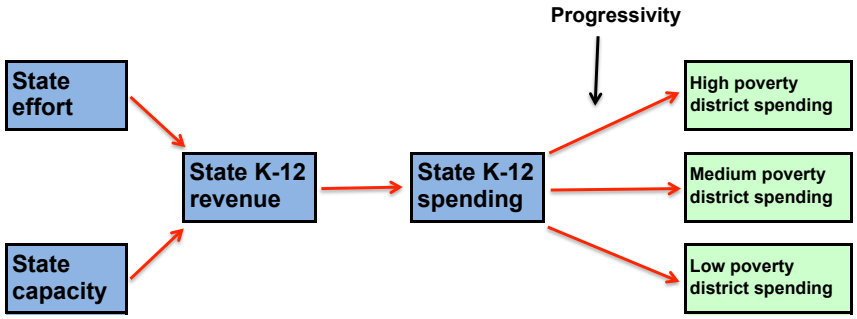

FIGURE 11
Illustrative Model of State School Finance Systems

We might conceptualize each state's funding system as a "profile": a representation of how effort, adequacy, and progressivity combine to determine how a state's schools are funded. In Figure 12, we present three hypothetical state profiles.

The red lines in these profiles represent "adequate" funding, however defined (in our system we use nationally-normed test scores to determine adequacy). The blue lines represent actual spending. The horizontal axis represents student poverty.

State A is a progressive funding system. Total spending increases as student poverty rises (i.e., the blue line is sloped upward). Suppose, for the sake of this illustration, that there are an equal number of students served at each measured poverty level. This means that the total area underneath the blue sloping line represents total state spending for education. The triangle-shaped area, shaded in yellow, between the sloping blue line and the dotted line represents the degree of progressivity –– how much more districts spend the more economically disadvantaged students they serve.

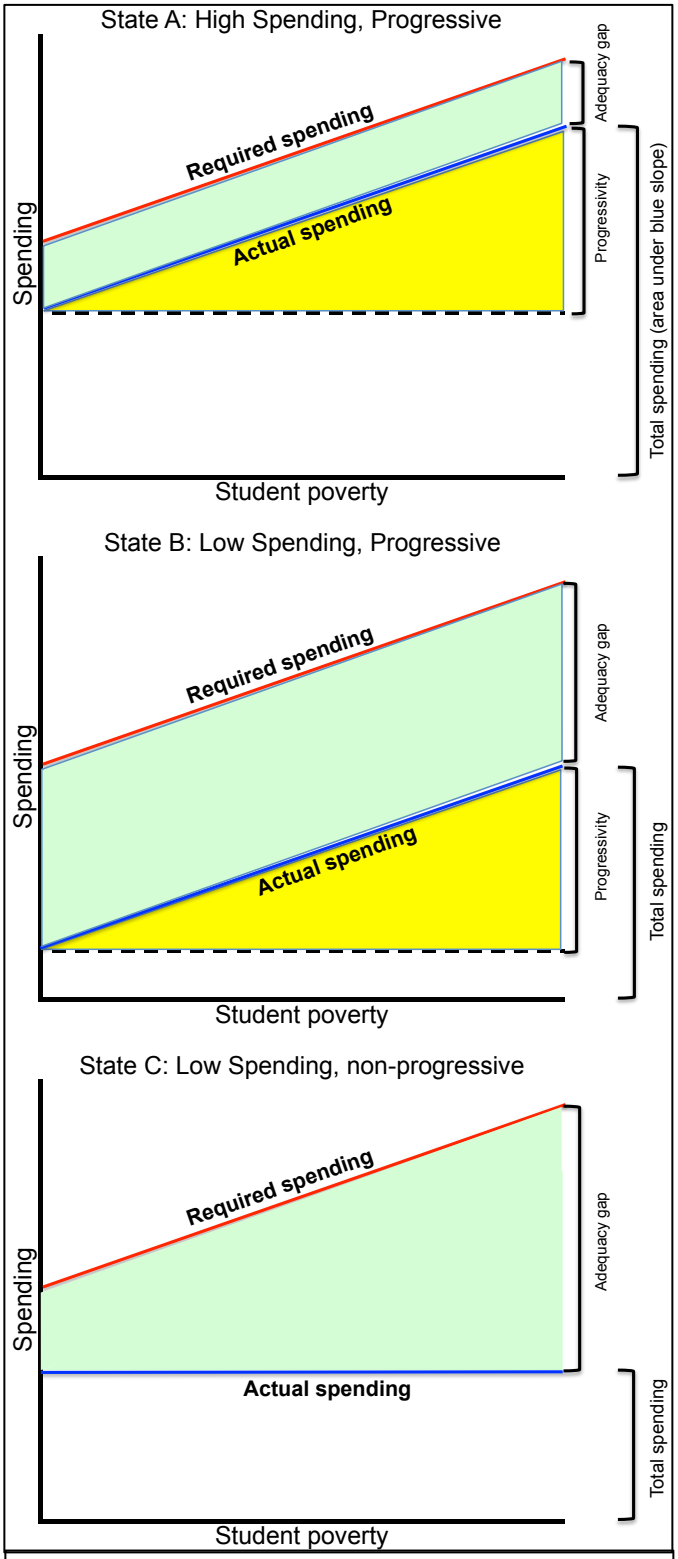

FIGURE 12
Illustrative State Finance Profiles

All else being equal, the steeper the blue spending slope, the larger the yellow area in the triangle; consequently, more funding is targeted at higher-poverty districts, making the system more progressive. Note that in states with regressive systems (i.e., those in which higher-poverty districts actually spend fewer resources, on average, than lower-poverty districts), the slope would be downward, and the area within the triangle would represent regressivity rather than progressivity.

The distance between the blue line, denoting actual spending, and the red line, denoting adequate funding, represents the state's funding gap. In reality, this gap almost always varies by poverty, but in our illustrative profiles it is consistent across poverty levels, which means that the total area between the red and blue lines, shaded in light green, represents the total amount of funding that would be required to achieve adequate outcomes.

In State B, due to either effort or capacity (or both), revenues are lower than in State A, and, thus, spending is lower -- the blue slope is further down in the graph. Note that progressivity has not changed (the area within the yellow triangle is just as large). There is, however, less revenue to go around in State B, and so total spending (the total area underneath the blue sloping line) has decreased markedly relative to State A. In addition, of course, the adequacy gap, represented by the total area shaded in light green, has also increased.

This illustrates how two states might be similar in how they distribute education resources (progressivity), but differ drastically in terms of how much they spend, and thus in the degree to which that spending is or is not adequate.

Finally, consider a third and final hypothetical state profile, State C, in which the distribution of resources is neither progressive nor regressive -– that is, districts receive the same amount of funding regardless of their student poverty levels.

In this profile, the yellow progressivity/regressivity triangle has disappeared entirely, because there is no variation in spending by poverty –- i.e., spending is non-progressive. The total area underneath the blue line, however, is the same as it was in State B (although it is a different shape). State C, in other words, spends just as much total money on education as does State B, but the former allocates those resources in a manner that ends up having no relationship with student poverty. The adequacy gap -– the total area between the red and blue lines, shaded in light green -– is also unchanged, but the gap is now far larger for high-poverty than for low-poverty districts.

Just as two states might be equally progressive (or regressive) but spend different amounts, as illustrated by the comparison of States A and B, comparing States B and C shows how the converse is also true: States might spend equal amounts but differ in terms of: 1) the progressivity of how those resources are allocated; and 2) how (and whether) adequacy varies by poverty. Adequacy and progressivity, then, must be considered in tandem when evaluating state finance systems, because they are, at least in theory, independent.

Similarly, effort *alone* might be a misleading measure of the quality of states' finance systems. As discussed above, larger, wealthier states may not need to put forth as much effort to achieve adequate resource levels as less-prosperous states.

We can construct a profile similar to these illustrative models for each state using our State Indicator Database, but it would not be feasible to present all 50 states' profiles in this report. We instead encourage readers to use the data visualization tools on our website, which include effort, adequacy, and progressivity profiles for each state. These tools can be accessed at: http://schoolfinancedata.org/analyze-data.

EVALUATING STATE SCHOOL FINANCE SYSTEMS

We do not offer any state ratings or grades based on our three core indicators. The complexity and multidimensionality of school finance systems belies simple characterization and boiling these systems down to one rating or a small set of ratings would at this point entail substantial subjective (and, in no small part, arbitrary) decisions. We are, however, exploring the possibility of designing and publishing a more holistic version of a ratings system in the future.

In the meantime, we can use the core principles put forth at the beginning of this document as general guidelines for how to use our three core measures to evaluate state finance systems:

1. **Effort**: All else being equal, more effort is better, particularly for states with less capacity. Conversely, however, states with larger economies may not require as much effort as states with smaller economies.

2. **Adequacy**: In light of widespread agreement that educational outcomes in the U.S. must improve, we assert, as a general principle, that allocating more resources to schools is better. However, states should also provide resources to schools that are commensurate with achieving common outcomes or improvement toward those outcomes.

3. **Progressivity**: States' allocation of resources should be progressive –– i.e., districts serving more high-needs students should receive more revenue. The optimal degree of progressivity, however, might depend on factors such as the amount of inequality of education outcomes (for example, states with large achievement gaps might allocate resources more progressively).

These general recommendations illustrate the interconnectedness of our core indicators, and how they provide a nuanced but clear picture of school funding. Even the most progressive school funding systems, for example, might still provide inadequate resources, just as the highest-spending states overall might be short-changing high-needs students if their systems are regressive. Moreover, the lowest-capacity states may simply be incapable of achieving adequate funding regardless of effort.

Wyoming is a good example of the importance of state context. The state's effort, adequacy, and progressivity are among the best in the nation. But one critical factor our measures cannot capture is that the state is able to spend a lot on education and other public services due to unusually high revenue from natural resources. In addition, while there are a handful of extremely high-poverty districts in Wyoming, they are small districts. The rest of the districts in the highest-poverty quintile in Wyoming are not as poor as their highest-poverty counterparts in other states. These two factors, in addition to a progressive revenue allocation system, mean that even the highest-poverty districts in Wyoming receive ample funding, and have test scores that are actually above the national average. The same funding situation applies to Wyoming's lowest-poverty districts, but these districts barely meet the national test score average, because the districts in this quintile are not as affluent as their counterparts in the lowest-poverty quintile in other states.

New Jersey's school finance system is also high-effort and very progressive, and its funding is adequate for all poverty quintiles except the highest-poverty quintile, where funding falls far short of the estimated required amount. The latter finding is most likely due to the extreme poverty in New Jersey's highest-poverty districts (including districts such as Camden and Newark), which push up the cost of achieving national average outcomes. In other words, even though New Jersey's high-poverty districts receive more funding than its low-poverty districts, the additional revenue is not sufficient to make up for the needs of the state's extremely poor districts.

Mississippi, in contrast, is a low-capacity state that, despite relatively high effort, could not possibly raise enough revenue to meet the needs of its even middle-poverty districts, to say nothing of it highest-poverty districts, which are among the poorest in the nation. The state does allocate revenue in a moderately progressive fashion, but its low capacity means that funding is woefully inadequate in virtually all districts, regardless of poverty. As a consequence, testing outcomes among districts in even the highest-poverty quintile, barely surpass the national average.

These examples illustrate how each core indicator should be evaluated with an eye on the others, and each state's specific characteristics, measurable and unmeasurable, should be considered when evaluating their systems.

RESOURCE ALLOCATION INDICATORS

In addition to our three core indicators of effort, adequacy, and progressivity, the *State Indicators Database* also includes a number of important state-level variables that focus on how states actually spend those resources.

1. **Teacher/non-teacher wage competitiveness**: Comparison of teachers' wages to wages of other professionals in the same state, controlling for factors such as age and education.

2. **Predicted staffing ratios**: Teacher-per-student ratios by district poverty adjusted for district size, regional wage variation, and population density. Can be compared with high- and low-poverty districts in each state.

3. **Predicted class size**: Average class size by district poverty, for both departmentalized and self-contained classes, adjusted for district size, regional wage variation, and population density. Can be compared with high- and low-poverty districts in each state.

4. **Teacher salary competitiveness**: Ratio of actual to predicted teacher salaries, adjusted for degree, experience, and labor market, by poverty (poverty as a percentage of poverty within the labor market). Can be compared with high- and low-poverty districts in each state.

5. **Coverage and charter market share**: The number of school-aged students enrolled in public schools as a percentage of all school-aged children, as well as total charter school market share by state (percent of all public school students enrolled in charter schools).

6. **Income-based early childhood schooling gap**: The number of 3- and 4-year-olds from low-income families enrolled in school as a percentage of the total number of 3- and 4-year-olds enrolled in school.

These measures, which are all part of our State Indicators Database, can be used independently or in coordination with our three core indicators. One might, for example, examine the relationship between progressivity of resources and progressivity of class sizes or staffing ratios.

Readers can also download our District Indicators Database, with includes over 200 district level variables. Many of these are used to construct our state indicators, but can serve as useful measures in their own right. These data, along with supporting documentation, are all freely available at: http://schoolfinancedata.org.

CONCLUSION

There is a large and growing body of high-quality empirical research showing that the amount and distribution of school funding has a profound effect on student outcomes. Moreover, while the issue of *how* to spend money remains contentious, the centrality of funding to improving outcomes is slowly gaining political consensus in all but the most extreme ideological camps. The idea that "money doesn't matter" is no longer defensible.

But acting on this empirical and political consensus requires data and measures that are likewise widely accepted as credible, and can serve as the "raw materials" for important debates about how to improve states' K-12 education funding programs.

School finance systems, and their measurement, are highly complex, and often difficult to understand for policymakers, parents, and the general public. Our goal here is to make school funding data and analysis more accessible to all stakeholders. Based on our extensive experience collecting, analyzing, and disseminating finance data, and in collaboration with other researchers and organizations, we have designed a range of indicators that we believe capture the complexity of school finance in a manner that is useful and comprehensible to researchers and non-researchers alike.

In this report, we have presented data from three of the measures included in our system. These are the three that we feel provide the most useful picture of the fiscal resources raised and allocated by state's school finance systems: effort, adequacy, and progressivity. Our results indicate that, while states vary widely on all three measures, most states finance systems are either non-progressive (high- and low-poverty districts receive similar funding) or regressive (low-poverty districts receive less funding). Moreover, while there are, to be sure, laudable exceptions, the results of our models of how much states would have to spend in order to achieve national average test scores (i.e., adequacy) indicate that the vast majority of states spend only a fraction of estimated requirements, particularly among their highest-poverty districts.

We are making all of our data and its full documentation, updated annually, freely available to the public, and will be publishing a series of reports and policy briefs on an ongoing basis using these data. It is our hope and intention that this collection of data and measures will become an important tool in constructing better school funding systems.

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APPENDIX TABLES

Appendix Table A	**Information on Data Sources**	
Indicator	**Variable(s)**	**Source**
Effort	Direct expenditures on elementary and secondary education	Tax Policy Center Data System
	Gross State Product	Bureau of Economic Analysis
	Personal income	Bureau of Economic Analysis
Adequacy (equated spending) and substantial progressivity	Student poverty (district)	U.S. Census Bureau – Small Area Income and Poverty Estimates
	Local and state revenue (progressivity) and current spending (adequacy) per pupil	U.S. Census Bureau – Public Elementary-Secondary Education Finance Survey (F33)
	Regional wage variation	Education Comparable Wage Index (Lori Taylor)
	District size/enrollment	NCES Common Core of Data – Local Education Agency Universe Survey
	Population density	U.S. Census Population Estimates
Adequacy (equated spending relative to common goals)	Nationally-normed test scores (2013-2015)	Stanford Education Data Archive (SEDA)
	Estimated required and actual spending, by poverty quintile	National Education Cost Model (NECM)[1]
Systematic progressivity[2]	Local and state revenue per pupil	U.S. Census Bureau – Public Elementary-Secondary Education Finance Survey (F33)
	Student poverty (district)	U.S. Census Bureau – Small Area Income and Poverty Estimates

Notes: This table includes only data sources for variables presented directly in this report. For more information on these variables and their sources, see the documentation for our State and District Indicator Databases.

[1] For more details on all the variables used to generate NECM estimates, see Baker et al. (2018)

[2] Both revenue and poverty are centered around the mean of the district's labor market

Appendix Table B — Adjusted State and Local Current Spending by Poverty Level and State, 2016

	District poverty level			
State Name	**0%**	**10%**	**20%**	**30%**
Alabama	$ 8,046	$ 8,236	$ 8,430	$8,629
Alaska	10,493	13,957	18,565	24,694
Arizona	5,699	6,125	6,582	7,073
Arkansas	7,644	8,178	8,748	9,358
California	8,379	8,942	9,542	10,183
Colorado	7,710	8,174	8,665	9,185
Connecticut	16,737	16,508	16,283	16,061
Delaware	10,961	12,286	13,770	15,434
Florida	7,338	7,663	8,003	8,358
Georgia	7,591	8,052	8,540	9,058
Hawaii	12,324	12,615	12,913	13,218
Idaho	5,353	6,067	6,877	7,795
Illinois	12,297	11,956	11,624	11,302
Indiana	7,780	8,422	9,116	9,868
Iowa	8,787	9,403	10,062	10,766
Kansas	7,568	8,554	9,669	10,929
Kentucky	8,198	8,556	8,929	9,319
Louisiana	9,643	9,779	9,918	10,058
Maine	11,338	11,296	11,254	11,212
Maryland	11,684	12,060	12,449	12,851
Massachusetts	12,623	13,310	14,035	14,799
Michigan	8,561	9,060	9,587	10,146
Minnesota	8,517	10,107	11,995	14,236
Mississippi	6,686	7,112	7,565	8,047
Missouri	8,889	8,848	8,808	8,767
Montana	8,291	9,337	10,515	11,840
Nebraska	8,301	9,982	12,004	14,435
Nevada	12,302	9,418	7,210	5,519
New Hampshire	12,825	13,454	14,114	14,806
New Jersey	15,036	15,163	15,291	15,420
New Mexico	7,121	7,666	8,253	8,885
New York	18,519	18,628	18,737	18,847
North Carolina	6,897	7,393	7,925	8,495
North Dakota	10,140	11,446	12,921	14,587
Ohio	8,666	9,389	10,172	11,021
Oklahoma	6,036	6,596	7,208	7,878
Oregon	8,298	8,829	9,393	9,994
Pennsylvania	13,676	12,868	12,107	11,391
Rhode Island	13,863	13,750	13,638	13,526
South Carolina	7,743	8,440	9,198	10,025
South Dakota	6,881	7,895	9,059	10,395
Tennessee	7,210	7,583	7,976	8,388
Texas	6,783	7,215	7,675	8,164
Utah	4,922	6,095	7,549	9,349
Vermont	15,703	16,608	17,564	18,576
Virginia	9,816	9,783	9,750	9,717
Washington	8,966	9,668	10,424	11,240
West Virginia	9,124	9,623	10,148	10,703
Wisconsin	9,432	10,010	10,623	11,274
Wyoming	13,199	15,013	17,076	19,423

Notes: Estimates adjusted for district size, population density, and regional wage variation.
Variables used: *predicted_curexpp0_; predicted_curexpp10_; predicted_curexpp20_; predicted_curexpp30*

$$(\ln)\textbf{SCHOOL} = b_0 + b_1 State_i + b_2 LaborMarket_{ij} + b_3 CWI_{ij} + b_4 \textbf{FINANCE}_{ij} + b_5 PopulationDensity_{ij} + b_6\ Enrollment_{ij} + b_7 \textbf{INDICATORS}_{ij} + b_8 Scale_{ij} + b_9 Poverty_{ij} + b_{10} SchlType_{ij} + b_{11} \textbf{DATABASE}_{ij} + e$$

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