The Adequacy and Fairness of State School Finance Systems

Key Findings from the School Finance Indicators Database

Bruce D. Baker
Matthew Di Carlo
Mark Weber

ALBERT SHANKER INSTITUTE

RUTGERS
Graduate School of Education

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THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

Findings From the School Finance Indicators Database School Year 2016-2017

schoolfinancedata.org

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Matthew Di Carlo
Mark Weber

SECOND EDITION
FEBRUARY 2020

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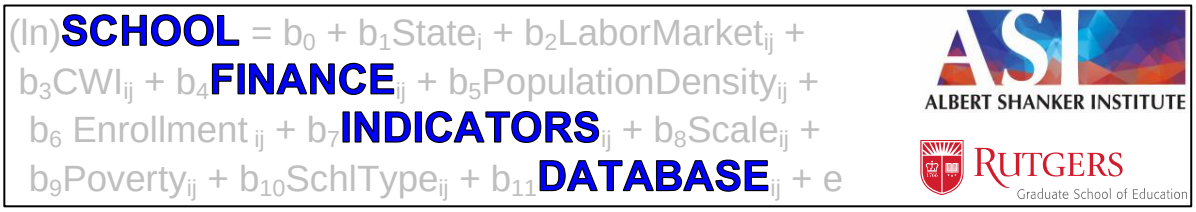
TABLE OF CONTENTS



THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

SECOND EDITION (FEBRUARY 2020)

EXECUTIVE SUMMARY

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. In other words, the evidence is clear that money does, indeed, matter.

Certainly, debates about how education funds should be spent are also important, and money should be spent wisely. But there are few options for improving America's schools that don't require adequate and sustained investment, particularly for disadvantaged students. And while maintaining efficiency is important, the fact is that districts cannot spend money wisely that they do not have.

In this report, we present key findings from the second release of our **School Finance Indicators Database** (SFID), a public database of sophisticated but user-friendly state school finance measures going back to 1993. This latest version of the SFID includes data up to 2017 (the 2016-17 school year).

The database includes approximately 130 variables, but in this report we focus on three key school finance measures: **effort**, **adequacy**, and **progressivity**. As a whole, we feel that these three measures provide a succinct and informative overview of the adequacy and fairness of states' school finance systems.

Our indicators are most appropriately interpreted on a state-by-state basis, but in this report we do attempt to present some calculations of national averages and trends in those averages. A summary of our key findings on our "core indicators" is as follows:

Effort

Effort (or fiscal effort) measures how much of states' total economic resources or capacity are spent directly on K-12 education. States with smaller economic capacity must exert greater effort than states with greater capacity to raise the same amount of revenue for their schools. Our measures allow us to determine whether states lag behind in spending because they don't have the capacity to raise revenue (e.g., they have smaller economies from which to draw tax revenue), or because they refuse to devote sufficient resources to education.

- The typical state devotes about 3.5 percent of its capacity (i.e., Gross State Product) to K-12 education. Individual states' effort levels range from about 2.4 percent in Nevada to over 5 percent in Vermont.
- Other higher effort states include Wyoming (4.7), New Jersey (4.6), New York (4.5), and Alaska (4.5). Other lower effort states include Arizona (2.6), North Carolina (2.7), Delaware (2.8), and Tennessee (2.8). Most states, however, are within 0.5 percentage points of the national average (though even small differences can translate into large amounts of revenue, particularly in states with large economies).
- The U.S. average effort increased from 3.7 percent in 2004 to a high of 4.1 percent in 2009. This was followed by a five year decline between 2009 and 2014, stabilizing at roughly 3.5 percent since then. In fact, between 2009 and 2017, fiscal effort decreased at least nominally in every single state except Wyoming. Overall, then, average effort has not rebounded since the Great Recession, and is slightly lower in 2017 than it was in 2004.

Adequacy

While effort measures how hard states and districts work to raise funds for their public schools, adequacy measures address whether the amount raised is enough. Our primary measure of adequacy compares current education spending, by district poverty quintile, to spending levels that would be required to achieve national average test scores. In other words, we define adequacy in terms of a common "benchmark" (national average scores) that is educationally meaningful, using estimates from complex models that take into account factors such as student characteristics, labor market costs, and district characteristics.

- On average, spending on the highest poverty districts (80-100th percentile poverty) is approximately 70 percent of estimated adequate levels. That is, the typical state spends 30 percent less than it would need to for students in its highest poverty districts to achieve nationally average test scores.
- There are only six states in which spending on the highest poverty districts exceeds estimated adequate levels: Wyoming; Delaware; New Hampshire; Nebraska; Connecticut; and New York. Conversely, current spending on these highest poverty districts is less than *half* of the adequate level in five states: Arizona; New Mexico; California; Texas; and Mississippi.
- Nationally, the situation is not much better in the second highest poverty districts (60-80th percentile district poverty), where spending is, on average, about 78 percent of required amounts. In contrast, spending is *above* our estimated adequate levels for the lowest poverty (0-20th percentile) and slightly higher in the second lowest poverty (20-40th percentile) districts.
- In general, states are spending enough on their lower poverty districts and not enough on their higher poverty districts (and their testing outcomes generally reflect this pattern).
- There is a relationship between fiscal effort and adequacy -- that is, states that spend more of their "economic pie" on education tend to exhibit more adequate spending levels. Of particular concern are states, such as Arizona, that spend inadequately and put forth low effort, as well as states, such as Mississippi, that fail to achieve adequate funding levels *despite* putting forth relatively high effort levels.

Progressivity

Put simply, progressive funding systems are those in which higher poverty districts, all else being equal, receive more revenue than lower poverty districts. Regressive funding systems, in contrast, allocate more revenue to wealthier districts than they do to poorer districts. Progressivity (sometimes called "fairness") is important because it is generally acknowledged that students from disadvantaged backgrounds tend to require more resources than their more affluent peers to achieve the same level of educational outcomes. Our primary progressivity measure controls for factors — such as poverty, labor market costs, population density, and district size — that affect the value of the education dollar. These controls allow us to compare district and state school revenues in a way that accounts for differences that are largely outside the control of education policymakers.

- A handful of states, such as Wyoming, Alaska, and Utah, allocate revenue in a strongly progressive manner, whereas funding is highly regressive in Illinois and Nevada.
- There are only ten states in which high poverty districts receive at least 10 percent more revenue than zero poverty districts. In 28 states, high poverty districts actually receive *less* revenue. In other words, the vast majority of states' finance systems fund their high and low poverty districts either similarly or regressively.
- Accordingly, on average, state and local education funding in the U.S. is neither progressive nor regressive. That is, the highest poverty districts in the typical state tend to receive similar amounts of revenue, all else being equal, as do the lowest poverty districts.
- U.S. average progressivity has increased very modestly over the past two decades, going from minimally regressive in 1997 (revenue in the highest poverty districts was 3-4 percent lower than in the lowest poverty districts) to minimally progressive in 2017 (revenue was about two percent higher in the highest poverty districts compared with the lowest poverty districts). At the national level, education funding has been non-progressive for the past two decades.

Overall, then, our findings indicate that there are several states in which education funds are both adequate and distributed equitably. In general, however, resources in most states tend to be allocated regressively or non-progressively, and funding for higher poverty districts in the vast majority of states falls far short of estimated adequacy levels (in many cases reflecting a lack of effort).

We do not provide state rankings or grades in this report, as the interplay between effort, adequacy and progressivity is far too complex to be boiled down to such simple measures. We do, however, include recommendations as to 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.

The School Finance Indicators Database is freely available to the public, with proper attribution, and can be downloaded at: http://schoolfinancedata.org. This website also includes user-friendly documentation, supplemental reports using the data, and online visualization tools with which users can analyze the data themselves.

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 too 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. There is now widespread agreement, backed by a large and growing body of research, that we cannot improve educational 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** (SFID), a 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 the SFID project 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, the primary product of the SFID: **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. You may 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 educational quality depends on context, including the students a district serves, the labor market in which it is located, its size, and other factors (Duncombe and Yinger 2008).

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 can 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 school-aged children (5-17) living in the district with 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 Dr. 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 that 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.

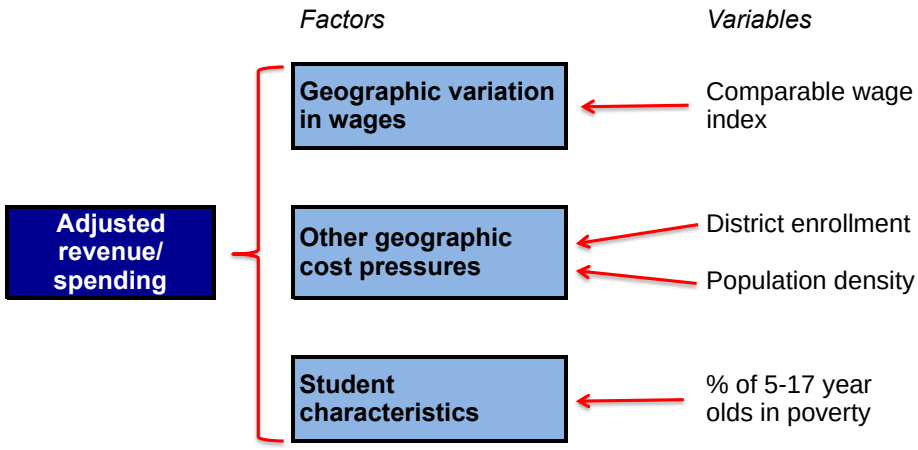


FIGURE 1

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 between scholars in a variety of disciplines and organizations across the political spectrum that school districts serving higher-need student populations — those with higher poverty rates in particular — require not the same, but rather *more* resources per pupil than districts serving lower need 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.

Of course, 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 2016-2017 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 over 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, 2017 means that the data pertain to the 2016-2017 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.

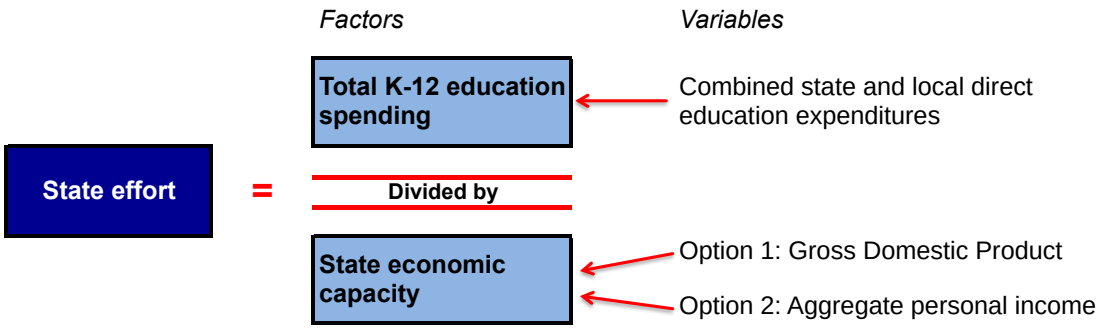


FIGURE 2

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* 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, below, we present each state's effort as a percentage of its Gross State Product. 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 both can be downloaded as part of our State Indicators Database.

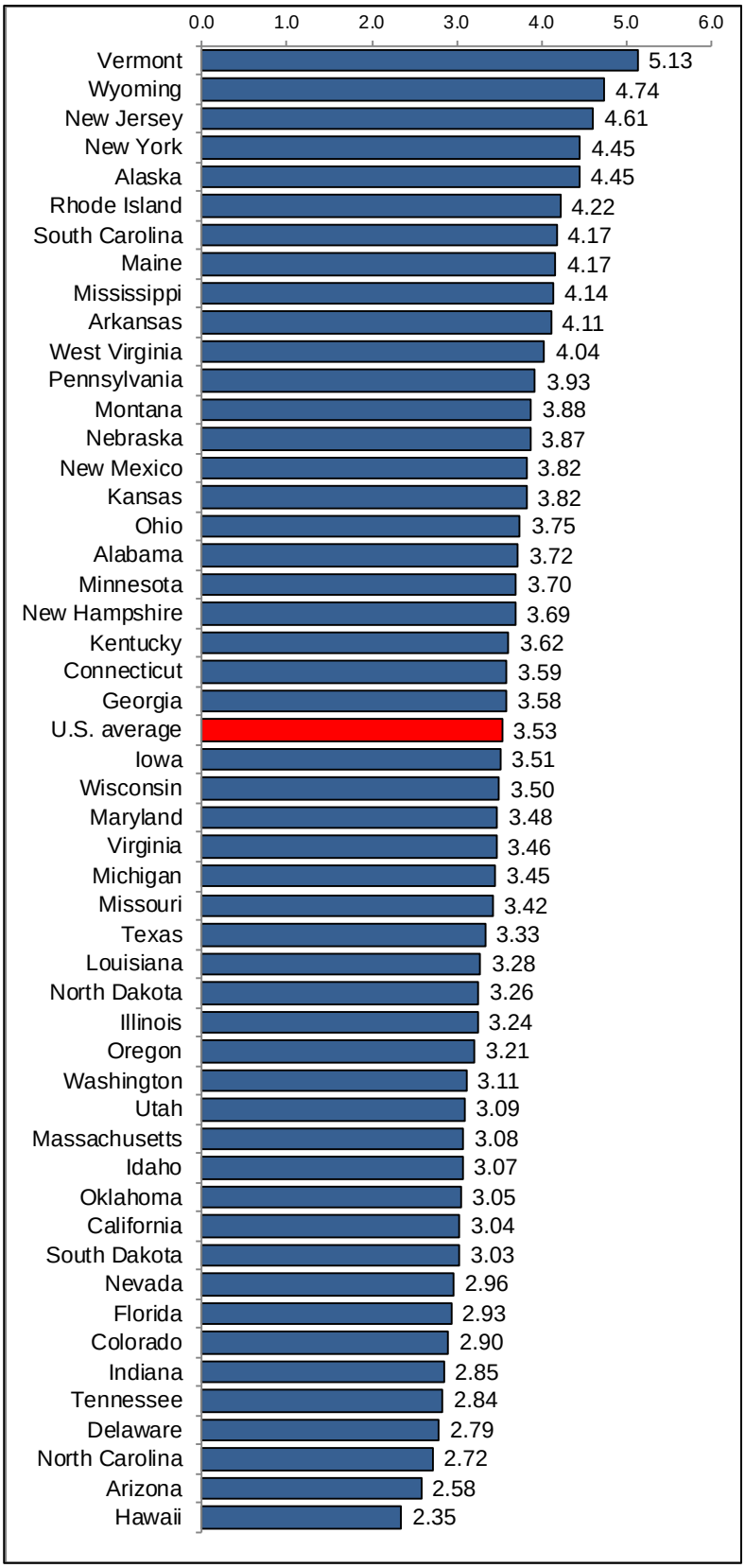


FIGURE 3

State fiscal effort

Direct education expenditures as a percentage of Gross State Product, by state, 2017

Notes: U.S. average is unweighted.

Effort can also be measured as a percentage of states' aggregate personal income; this variable (*inc_effort*), though not presented in this report, is included in our State Indicators Database.

Variables used:
effort

States with higher values in the graph invest more of their total economy (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.

Figure 3 indicates that effort ranges from over five percent in Vermont to approximately 2.4-2.6 percent in Hawaii and Arizona. In other words, the amount Wyoming spends on its schools is equal to over five 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 3.53 percent. Note, though, that even small differences in effort can represent substantial increases or decreases in education resources, particularly in high-capacity states.

It also 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 lower 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 limited capacity.

States' fiscal effort can vary year to year due to changes in their education funding policies, their overall economies (e.g., GSP), or both. Figure 4 presents the national trend in effort between 2004 and 2017 (the averages do not include the District of Columbia). The figures in the graph are unweighted averages, but they provide a sense of changes over time in how much the typical state is spending as a share of its capacity (the trend is extremely similar using the alternative, personal income-based effort indicator).

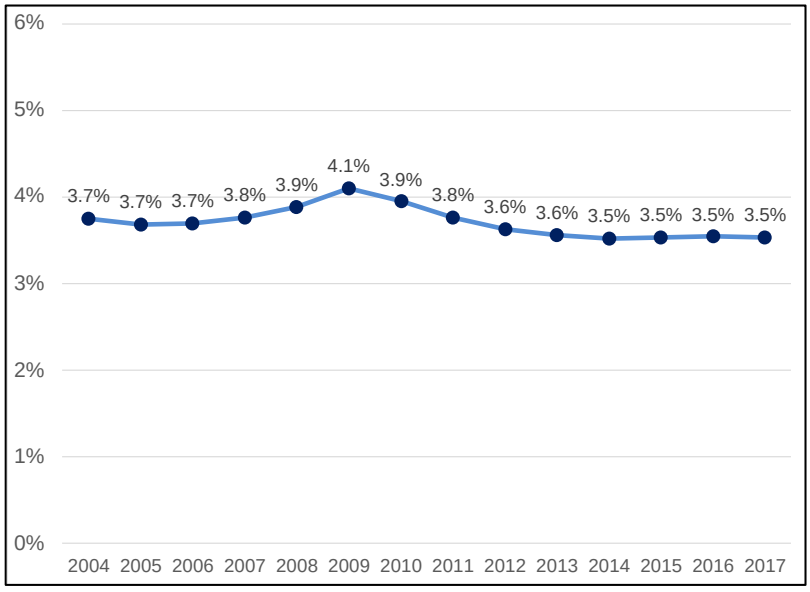


FIGURE 4

U.S. trend in state fiscal effort

Direct education expenditures as a percentage of Gross State Product, by year, 2004-2017

Notes: Averages are unweighted. Estimates do not include D.C.

Variables used:
Effort
Year

Figure 4 shows, first, that effort increased modestly during the financial crisis and recession that peaked between 2007 and 2009, followed by a decrease between 2009 and 2014, and relative stability after that.

This overall trend, predictably, varied quite widely by state. Most notably, in Michigan, effort dropped 1.3 percentage points during this time period, going from 4.7 percent in 2007 (among the highest of all states) down to 3.5 percent in 2017, roughly the national average. In a few other states, such as Florida, Indiana, and Hawaii, the net decrease in effort between 2007 and 2017 was equivalent to almost a percentage point (a very large change).

Conversely, only Alaska and Wyoming exhibit large increases in effort between 2007 and 2017 (most likely having to do with revenue from natural resources), and only 10 additional states saw any increase during this time, in most cases a minor increase.

Perhaps the most disturbing conclusion one can draw from Figure 4 is that, on average, effort has not rebounded from the losses suffered in the wake of the Great Recession. In fact, between 2009 and 2017, effort declined at least nominally in every single state except Wyoming, and the U.S. (unweighted) average remains stable at roughly 3.5 percent since 2014. The end result is that national average effort is slightly lower in 2017 compared with 2004.

This matters because, in general, declines in effort coincide with declines in revenue for schools. Moreover, 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 do not put up the effort.

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 educational 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 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 to 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.[1]

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.[2] In addition, instead of comparing spending between 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, 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.

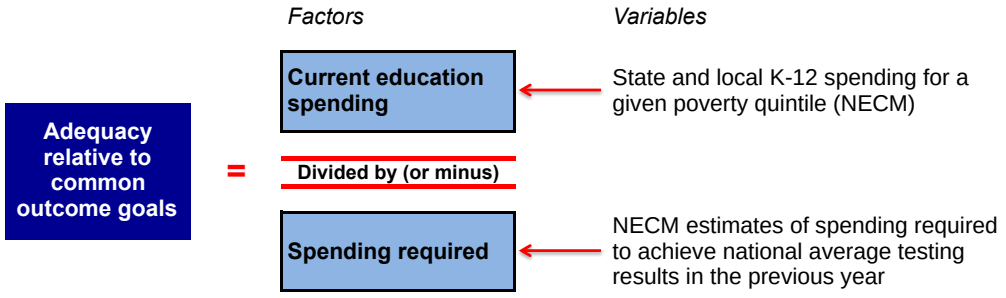


FIGURE 5

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 estimates from the Stanford Education Data Archive (Reardon et al. 2019), a database of testing outcomes that are made comparable across states. In simplified terms, the NECM does the following:

[1] 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.

[2] 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.

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);

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 gap to that found in lower poverty districts. Our 2017 NECM estimates use testing and finance data from 2014-2016, but they are presented as 2017 estimates because they measure spending required to achieve national average scores in the prior year. For more technical details on the NECM, see Baker et al. (2018).

In Figure 6, below, 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, while D.C. is not presented in Figure 6 because estimates are only available for one of the five poverty quintiles). 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 6, which are averaged across states (weighted by enrollment), should be interpreted with caution. They do, however, provide a general sense of the national situation when it comes to outcome-based adequacy.

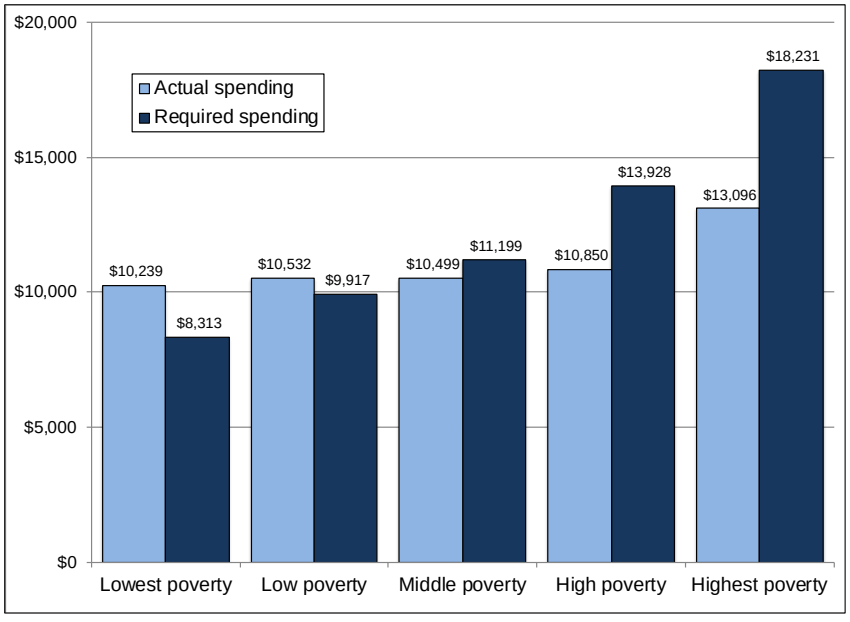


FIGURE 6

Adequacy of U.S. education spending

Predicted current per-pupil spending and predicted spending required to achieve national average test scores, by district poverty quintile, 2017

Notes: Averages are weighted by enrollment. Estimates do not include D.C.

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

In the lowest poverty districts (0-20th percentile), average actual per-pupil spending is higher than required to achieve national average test scores (and, as shown below, in all but six states, test scores for this group are higher than the national average). In the "low poverty" quintile (20-40th percentile), actual per-pupil spending is still higher,

but only by roughly $600, while all but 16 states have scores above the national average. This means that, on the whole, states are spending enough for their low and lowest poverty districts to achieve national average test scores (and most are achieving that result).

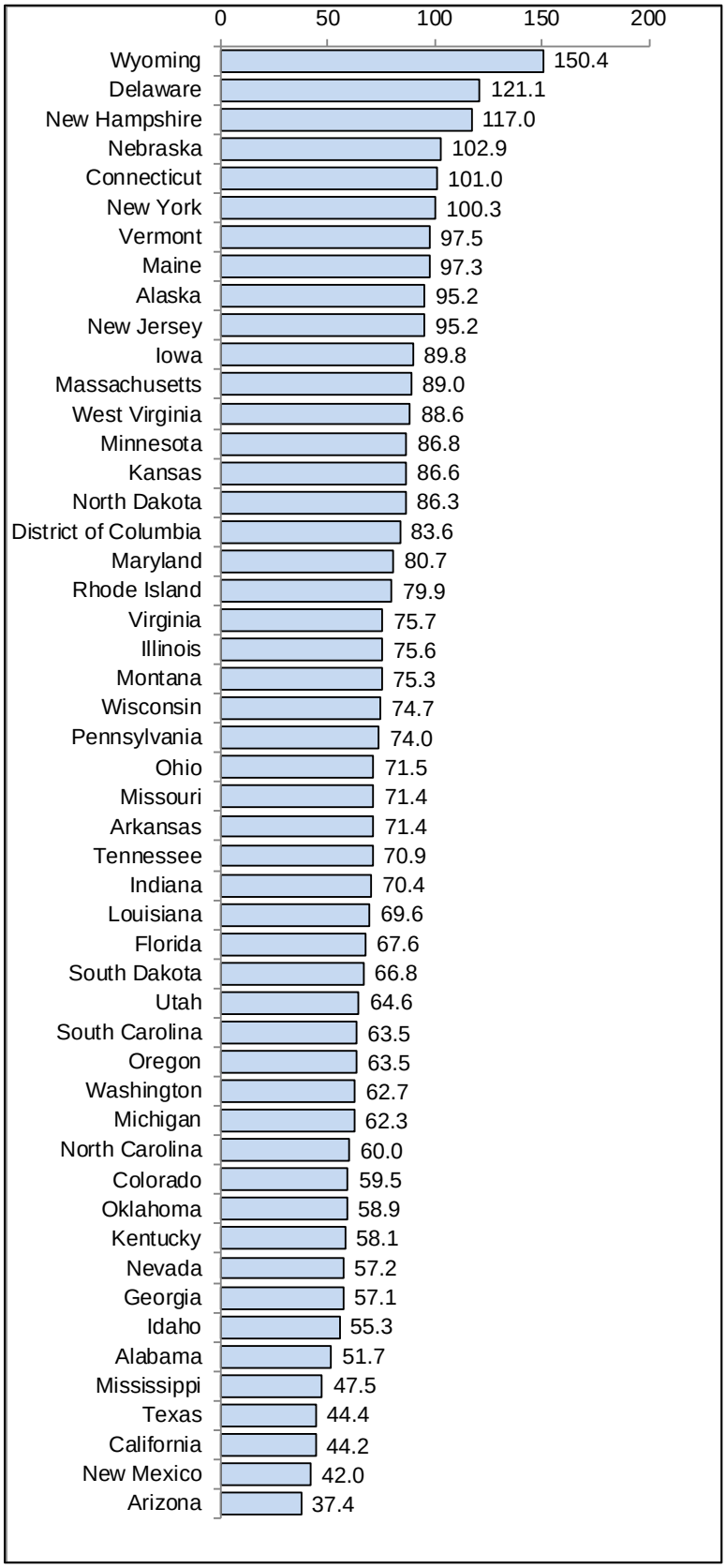


FIGURE 7

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, 2017

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.

In the middle, high, and highest poverty quintiles, the gap between required and actual spending increases rapidly, from about $700 per pupil (actual spending is 93.7 percent of the estimated required amount) for the middle quintile to $5,100 (actual spending is 71.8 percent of required amount) among the highest poverty districts.

In other words, on average, the highest poverty U.S. districts (80-100th percentile) spend only about 70 percent of how much they would have to for their students to achieve national average test scores (again, this means the national average for all students, regardless of poverty). And the situation is not much better in high poverty districts (60-80th percentile), where actual spending is about 78 percent of the estimated required amount. These gaps are quite striking.

Overall averages, of course, mask quite a bit of variation by state. Figure 7 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. For example, Wyoming spends 150.4 percent of its estimated required amount, or roughly 50 percent more.

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 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 high bar for higher poverty districts, and a rather low bar for lower poverty districts. Moreover, our adequacy measure is not meant to imply that if a state or states spent a certain amount, 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.

That said, somewhat surprisingly, there are six 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 (all four are actually within five percentage points). In only two of these ten states — Florida and Wyoming — are the actual test scores among the highest-poverty districts higher than the national average (once again, these outcome gaps are not presented in Figure 7, but are presented below).

In the majority of states, in contrast, actual spending is far short of predicted requirements, including five 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 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 that 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 higher-scoring 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 get 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 8. 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 7, 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 of the horizontal line spend less. Note that the value of the x-axes differ between the first and the other two scatterplots (though the total amount contained within the axis is the same across all three plots).

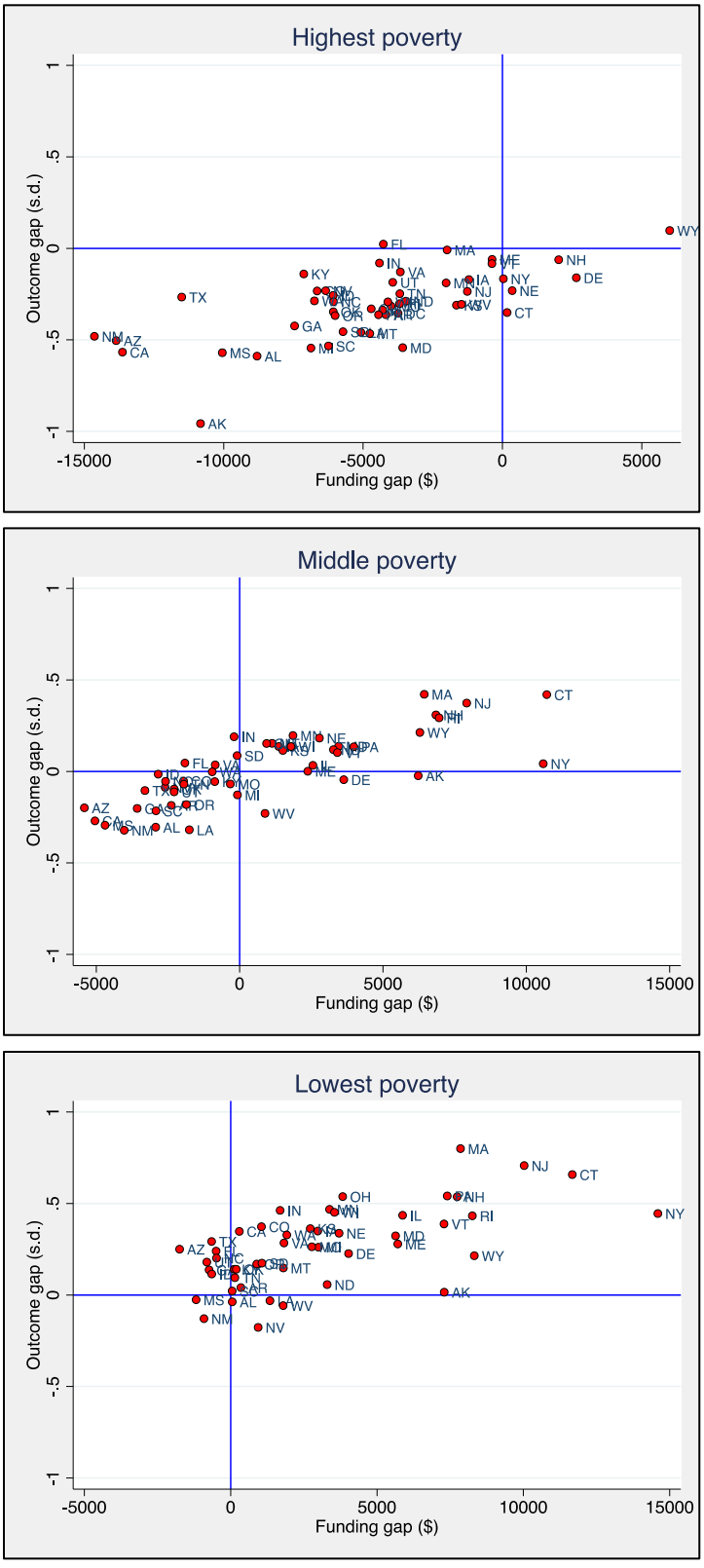


FIGURE 8

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 district poverty quintile, 2017

Notes: Blue lines represent zero gaps (outcome and funding). 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.

As would be expected, given the research on school funding, the dots in all three graphs exhibit a general 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 formed by the blue lines (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 scatterplot containing results for the highest poverty districts (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 6, 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 near or above requirements and achieve near or above average outcomes, while other states, such as Mississippi and Alabama, tend to spend less than required and exhibit accordingly low outcomes.

There are, however, 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 relatively affluent districts do not even achieve national average test scores. Spending in Mississippi's lowest-poverty districts is similarly low, and its students also fail to meet the average.

Conversely, in New York's lowest-poverty districts, funding is far above the predicted requirement, but testing outcomes are somewhat 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 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.

Adequacy as we measure it (by comparing actual spending with required spending to achieve outcome goals) can vary between states for different reasons, and not all of these factors are within states' control. Alaska is a unique example of this. More commonly, states serving larger populations of disadvantaged students will require more spending to achieve a common goal, such as national average test scores, as more students in these states will tend to enter the K-12 system further behind their more affluent peers.

Yet some of the important reasons why some states' spending levels fall far short of adequate levels while others' do not represent deliberate choices on the part of

policymakers. One of the key factors shaping adequacy is fiscal effort, which we discussed above. Recall that fiscal effort measures how much of a state's economic capacity (in this case, its Gross State Product) goes toward K-12 education. Figure 9 presents a scatterplot of the relationship between our effort indicator (from Figure 3) and the adequacy of spending on states' highest poverty districts (from Figure 7).

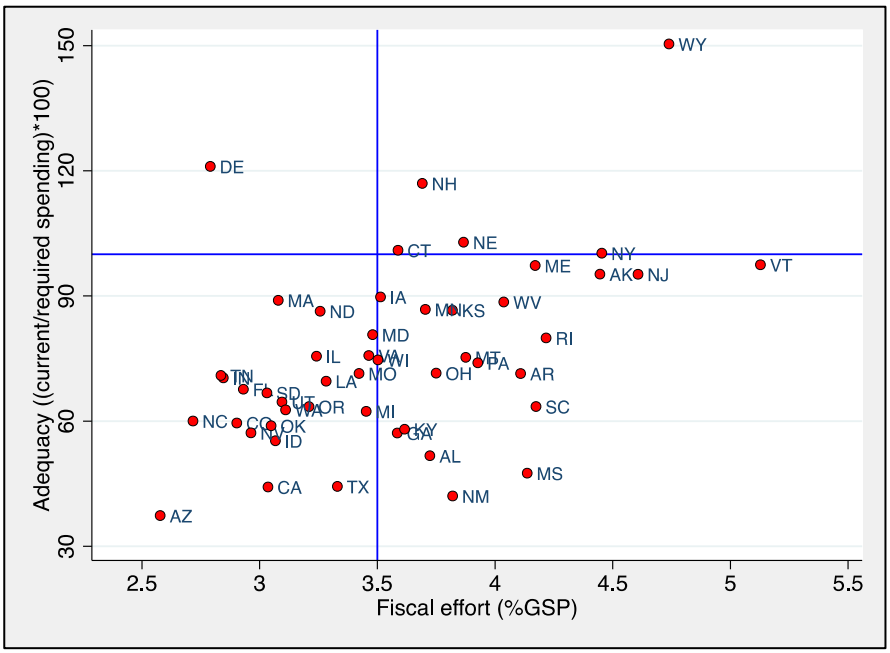


FIGURE 9

Adequacy by effort

Scatterplot of adequacy of spending on highest poverty districts (current divided by required spending)
AND
state fiscal effort (% of GSP), 2017

Notes: Horizontal blue line represents adequate spending (100 percent); vertical blue line represents average effort (unweighted).

Variables used:
necm_predcost_q5
necm_ppcstot_q5
effort

As in Figure 7, adequacy is presented in terms of current spending as a percentage of required spending, with values close to or above 100 percent (the horizontal blue line in the scatterplot) representing funding levels that are close to or exceed estimated adequate levels. The vertical blue line in the plot represents average effort.

The scatterplot indicates a relationship between effort and adequacy -- i.e., the dots tend to slope upward. In general, states that put forth higher effort tend to spend more adequately on their highest poverty districts, and vice-versa, though the relationship is moderate (the correlation between the two variables is 0.47).

One area of the scatterplot that merits special attention is the lower left part of the plot, where both adequacy and effort are low. Arizona, for example, exhibits both the least adequate spending on its highest poverty districts (current spending is a mere 37.4 percent of required spending), as well as the lowest effort of any state (2.58 percent) except Hawaii, which is not included in this scatterplot because it contains only one district. Other states, including California, North Carolina, Colorado, and Nevada, also spend inadequately and put forth relatively low effort levels. These are states in which poor outcomes among students in high poverty districts reflect, at least in part, a deliberate choice by state policymakers to devote an insufficient share of state resources to public schools.

In contrast, the upper right area of the plot includes states such as New York, New Jersey, Alaska, Vermont, and especially Wyoming, all of which put forth above average effort and are among the relatively few states that fund their highest poverty districts at adequate or near-adequate levels. This shows, in general, that states willing

to put forth the effort to fund their schools adequately tend to accomplish this goal (and, as suggested by Figure 8, also tend to achieve better testing results).

Of particular concern, however, are the exceptions to this tendency - i.e., states that exhibit strong fiscal effort but still fall short of adequate spending levels (the lower right area in Figure 9). These states, such as Mississippi, Alabama, and New Mexico, are devoting a relatively large share of their economies to schools, but still failing to fund them anywhere near adequately. This is in part because these are higher poverty states, which, as mentioned above, means they have to spend more to achieve common outcome goals. But it is also because of the highly related fact that these are comparatively low-capacity states. That is, their high effort levels still yield less revenue than those levels would in more affluent states, since their economies are smaller (e.g., four percent yields a lot more revenue in a high-GSP state than in a low-GSP state). In other words, these are the states that are trying to fund their highest poverty districts properly, but simply lack the capacity to do so.

On the whole, 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. Moreover, we find a relationship between adequacy and fiscal effort, suggesting, unsurprisingly, that states that put forth the effort tend to achieve more adequate funding levels.

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 25 percent more revenue than the lowest-poverty districts, while in another state, the highest-poverty districts may only receive five percent more revenue. We would say, then, that the first state is more substantially progressive than the second state.[3]

[3] 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. In addition, while Figure 10 presents the comparison of revenue in the highest and lowest poverty districts, users of the State Indicators Database can also compare states at other poverty levels (i.e., 10 and 20 percent).

Systematic progressivity, on the other hand, 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). The results for systematic and substantial progressivity are very similar (the correlation between the two variables is roughly 0.9), so we will focus solely on the latter in this report. Both variables are available for multiple years in our State Indicators Database.

In Figure 10, we present substantial progressivity, by state. In the interest of more intuitive visualization, we recast the ratios in terms of the percentage difference in revenue between the highest poverty (30 percent) districts and lowest poverty districts (0 percent) in each state. For example, the figure for Wyoming is 92.8 percent, which means that the highest poverty districts receive almost twice as much (92.8 percent more) revenue as do otherwise similar districts with zero poverty rates. Estimates greater than zero in Figure 10 indicate progressive funding (the highest poverty districts receive more than the lowest poverty districts), whereas those less than zero indicate regressivity.

Half of the states exhibit at least nominal progressivity, although, in several cases, such as Indiana, Kansas, Pennsylvania, and Oklahoma, the percentages are so close to 1 that they are more accurately described as non-progressive (i.e., neither progressive nor regressive - i.e., "flat funding states"). In Wyoming, Alaska, and Utah, funding is highly progressive - adjusted revenue among the highest-poverty districts is at least 50 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.

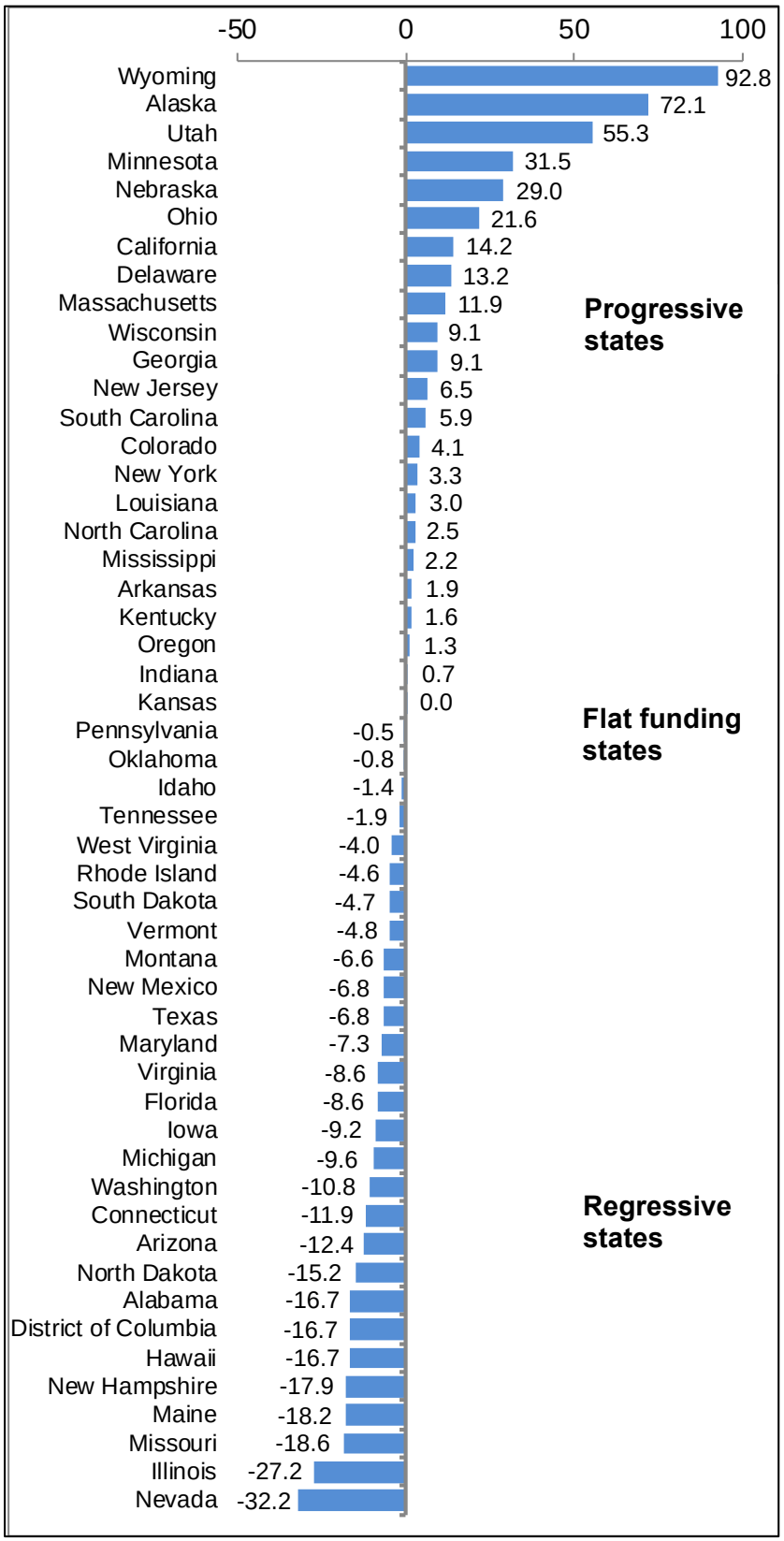


FIGURE 10

Progressivity of state education funding

Percent difference in adjusted state and local revenue between highest poverty districts (30 percent) and lowest poverty districts (0 percent), by state, 2017

Notes: Values indicate the percentage difference in adjusted revenue between 30 and 0 percent poverty districts in each state.

Variables used:
predicted_slocrev0_
predicted_slocrev30_

Values over 0 indicate progressive education funding – that is, the highest (30 percent) poverty districts receive more revenue than 0 percent poverty districts, all else being equal. The states toward the bottom fund education regressively – 0 percent poverty districts actually receive more revenue than the highest poverty districts.

There is, of course, no concrete rule for assessing whether education funding is progressive *enough*, in no small part because state context is an important factor in any such assessment (e.g., states with larger achievement gaps or greater income inequality might need to fund schools more progressively than states with smaller gaps or lower inequality).

That said, in order to provide some rough frame of reference for interpreting the magnitude of the results in Figure 10, we might recall the adequacy data presented in Figure 6, which show that our estimates of required spending levels for the highest poverty districts are well over twice as high as the required spending levels for the lowest poverty districts. This does not, of course, mean that states can only be considered sufficiently progressive if their highest poverty districts receive twice as much funding as do their lowest poverty districts. It does, however, suggest that even progressive funding systems, while certainly laudable, may not be progressive enough, at least relative to common outcome goals.

Bearing this in mind, we might note the large number of states clustered around 0 percent in Figure 10. For instance, in the 23 states with at least nominally progressive funding (estimates greater than zero), the difference is greater than five percent in only 13 states, and greater than 10 percent in only nine states. From this perspective, one might argue that the vast majority of states' funding systems are either regressive, non-progressive, or, at best, only minimally progressive.

In order to get a national sense of the fairness of U.S. education funding, and how it has changed over time, in Figure 11 we present the trend in national average progressivity between 1997 and 2017. To control roughly for interstate contextual differences, we present this trend in terms of the ratio of average state and local revenue (centered around the labor market mean) among districts in the highest poverty quintile to that among districts in the lowest poverty quintile (the variables used for this calculation are available in our District Indicators Database). Values greater than one in Figure 11 indicate progressive funding (the highest poverty districts receive more funding than the lowest poverty districts), whereas values less than one represent regressive funding (the lowest poverty districts receive more funding).

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. Note that the vertical axis begins at 0.90 and ends at 1.10, and so year-to-year changes in the graph may appear larger than they would with different axis scaling.

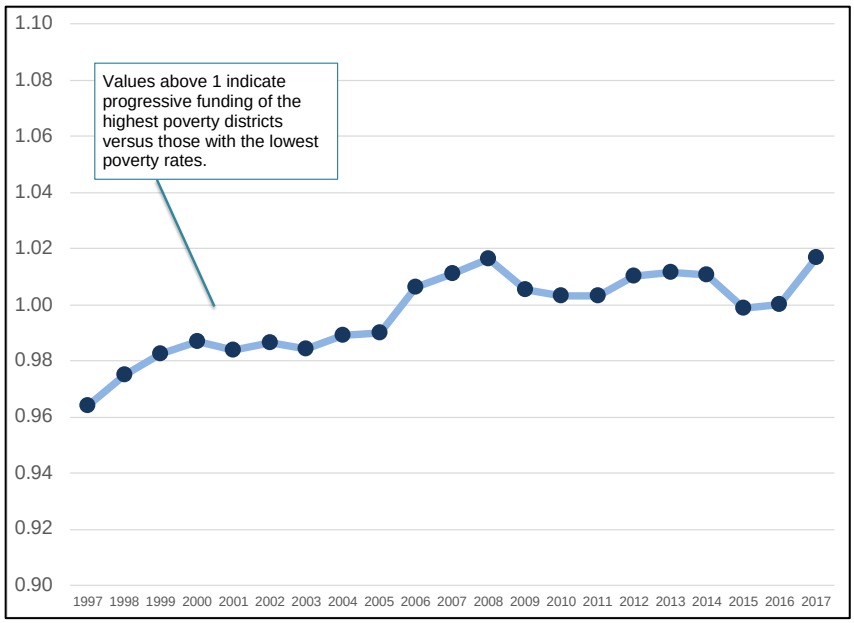


FIGURE 11

Trend in progressivity of U.S. education funding

Ratio of average (labor market-centered) state and local revenue to districts in highest poverty districts to revenue in lowest poverty districts, by year, 1997-2017

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

Variables used:
(District Indicators Database)
ctr_slocrevpp
povgroup

Focusing first on the ratio in the most recent year (2017), we find that revenue in the highest poverty districts is approximately two (1.7) percent higher than it is in the lowest poverty districts. This difference is very small, and can be realistically interpreted as neither progressive nor regressive.

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, all else being equal, the highest and lowest poverty districts receive roughly the same funding.

Finally, we turn to how this national situation has changed over time. As was the case with effort (Figure 4), there is a steady, albeit rather modest increase in progressivity up until the peak of the Great Recession, followed by a decline in the three subsequent years. Prior to 2008, revenue went from a minimally regressive 0.964 in 1997 (i.e., revenue in the highest poverty districts was about 3.6 percent lower than that in the lowest poverty districts) to a minimally progressive 1.017 in 2008. This was followed by some volatility in the trend, with declines between 2008-2009 and again between 2014-2015, interspersed with increases between 2010-2011 and in our latest year-to-year change, 2016-2017.

In one sense, then, U.S. education funding seems to be getting more progressive over the long term, despite the apparent negative impact during and immediately following the Great Recession (Baker 2014). On the other hand, the net increase of approximately 4-5 percentage points between 1997 and 2017 is not particularly large given the time frame. The most charitable interpretation of the trend is that progressivity has gone from very slightly regressive to very slightly progressive. Once again, however, it might be more appropriate to summarize Figure 11 by saying that funding has been neither progressive nor regressive for the past two decades.

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 educational 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 and local 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.

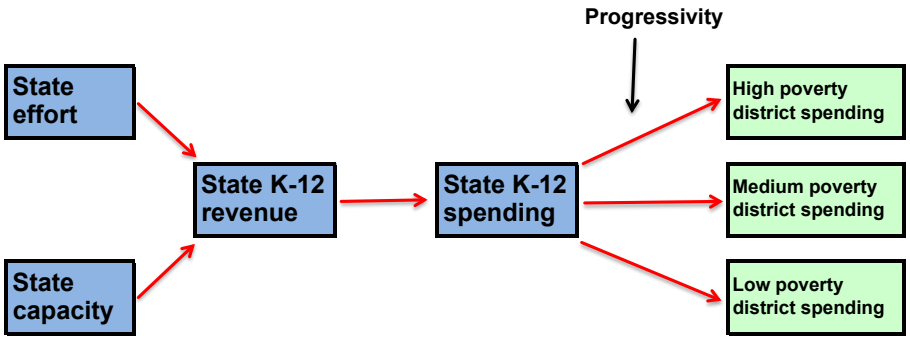


FIGURE 13

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 14, 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.

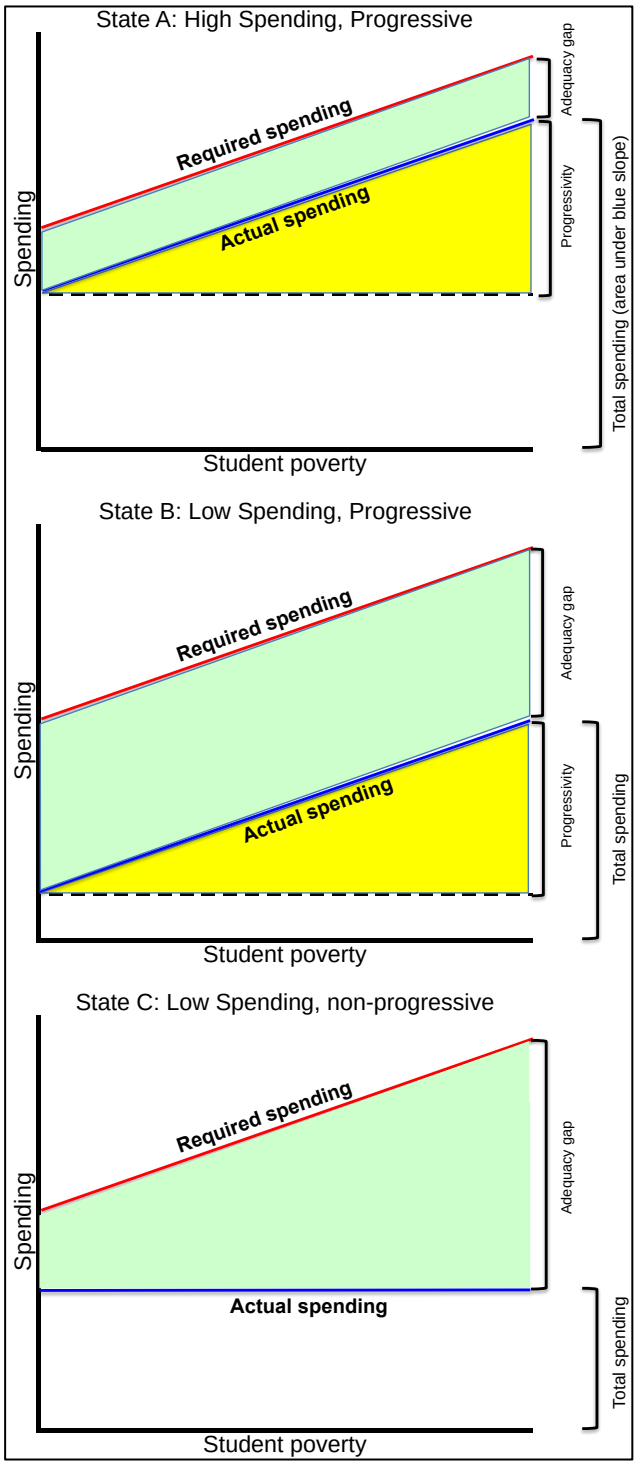


FIGURE 14
Illustrative state finance profiles

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 educational 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 educational 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 all 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 exhibit 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 substantially short of the estimated required amount. The latter finding is most likely due to the extreme poverty in New Jersey's highest-poverty districts (which includes 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, even 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 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 between 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 between 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 between 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 low-income 3- and 4-year-olds 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 (see Baker et al. [2019] for an analysis of teacher wage competitiveness using SFID data).

Readers can also request access to our District Indicators Database, which 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. Information on these data is 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. The primary goal of the School Finance Indicators Database 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 both researchers and non-researchers.

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. A detailed review of our results can be found in the executive summary of this report. In the most general terms, however, our findings 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 more 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 higher-poverty districts.

We are once again making all of our data and its full documentation, updated annually, freely available to the public. 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 (2014-2016)	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, 2017

State Name	District poverty level 0%	10%	20%	30%
Alabama	8,372	8,481	8,592	8,704
Alaska	10,525	13,836	18,187	23,908
Arizona	5,929	6,424	6,960	7,542
Arkansas	7,928	8,367	8,829	9,317
California	8,753	9,446	10,194	11,002
Colorado	7,946	8,343	8,760	9,198
Connecticut	17,035	16,576	16,130	15,695
Delaware	11,399	12,673	14,090	15,665
Florida	7,276	7,676	8,099	8,544
Georgia	7,681	8,235	8,829	9,466
Hawaii	12,716	12,882	13,059	13,220
Idaho	5,790	6,484	7,261	8,132
Illinois	13,314	12,685	12,085	11,514
Indiana	7,998	8,598	9,243	9,936
Iowa	8,954	9,687	10,479	11,336
Kansas	7,667	8,861	12,239	11,832
Kentucky	8,334	8,730	9,146	9,581
Louisiana	10,196	12,121	10,048	9,975
Maine	11,985	11,664	11,351	11,046
Maryland	11,752	12,327	12,930	13,563
Massachusetts	13,116	13,608	14,119	14,649
Michigan	8,957	9,266	9,585	9,915
Minnesota	8,785	10,397	12,304	14,562
Mississippi	6,833	7,229	7,648	8,091
Missouri	9,177	9,062	8,947	8,834
Montana	8,471	9,519	12,696	12,019
Nebraska	8,594	10,168	12,031	14,235
Nevada	10,477	8,918	7,591	6,461
New Hampshire	13,352	13,486	13,622	13,759
New Jersey	15,222	15,245	12,269	15,292
New Mexico	7,309	7,858	8,448	9,083
New York	18,731	18,813	13,896	18,978
North Carolina	7,190	7,628	8,093	8,586
North Dakota	10,242	11,597	13,130	14,867
Ohio	8,819	9,642	12,542	11,526
Oklahoma	5,840	6,400	7,015	7,689
Oregon	8,850	9,232	9,630	12,045
Pennsylvania	13,731	12,936	12,168	11,455
Rhode Island	14,080	13,879	13,681	13,486
South Carolina	7,976	8,667	9,418	10,235
South Dakota	7,485	8,502	9,658	12,971
Tennessee	7,416	7,800	8,203	8,627
Texas	6,959	7,439	7,952	8,501
Utah	5,061	6,315	7,881	9,835
Vermont	18,038	17,138	16,283	15,471
Virginia	9,951	9,957	9,963	9,969
Washington	9,319	9,950	10,624	11,344
West Virginia	9,621	9,940	10,269	12,610
Wisconsin	9,486	12,289	11,160	12,105
Wyoming	12,764	14,556	16,598	18,927

Notes: Estimates adjusted for poverty, 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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