the adequacy and fairness of state school finance systems

key findings from the school finance indicators database

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Lauren Schneider
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ALBERT SHANKER INSTITUTE
RUTGERS Graduate School of Education

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THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

Key Findings from the School Finance Indicators Database

School Year 2017-18
schoolfinancedata.org

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Lauren Schneider
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Graduate School of Education

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Table of Contents

$$(\ln)\text{SCHOOL} = b_0 + b_1\text{State}_i + b_2\text{LaborMarket}_{ij} + b_3\text{CWI}_{ij} + b_4\text{FINANCE}_{ij} + b_5\text{PopulationDensity}_{ij} + b_6\,\text{Enrollment}_{ij} + b_7\text{INDICATORS}_{ij} + b_8\text{Scale}_{ij} + b_9\text{Poverty}_{ij} + b_{10}\text{SchlType}_{ij} + b_{11}\text{DATABASE}_j + e$$

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THE ADEQUACY AND FAIRNESS OF STATE SCHOOL FINANCE SYSTEMS

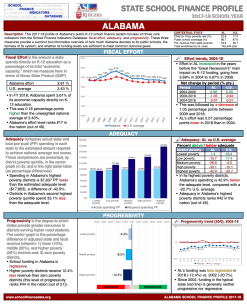
Third Edition
January 2021

Executive summary

The publication of this annual report and accompanying database is motivated by two considerations. The first is that there is now an emerging empirical consensus about the centrality of equitable and adequate funding for high-quality K-12 education. Yes, how money is spent is also important, but there are few options for improving U.S. public schools that do not require investment of resources, and districts cannot spend wisely money they do not have. The research is clear: Money matters. Period.

The second consideration is that school finance is extremely complicated. The inner workings of states' funding systems, shaped over decades in state legislatures and courts, are so intricate and complex that few truly understand how they work. And finance research is among the most arcane and impenetrable fields for policymakers, parents and the general public. Every year, countless reports of varying quality are published by a variety of different individuals and organizations, sometimes reaching inconsistent conclusions.

The primary purpose of the School Finance Indicators Database (SFID) is to cut through this clutter. It is a public collection of finance and resource allocation measures that are based on sophisticated and widely accepted methods but are also designed to be easy for non-researchers to interpret and use themselves.



NEW STATE PROFILES

Accompanying this report are single-page profiles of the school finance systems of all 50 states and D.C.

Download your state's profile at:
schoolfinancedata.org

The State Indicators Database (SID), which is the SFID's primary product, includes approximately 125 variables, but we focus in this report on three key school finance measures: **fiscal effort**, **adequacy**, and **progressivity**. We feel that these three indicators as a whole provide a succinct and informative overview of the adequacy and fairness of each state's school finance system.

This third edition of our database and annual report, however, is being published in the middle of a terrible global crisis: the coronavirus pandemic. Due to the lag in the release of national school finance data, our measures (2017-18 school year) predate the economic crisis caused by this pandemic. Yet this is precisely the right time to examine and evaluate states' school finance systems, as they will play a big role in determining the severity, duration and distribution of the school budget shortfalls. Accordingly, we pay special attention in this report to discussing how states' systems tend

to mediate the impact of economic downturns, and we offer general guidance as to what we can expect as the impact of the current crisis continues to unfold over the next few years.

Fiscal effort

Fiscal effort (or simply effort) measures how much of states' total economic capacity is spent directly on K-12 education. It is fundamentally less a measure of how much states spend than the degree to which they leverage their *potential* to spend. Our effort indicators 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 their public schools.

- **States vary in their effort levels, which, along with state capacity, drive large interstate differences in school resources.**
  - Individual states' effort levels range from about 2.4 percent of gross state product (GSP) in Hawaii and Arizona to 4.4-4.5 percent in Wyoming and New Jersey. That is, New Jersey and Wyoming devote almost twice as much of their "economic pies" to public schools as do Hawaii and Arizona.
  - Higher-effort states generally produce more revenue, though states with larger economies can produce the same amount of revenue as states with smaller economies that put forth the same effort levels. Effort and capacity together explain roughly 70-80 percent of interstate differences in adjusted state and local revenue.
- **The Great Recession, in combination with policymakers' choices in its aftermath, caused what appears to be a permanent decline in fiscal effort.**
  - Average U.S. effort increased from roughly 3.8 percent in 2004 to a high of 4.1 percent in 2009. This was followed by a rapid four-year decline between 2009 and 2013, during which time the average decreased from 4.1 to 3.5 percent. It has remained relatively flat since 2013. States' economies recovered, but most failed to revisit their funding systems to make up lost ground.
  - Between 2007 and 2018, there was at least a nominal net decrease in effort in all but nine states (and even small changes in effort represent large changes in resources). In several states—such as Florida, Hawaii, Indiana and Michigan—this decrease was close to or greater than one percentage point.
  - As a result, in 40 states, effort was lower in 2018 than it was in 2004, 14 years earlier.
- **Most states are in a worse position to handle the current economic crisis than they were prior to the Great Recession.**
  - *High-effort, low-capacity states are particularly vulnerable.* These states, such as Arkansas, Mississippi and South Carolina, are already spending a relatively large share of their "economic pies" on education and are more limited in their ability to increase resources.
  - *Most states' effort levels will likely increase in the short term, and decline afterward.* The initial increase is an illusion of sorts, as it tends to take some time for education budget cuts to "catch up" with the immediate economic contraction caused by recessions. Without significant federal and state level policy responses, decreases in effort may once again recur for several years and not subsequently recover, representing another long-term de facto cut in school funding.

Adequacy

Effort measures how hard states and districts work to raise funds for their public schools, while adequacy addresses whether the amount raised is enough. Our primary measure of adequacy compares each state's current education spending, by district poverty level, to estimates of 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 models that take into account factors such as student characteristics, labor market costs and district characteristics.

- **In the vast majority of states, spending in high-poverty districts falls far short of estimated adequate levels.**
  - On average, spending in the highest-poverty districts (80-100th percentile poverty) is approximately 20 percent below our estimated adequate levels.
  - There are only nine states in which spending on the highest-poverty districts exceeds estimated adequate levels: Wyoming; New York; New Hampshire; Nebraska; Alaska; Connecticut; D.C.; North Dakota; and Delaware.
  - Conversely, spending in the highest-poverty districts is at least 20 percent *below* the adequate level in 28 states, and at least 40 percent lower in eight of these states: Arizona; New Mexico; Texas; Mississippi; California; Nevada; Oklahoma; and Alabama.
  - The situation is not much better in the second highest poverty district quintile (60-80th percentile district poverty), where spending is above adequate levels in only 19 states.
- In contrast, **spending in lower-poverty districts is above estimated adequacy targets in most states**. When it comes to their lowest-poverty (0-20th percentile) districts, 41 states spend above estimated adequacy targets, by an average of 45 percent. In the second-lowest district poverty quintile (20-40th percentile), spending is above adequate levels in 30 states, by an average of 11 percent.
- **There is a positive relationship between adequacy and fiscal effort.** That is, states that spend a larger slice of their "economic pies" on education tend to exhibit more adequate spending levels. Adequate spending in no small part represents a policy choice.
- **Higher-poverty districts (and states) are particularly vulnerable during the current economic downturn, and most are already spending below adequate levels.**
  - *The negative impact of budget cuts on spending adequacy will be more severe and persistent in higher-poverty districts*, as lower-income districts are generally hit harder by state revenue cuts, and are less well-equipped to recover from them.
  - *Federal aid should be targeted at high-effort states with inadequate funding.* States such as Mississippi and New Mexico try to raise their own revenue but are constrained in their ability to do so. Low-effort states with inadequate funding, in contrast, have more flexibility to generate resources in house.

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 funding to wealthier districts than they do to poorer districts. Progressivity (sometimes called "fairness") is important because it is generally well established that students from marginalized backgrounds tend to require more resources than their more affluent peers to achieve the same level of education outcomes. Our primary progressivity measure compares revenue between high- (30

percent Census child poverty) and zero-poverty districts while controlling for factors—such as labor market costs, population density and district size—that affect the value of the education dollar.

- **State and local education revenue in most states is either non-progressive or regressive.** That is, high-poverty districts, all else being equal, tend to receive revenue that is similar to or less than that allocated to the lowest-poverty districts in the same state.
  - There are only 10 states in which high-poverty districts receive at least 10 percent more revenue than zero-poverty districts. In only four of these states (Alaska, Utah, Nebraska, and Minnesota) do high-poverty districts receive at least 25 percent more.
  - In 25 states, high-poverty districts actually receive less revenue than zero-poverty districts. Funding is particularly regressive in Nevada, New Hampshire, Illinois, Delaware and Maine.
- At the national level, **education funding has been non-progressive for the past two decades**. On average, labor market-centered state and local revenue in the highest-poverty districts has been within 2-3 percentage points of that in the lowest-poverty districts since 1998.
- **The Great Recession reversed a decade of slow progress** in improving the fairness of education funding.
  - Between 1998 and 2008, 35 states saw at least a nominal net increase in progressivity.
  - During and after the recession, however, most states saw a net *decrease* in revenue fairness—in 32 states, funding was less progressive in 2018 than in 2008. Even as states' economies recovered, the damage to funding equity persisted.
- **Due to the pandemic-fueled economic downturn, increasing inequity of education funding is likely in the short term, but policymakers can limit and reverse the damage.**
  - *School funding in many states will likely become more regressive during the next two to four years.* This shift could be even more pronounced and persistent than it was during and after the Great Recession, as revenue from property taxes, which are regressive, declined due to the collapse of the housing market in 2007-08, but hopefully will remain more stable during this current downturn.
  - *The magnitude of these shifts, and how long they last, is largely in the hands of policymakers.* The current distribution of state revenue, how it is cut, and its interplay with local revenue will shape these trends. For example, states can cut aid in a manner that minimizes harm to higher-poverty districts, and reform their systems going forward to ensure a more progressive distribution of K-12 revenue.

Overall, then, 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). These results are particularly troubling in our current economic situation, which threatens to make a bad situation worse.

Yet our findings also highlight the heterogeneity of states' school finance systems. There are, in fact, several states in which education funds are both adequate and distributed equitably, and there are relatively few that perform poorly on all three of our core measures. Such diversity is a result of the fact that school finance is primarily in the hands of states, and the structure and performance of systems thus varies widely among those states.

The impact of the current economic crisis on K-12 funding will likewise differ among states that were at a variety of different "starting positions" when the pandemic began. And it bears emphasizing that state policymakers have the ability to mediate the severity of the damage, how long

it lasts, and whether the burden is borne disproportionately by districts serving higher-needs students.

Finally, while the purpose of this report (and the SFID in general) is to describe and evaluate states' school finance systems, we do not provide overall state ratings or grades. Due to the complex interdependency of our three core measures, as well as the importance of state contextual factors, the potential for single summative measures to mislead and oversimplify outweighs their benefits. We do, however, include recommendations as to how policymakers, journalists, parents, and the public can use our data and results to summarize and assess the performance of state school finance systems.

We have once again made our State Indicators Database, which includes many measures not presented in this report, freely available to the public. Also accompanying this report are one-page profiles of the school finance systems of all 50 states and the District of Columbia, which may be particularly useful to those interested in one state or a small group of states. The data and profiles, in addition to user-friendly documentation, online data visualizations, and other resources are all available at the SFID website: schoolfinancedata.org. It is our hope that these data and analyses will improve school finance debates and policymaking in the U.S., both during this current economic crisis and beyond.

part 1 Introduction

Over the past decade, there has begun to emerge 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, 2018; Jackson 2020).

There are, of course, serious and often important debates about how education funding should be spent. Without question, how money is spent—and on which students—also matters. Yet virtually all potentially effective policies and approaches require investment, often substantial investment. Put simply, we can't decide how best to spend money for schools unless schools have enough money to spend.

This consensus around the importance of school funding is the impetus for the **School Finance Indicators Database** (SFID), a public 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 education outcomes require adequate resources, and improving education 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 are 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 degree to which these promises are fulfilled, however, varies a great deal, within and between states.

In this report, we provide results from three types of indicators included in our State Indicators Database (SID), the primary product of the SFID: **effort**, **adequacy** and **progressivity**. We refer to these as our "core indicators," as we believe that as a group they provide a concise summary of how much states spend on education, how those resources are distributed, and whether they are sufficient to achieve common student outcome goals.

1.1 Measuring school funding

Outside of arcane academic journals, the majority of school finance discussions and comparisons use simple measures, such as raw per-pupil spending or revenue. 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.

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, etc., 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 higher cost of living, 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 provide a given level of education quality.

Comparing finance measures among districts and states requires accounting for these contextual differences (to the degree possible). Accordingly, most of the measures in our state database, including those presented in this report, control statistically for the following characteristics:

1. **Student poverty:** Percent of school-age children (ages 5-17) living in the district with household incomes below the federal poverty line, an important control variable because, in general, districts serving larger shares of higher-needs students require greater resources to provide a given level of education quality (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, which accounts for variation in labor costs across locations (data source: Education Comparable Wage Index [ECWI], developed by Dr. Lori Taylor [Taylor and Fowler 2006; Taylor 2014]);
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); and
4. **Population density:** Population per square mile of land area, which we include because the poverty-related costs of education increase with population density (data source: U.S. Census Bureau).

For instance, our measures of "adjusted" (or "predicted") revenue and spending calculate, in each state and year, revenue/spending for a "typical" district that has: (1) at least 2,000 pupils; (2) average population density; (3) a labor market with national average (within year) external labor cost pressures and; (4) one of four poverty rates (i.e., 0, 10, 20 or 30 percent, yielding four separate variables). Adjusted state and local revenue is used directly in our primary progressivity measure ("substantial progressivity"), which compares revenue between 30 and 0 percent poverty districts. In addition, the model from which our primary adequacy estimates are derived includes these four key variables (and others).

The most important of these factors is child poverty, not only because it exerts strong influence on the cost of providing education, but also because there is now broad agreement among scholars in a variety of disciplines and organizations across the political spectrum that school districts serving higher-needs student populations—those with higher poverty rates in particular—require more resources per pupil than districts serving lower-needs student populations (Duncombe and Yinger 2008).

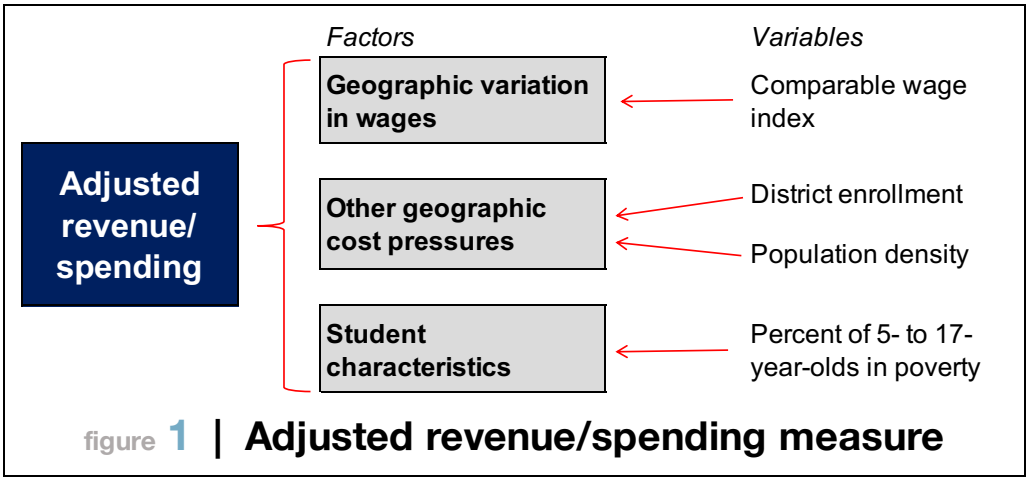


figure 1 | **Adjusted revenue/spending measure**

But 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.

1.2 School funding and the coronavirus pandemic

This third release of our database and annual report comes right in the middle of a terrible global crisis—the coronavirus pandemic. The most tragic and lasting effects of this pandemic will of course be measured in loss of life. But a parallel tragedy will also be unfolding in the coming months and years, one that will affect those at the beginning of their lives: a school funding crisis that threatens to disadvantage a generation of children.

It is currently difficult to make any precise predictions about the magnitude of the budget crisis caused by the coronavirus pandemic, except to say that it has already started and it seems likely to be severe (Leachman and McNichol 2020). The revenue that funds public K-12 schools will see large decreases, and there will be cuts. And if money matters, then funding cuts matter too (Shores and Steinberg 2019; Jackson et al. forthcoming).

Unfortunately, due to the lag in the publication of national school finance data, the most recent year of data in this new SFID release is 2017-18. We are therefore unable to perform a comprehensive national assessment of the current recession's initial impact on school budgets.

Some might wonder why it is useful to examine 2017-18 finance data during a massive 2020-21 financial crisis. We contend that this is precisely the time to examine the structure and performance of states' K-12 finance systems, as these systems will play an important role in mediating the extent and distribution of the damage, as well as the duration of the recovery.

For instance, thus far, our national discourse about the impact of this crisis on K-12 budgets has focused on the size of current or anticipated cuts. Yet the impact of these cuts will depend not just on their overall size, but, just as importantly, on how they are distributed among districts that vary in terms of the students they serve, their ability to raise revenue locally, and the extent to which their

funding was sufficient to meet their students' needs before the pandemic (and if recent history is any guide, the impact of this crisis on school budgets will persist even as states' economies recover).

Accordingly, in this report, we pay special attention to discussing how our findings can inform readers, including policymakers, regarding the current outlook for school budgets. The SFID is well-suited to this role. For one thing, many of our variables go back 20 or more years, which provides a solid means of anticipating and understanding what will happen during this pandemic-fueled recession: looking at what happened during the Great Recession of 2007-09 and its long aftermath (its effects, unfortunately, are still evident in many states today). The severity of that recession, as well as the role that federal stimulus funds played in filling state budget gaps, make it the economic crisis in recent decades that is most comparable to the one occurring now.

Moreover, while it is only possible to speculate about the ultimate severity of the current recession's impact on school budgets, it is virtually certain that the damage will be particularly harsh and persistent in higher-poverty states and districts. And the SFID, at its core, is fundamentally focused on equity. The majority of variables in our state database, including those presented below, allow for the comparison of school resources by district poverty, within and between states.

In short, while we cannot present results on the effect of the current crisis , and this impact will vary widely across states, we can and do offer discussion of how states' systems tend to mediate the impact of economic downturns, as well as general guidance as to what we can expect as the current crisis continues to unfold over the next several years (for more detailed discussion, see Baker and Di Carlo [2020]).

part 2 | Results: core indicators

Our State Indicators Database (SID), which is freely available to the public, includes roughly 125 state-level variables measuring both school revenue and spending, as well as many contextual and resource allocation measures, such as teacher pay competitiveness, staffing ratios and charter school coverage.

In this report, however, we focus on the following three "core indicators," which we believe provide a succinct but nuanced and informative summary of states' school finance systems:

1. **Fiscal 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 common outcome goals (e.g., test scores); and
3. **Progressivity:** whether states allocate more resources to districts serving larger proportions of high-needs students.

In this section, we discuss each of these core indicators in turn. Note that in the figures below, as in our public dataset, years refer to the spring semester of the school year (or the fiscal year). For example, 2018 means that the data pertain to the 2017-18 school year (the most recent year available). In addition, in the notes beside all figures below that present actual data, we list the names of the specific SID variables that are used to create the graphs, so that readers can replicate our results or use the same variables in different analyses.

2.1 | Fiscal effort

Fiscal effort (or simply effort) measures how much of a state's total resources or capacity is spent directly on K-12 education. In our system, effort is calculated by dividing total expenditures (state plus local, directly to education) by either gross state product (GSP) or aggregate personal income.

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 each state spends as a percentage of how much it *might* spend.

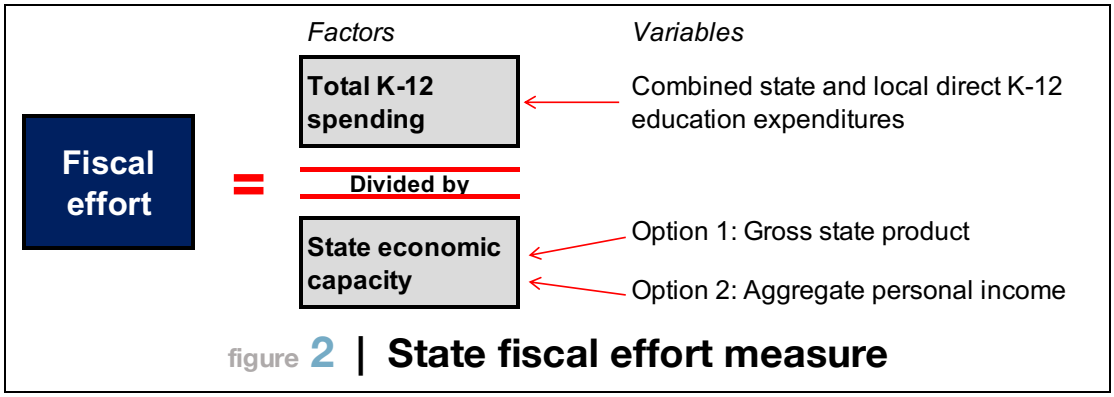


figure 2 | State fiscal effort measure

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 may still be 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 figure, as they are similar (the correlation between the two is roughly 0.90), and both can be downloaded as part of the SID.

Figure 3 indicates that effort ranges from approximately 2.4 percent in Hawaii and Arizona to around 4.5 percent in New Jersey. In other words, the amount New Jersey spends directly on its schools is equal to 4.5 percent of its annual GSP, while Arizona and Hawaii spend roughly half as much as a proportion of their GSPs.

Most states are clustered within 0.5 percentage points of the unweighted U.S. average of 3.43 percent. Note, though, that even small differences in effort represent large increases or decreases in education resources. The denominators of the effort calculation are entire state economies.

When evaluating states' effort levels, it is important to note that states with large economies and relatively high-income residents have larger "pies" from which education might be funded (via taxation). These states can exert less effort than their counterparts with smaller economies and still allocate the same amount of resources to schools. In other words, while higher effort levels are generally preferable, one should evaluate state effort with an eye on capacity. And there is no consistent relationship between state effort and state capacity.

New York and New Jersey, for instance, are high-capacity states that also put forth above-average effort, generating copious resources statewide. But there are also a number of states, such as Delaware, Massachusetts and California, that are high capacity and put forth relatively low effort. All else being equal, such lower effort levels will have less deleterious implications for education resources in these high-capacity states than they would in states with smaller economies.

In contrast, several states, such as Arkansas, Maine, Mississippi, South Carolina and West Virginia, exhibit rather strong effort, but their relatively limited capacity means that students in those states will be under-resourced vis-à-vis states that put forth similar effort but have greater capacity.

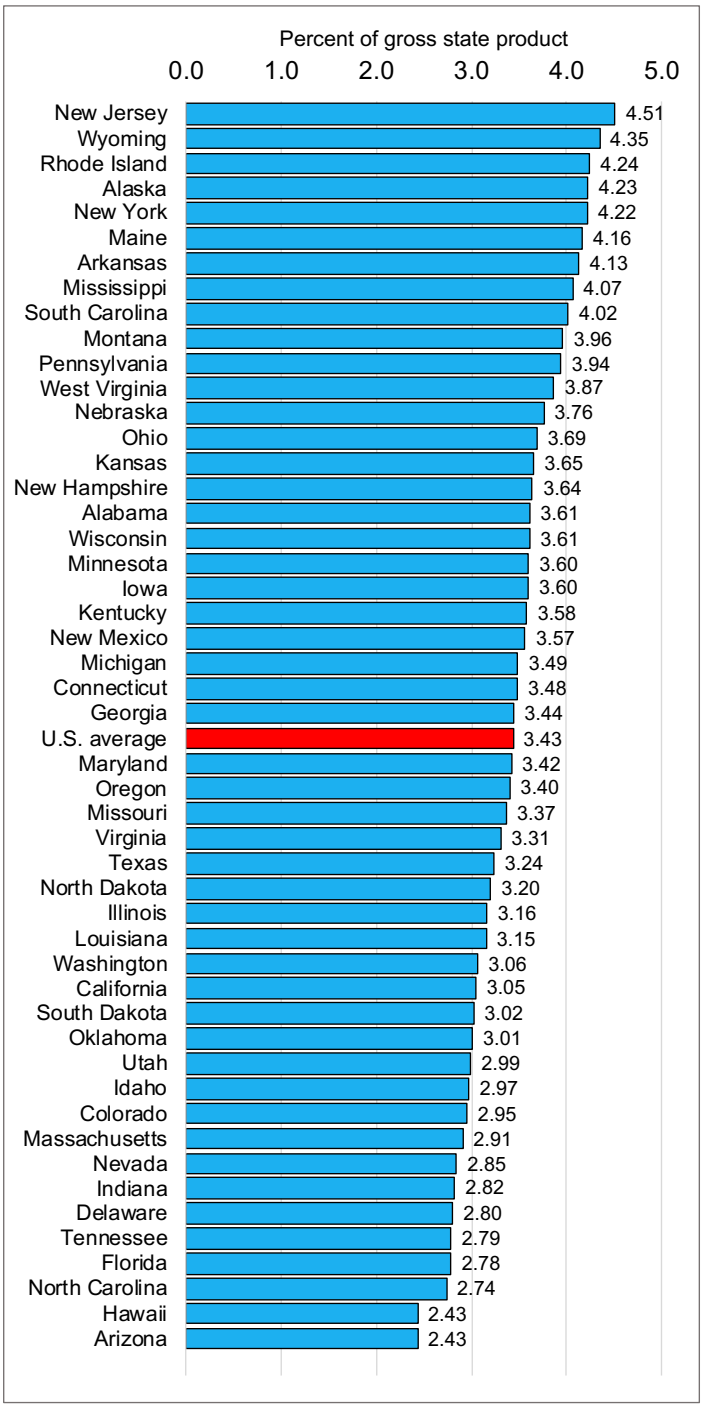


figure 3

State fiscal effort

Direct K-12 education expenditures as a percentage of gross state product, by state, 2018

Notes: U.S. average is unweighted. Effort is not available for D.C. and Vermont. Effort can also be measured as a percentage of aggregate personal income (SID variable: inc_effort). This alternative measure is highly correlated with that presented in this figure, and both can be downloaded as part of our State Indicator Database.

Variables used:
effort

About the graph

States with higher values invest larger shares of their economies in K-12 education—i.e., they put forth greater "effort." However, states with larger economies can put forth less effort than states with smaller economies and still invest the same or even greater resources. Note also that even small differences in effort can represent large differences in spending, as the denominators of the "effort equation" are entire state economies.

That said, unsurprisingly, greater effort is generally associated with higher revenue. This is clear in Figure 4, which is a scatterplot of the relationship between effort (again, direct spending as a proportion of GSP) and "adjusted" state and local revenue.

In Figure 4, revenue is presented at the 20 percent district poverty level, which can be characterized as a medium level of poverty. As discussed above, the revenue estimates are also adjusted for labor market costs, population density and district size, all of which affect the cost of providing a given

level of educational quality. Each red dot is a state, and the blue line in the middle of plot represents the average relationship between effort and revenue.

The upward slope of the line suggests a positive correlation (the correlation coefficient is 0.45). That is, while there are outliers (e.g., thanks to their greater capacity, Massachusetts and Connecticut produce relatively high revenue despite comparatively low effort), greater effort is associated with higher revenue. Effort matters. Along with capacity, it is among the primary root causes of vast differences between states in education resources. Effort and GSP per capita together explain roughly 70-80 percent of the interstate variation in adjusted state and local revenue regardless of district poverty level.

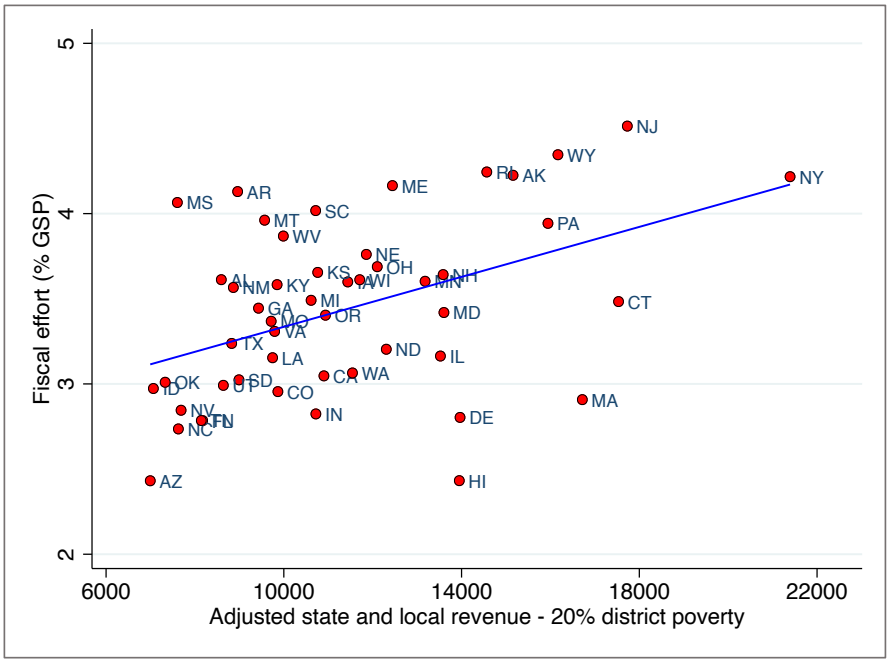


figure 4

Fiscal effort by revenue

Scatterplot of fiscal effort (direct K-12 spending as a percentage of gross state product) by adjusted state and local revenue per-pupil at 20 percent district poverty, 2018

Notes: Per pupil revenue predicted for district with 20 percent Census child poverty, more than 2,000 students, average population density, and average labor costs.

Variables used:
effort
predicted_slocrev20_

These results carry implications for our current economic crisis. Most notably, high-effort, low-capacity states are the most vulnerable during economic downturns, because they are already devoting a relatively large share of their capacity to education, and their ability to increase resources during recessions is constrained by the size of their "economic pies." In contrast, low-effort states, particularly those with high capacity, have more freedom to maneuver during recessions (e.g., via state and local taxation).

We might also take a look at trends in effort, which can also inform our current situation. States' fiscal effort levels can vary year to year due to changes in their education funding policies, their overall economies (e.g., GSP), or both. Figure 5 presents the national trend in effort between 2004 and 2018 (the averages do not include the District of Columbia, for which effort is not calculated, and Vermont, due to irregularities in that state's 2018 data). The figures in the graph are unweighted averages, and they provide a sense of changes over time in how much the typical state is spending as a share of its capacity. Note that the trend for our alternative effort measure (spending as a percent of personal income), not included in Figure 5, is virtually identical.

Figure 5 shows, first, that effort increased somewhat sharply during the financial crisis and recession that peaked between late 2007 and 2009. This is because recessions affect the denominator of the effort equation (capacity) before they affect the numerator. For example, recessions very rapidly cause unemployment (lower personal income) and contraction of states' economies (lower GSP). But school budget cuts might take a little longer to appear (particularly if there is an injection of federal stimulus aid, as there was in 2009). If, as a result, education spending (the numerator) remains constant while capacity (the denominator) declines, or if capacity decreases more quickly than spending, effort will increase, because the denominator is lower whereas the numerator is stable or declines more slowly.

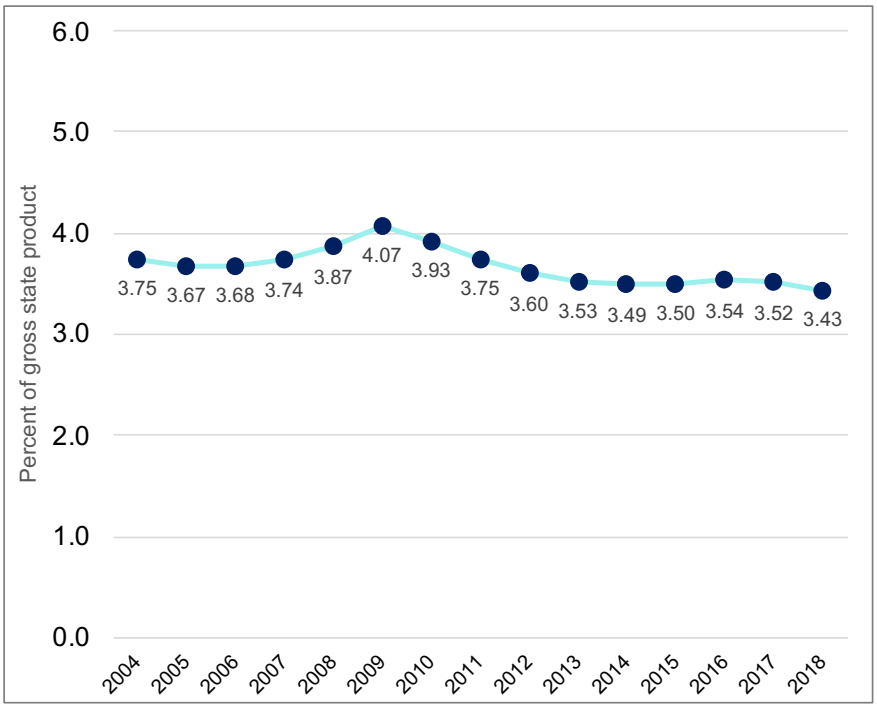


figure 5

National fiscal effort trend

Direct K-12 education expenditures as a percentage of gross state product (GSP), U.S. average, 2004-2018

Notes: Averages are unweighted, and do not include the District of Columbia (which is not calculated in any year) and Vermont (which is not available in 2018 only, but is excluded from all years to maintain a consistent set of states).

Variables used:
effort
year

Between 2007 and 2009, a time period which includes the duration of the "official" recession, effort increased at least somewhat in all but three states (North Dakota, Virginia, and West Virginia), which saw small decreases. The situation changed dramatically around 2009, as states' economies began to recover. Average effort decreased sharply between 2009 and 2013, going from 4.07 to 3.53, with at least a nominal net decrease during this time in every state except Delaware (where there was basically no change). This is rather a large drop in U.S. average effort over a relatively short period of time, and it represents the loss of billions of dollars in education resources.

Between 2013 and 2018, when our data end, average effort remained mostly flat, with the exception of a large single year drop between 2017 and 2018. A significant part of this latter year-to-year change was concentrated in states, such as Alaska, North Dakota, and Wyoming, that rely heavily on (volatile) revenue from natural resources, but there were also at least minor decreases in more than 30 states (in most cases due to an atypical year-to-year increase in GSP).

Overall, trajectories between 2007 and 2018 varied quite a bit by state, but it was mostly variation in the size of the net decrease. Most notably, in Michigan, effort dropped almost 1.2 percentage points between 2007 and 2018, going from just under 4.7 percent in 2007 (among the highest of all states)

down to roughly 3.5 percent in 2018, just above the national average. In three other states—Florida, Hawaii, and Indiana—the net decrease in effort between 2007 and 2018 was close to one percentage point. All but nine states exhibited at least a nominal decline in effort during this time period.

The result is that national average effort was lower in 2018 compared with 2004 (by about 0.3 percentage points), and there are only nine states in which effort was higher in 2018 than it was in 2004, mostly by relatively small margins.

It is quite possible, perhaps likely, that this pattern of a temporary bump in effort followed by a decline will repeat itself over the next several years, as states' economies contract rapidly but spending decreases take a couple of years to catch up (and this drop will be particularly sharp without additional federal assistance). Such a trend, were it to occur, would be extremely troubling, as the vast majority of states are already devoting smaller shares of their economies to K-12 schools than they did 15 years ago, in many cases substantially smaller shares. This matters because declines in effort typically represent declines in revenue, particularly state revenue, which, as discussed below, is generally allocated in a manner that improves equity across districts.

Yet it's important to bear in mind that effort, while it can vary over time due to changes in states' economic conditions, also represents, in no small part, a policy choice, reflecting both the decision to levy sufficient taxes and how the state prioritizes public education. It is clear that the Great Recession temporarily devastated states' economies and thus their K-12 revenue bases, but it is also clear that most states failed to reinvest in schools even as their economies recovered (and federal stimulus dollars ran dry). In other words, many states, particularly low-effort and/or high-capacity states, had the means to at least partially cover their losses, but, with relatively few exceptions, they chose not to do so. Consequently, K-12 education spending, adjusted for labor costs, was lower in 2017 than in 2009 in all but 12 states (Baker and Di Carlo 2020).

2.2 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 some minimal level of education outcomes.

But adequacy is not just an academic construct. The primary job of states' finance systems is to account for differences between their districts in the cost of providing equal educational opportunity, and then to distribute funds in a manner that compensates for the fact that some districts have less capacity than others to pay these costs.

Ideally, the first function—accounting for differences in costs of equal opportunity—would be based on target spending levels that represent the costs of achieving some common desirable outcome. From this perspective, rigorous adequacy measures can serve as guides for constructing and improving state systems. The target cost estimates represent imprecise but reasonable foundation levels of resources that each district needs to provide an acceptable level of educational quality. It is then the job of states to allocate revenue such that state funding fills the gap between the target foundation level and some "fair" local contribution, given differences in localities' ability to raise their own funds.

Rigorous, meaningful measures of adequacy are an important part not only of good state finance systems, but also of efforts to evaluate and compare them, as we seek to do with the SFID. While researchers have for decades analyzed equity variation within states, comparability *among* states has been far more elusive. This has been due, for instance, to differences between states in labor costs, child poverty, and especially the assessments used to measure student performance.

Our primary measures of adequacy come from the National Education Cost Model (NECM), which is part of the SFID, and is perhaps the first education cost model that allows for rigorous evaluation of input-/output-based adequacy not only within states (by district poverty), but between states as well.[1]

The measures themselves compare a state's *actual* spending to the estimated (modeled) spending level *that would be required to achieve a common outcome goal*: national average math and English language arts test scores in the previous year.[2] These comparisons are carried out by district poverty quintile (the 20 percent lowest-poverty districts, 20-40th percentile poverty, 40-60th percentile, and so on).

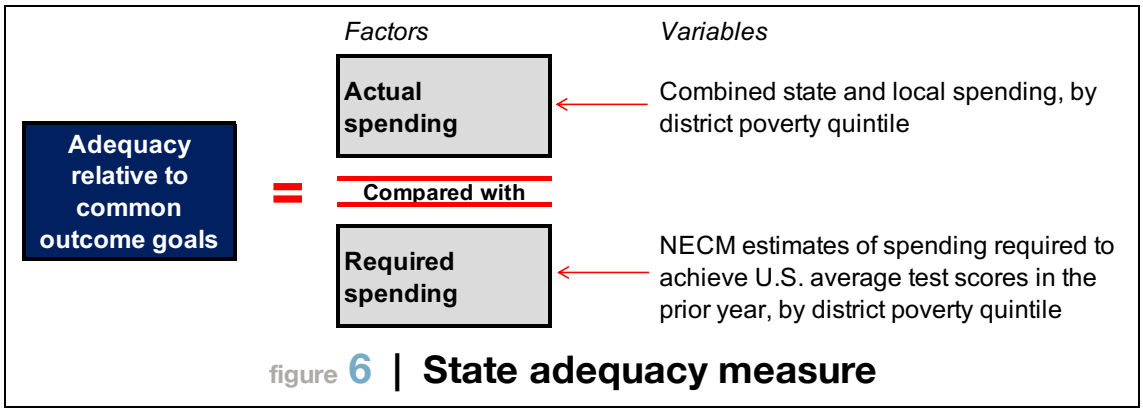


figure 6 | **State adequacy measure**

That we define adequacy in terms of testing outcomes is not intended to suggest that standardized test scores provide a comprehensive picture of the value of schools or investment in those schools. They do not. They are, however, a benchmark of student performance that can be used to assess, however imperfectly, the adequacy of state spending. We also contend that increased spending would benefit other meaningful student outcomes. Note that our 2018 NECM estimates use testing and finance data from 2015-2017, but they are presented as 2018 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 7, below, we present a snapshot of adequacy across 48 U.S. states. The values in the graph represent the average percent difference between actual and required spending, by district poverty quintile (weighted by enrollment). Positive values indicate actual spending above our estimated

[1] An alternative, purely input-based approach using SFID data is to assess the adequacy of spending (or revenue) in a given state versus that in other states at a given district poverty level (i.e., comparing "equated spending" between states). For instance, is spending at a given level of district poverty in a given state high compared with similar districts in other states? We focus here on our NECM-derived adequacy measure, but estimates of equated spending by state and poverty level are presented in Appendix A. The same set of estimates are available in the SID going back to 1993, as are 1993-2018 estimates of equated revenue by source (local, state, federal) and district poverty level (0, 10, 20 and 30 percent).

[2] In addition to the SFID, the NECM relies heavily on two other panel datasets: the Stanford Education Data Archive (Reardon et al. 2019), which provides nationally normed district level math and reading testing outcomes going back to 2009; and the Education Comparable Wage Index (Taylor and Fowler 2006; Taylor 2014), which allows for adjustment by district labor costs.

required levels, and negative values denote below-adequate spending. Before discussing the figure, it bears mentioning that NECM estimates are calculated state by state, as are the thresholds for poverty quintiles. This means that the estimates in Figure 7 are intended only to provide a rough sense of the national situation when it comes to outcome-based adequacy.[3]

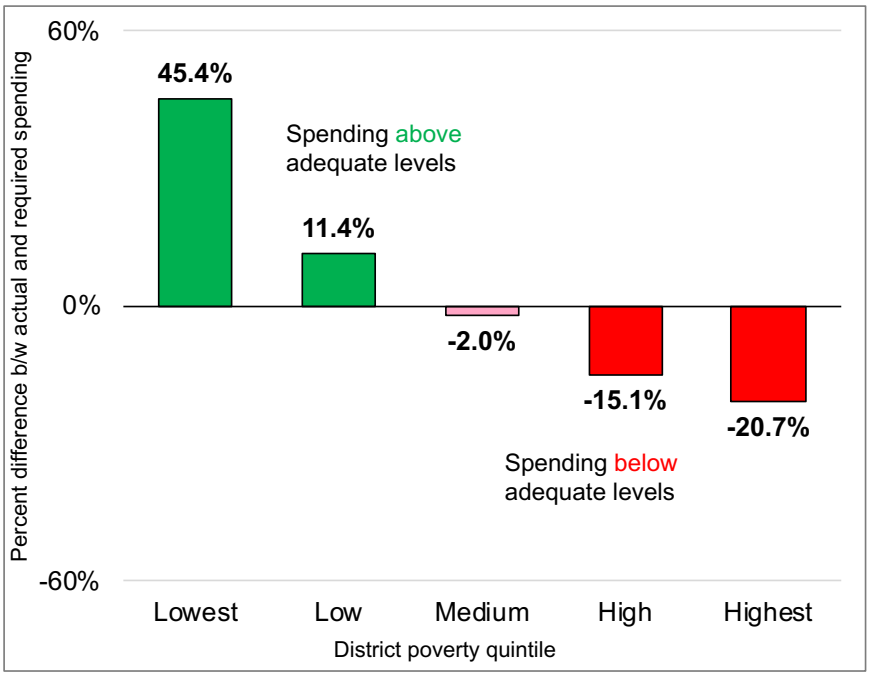


figure 7

Adequacy of U.S. education spending

Average percent difference between actual spending and estimated spending required to achieve national average test scores, by district poverty quintile, 2018

Notes: Poverty quintiles defined state by state. Average diferences weighted by enrollment, and do not include Vermont, Hawaii, and the District of Columbia. Estimates from National Education Cost Model (see text).

Variables used:
necm_ppcstot_q1-q5
necm_predcost_q1-q5

In the "lowest" district poverty quintile (the 20 percent lowest-poverty districts in each state), the average gap between actual and required per-pupil spending is positive and very large (45.4 percent). In the "low poverty" district quintile (20-40th percentile poverty), actual spending is also higher, on average, than cost targets, by roughly 11 percent. On the whole, states are spending more than enough for their low- and lowest-poverty districts to achieve the common benchmark of national average outcomes, and, in the case of the latter, actual spending is almost 50 percent higher than the targets.

In the middle, high and highest district poverty quintiles, in contrast, there is a negative average gap between required and actual spending—actual spending is lower than required spending—ranging from approximately -2 percent in the middle quintile to more than -20 percent in the highest-poverty quintile.

In other words, on average, districts in the highest-poverty quintile spend only about 80 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 in the second-highest poverty districts is not much better—spending is 15 percent lower than our cost targets.

[3] The national averages presented in this graph exclude Hawaii, the District of Columbia, and Vermont. Hawaii is always excluded from the NECM, as the state consists of a single school district. Adequacy estimates are available for the D.C., but only for the highest-poverty quintile, and so D.C. is excluded from this graph to maintain the same group of states across district poverty categories. Finally, estimates for Vermont, though available in previous SFID releases for all district poverty quintiles, are not available this year due to irregularities in that state's data.

These gaps are quite striking. They also imply that most states are failing to provide equal educational opportunity for their students to achieve the common goal of national average test scores.

But these overall averages, of course, mask substantial variation by state. Figure 8 presents the percentage difference between actual and estimated required spending for the highest-poverty districts in each state (this is the same measure as the rightmost bar in Figure 7, but presented for each state separately). For example, Wyoming spends 61.1 percent more than our estimate of the spending that we estimate would be required for students in its highest-poverty districts to achieve national average test scores.

We focus this state-level graph on the highest-poverty districts, rather than on the other four quintiles, because the former are the districts serving the students most in need of resources. We look at other quintiles below, and the full set of estimates for each state can be downloaded as part of our State Indicators Database or viewed on the one-page state profiles and online data visualizations at the SFID website.

To reiterate, this measure defines adequacy in terms of a goal (national average test scores) that is common across student poverty levels. This may be a somewhat ambitious goal for higher-poverty districts in most states, and a rather low bar for lower-poverty districts. Moreover, our adequacy measure is not meant to imply that if a state or states raised their funding to meet target levels, test scores in that state would increase to the average in the short term. The goal of getting students in higher-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 multigenerational effort. The purpose of this measure, once again, is simply to evaluate adequacy, albeit imperfectly, based on a concrete reference point that is realistic and educationally meaningful.

That said, Figure 8 shows that in addition to natural resource-rich Wyoming (61.1 percent above targets), New York, New Hampshire and Nebraska all spend at least 15 percent above their predicted required amounts, even in their highest-poverty districts. These four states are among the nine in Figure 8 that exhibit at least nominally adequate spending levels (i.e., the percentage difference between actual and required spending is positive). And there are another three states (New Jersey, Massachusetts and Montana) within 10 percentage points of the estimated targets.

In the vast majority of states, however, actual spending falls short of our estimated cost targets, including eight states in which spending is more than 40 percent lower than the targets, and two (Arizona and New Mexico) in which spending is at least 50 percent lower. In other words, in most states, the resources expended by the highest-poverty districts are well below what we estimate would be required for these students to perform at average testing levels; and in some states, we find a chasmic gap between actual and required spending.

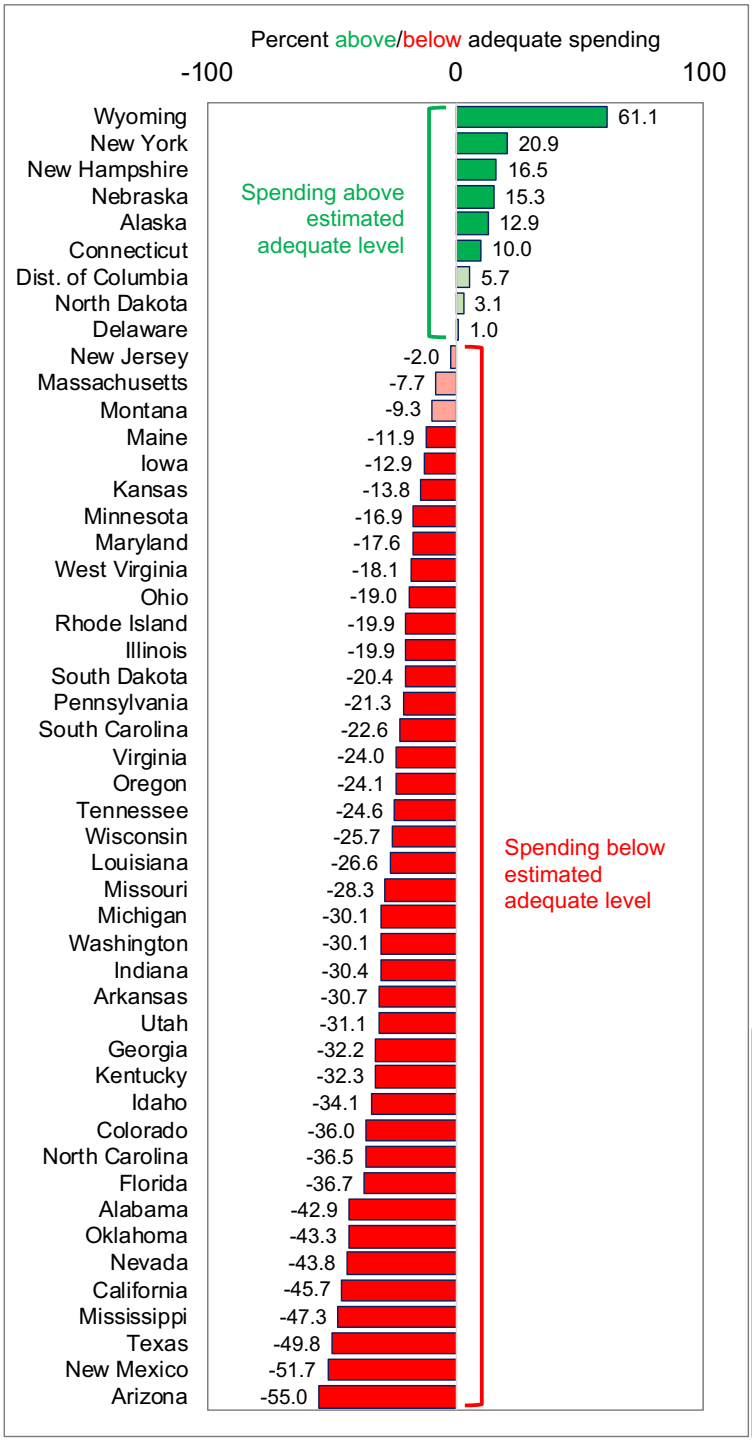


figure 8

Adequacy of state spending on highest-poverty districts

Percent difference between actual spending and estimated spending required to achieve national average test scores, highest-poverty district quintile, by state, 2018

Notes: Highest-poverty districts are the 20 percent of districts in each state with the highest Census poverty rates. Not available for Hawaii or Vermont. Estimates from the National Education Cost Model (see text).

Variables used:
necm_predcost_q5
necm_ppcstot_q5

About the graph

Positive values indicate adequate spending (actual spending is above estimated required levels). States with negative values are those in which actual spending is below estimated adequate levels. In most states, spending on the highest-poverty districts falls short, often far short, of estimated adequacy targets.

Note, however, that these state spending gaps apply to testing outcome gaps that also vary by state. 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. Put differently, adequate spending levels in one state may not be adequate in another state—spending adequacy as we define it 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 and testing outcome gaps in Figure 9. Here we present three scatterplots: one for the highest-poverty district quintile (the 20 percent highest-poverty districts in each state), one for the medium-poverty districts (40-60th percentile) and one for the lowest-poverty districts (0-20th percentile).

Instead of expressing gaps between actual and required spending as a percentage, as in Figures 7 and 8, the scatterplots present these gaps in U.S. dollars per pupil (on the horizontal axis). On the vertical axis in each plot is the outcome gap—that is, the gap in average test scores, expressed in standard deviations, between the students in each poverty quintile and the national average for all students. Each state is represented by a red dot, and the blue intersecting lines in the plots represent zero gaps (in testing outcomes and spending). Note that the value of the x-axes differ in the three scatterplots (though the total amount contained within the axis is the same).

As would be expected, 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 tend to achieve higher test scores relative to the national average.

Consequently, the majority of states in all three scatterplots fall into either: (1) the bottom-left quadrant formed by the blue lines (spending below estimated targets and test scores below the national average) or 2) the upper-right quadrant (spending above targets 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 quadrant. And in the middle-poverty scatterplot, there is a roughly equal split.

This indicates that most states provide sufficient resources to their lowest-poverty districts (as was also suggested by Figure 7), and they achieve above average outcomes. The opposite is true, however, of the highest-poverty districts: they are underfunded vis-à-vis estimated requirements, and their students perform accordingly. For instance, Massachusetts and New Hampshire spend near or above requirements in their highest-poverty districts (the top plot) and they both achieve near or above average outcomes (with scores above average only in Massachusetts). At the other end of the spectrum, Alabama, California, and Mississippi spend much less than required and exhibit accordingly low outcomes.

There are, however, exceptions to this pattern of adequate spending/outcomes in the lowest-poverty districts and inadequate spending/outcomes in the highest-poverty districts. New Mexico spends so little on its lowest-poverty districts (in part due to low capacity) that students in these relatively affluent districts do not even achieve national average test scores. Spending in Mississippi's lowest-poverty districts is also below the target, and students in these districts barely score above the national average.

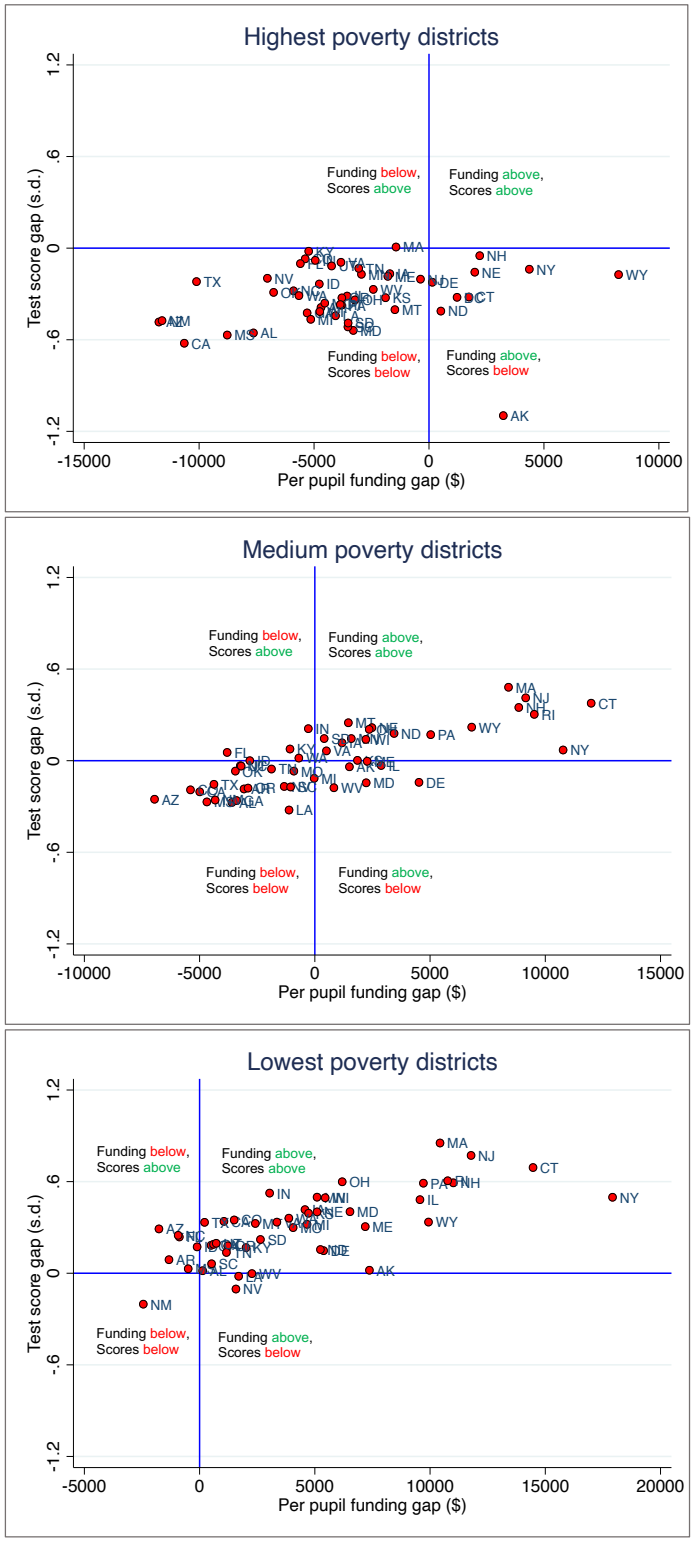


figure 9

State funding gaps by test score gaps

Scatterplot of gap between state and national average test scores (in standard deviations) *and* gap between actual and estimated required spending per-pupil ($), by district poverty quintile, 2018

Notes: Blue lines represent zero gaps (between state/national test scores and actual/required funding). District poverty quintiles calculated state by state (highest=80-100th percentile, medium=40-60th percentile, lowest=0-20th percentile). Not available in Hawaii or Vermont. Estimates from the National Education Cost Model (see text).

Variables used:
necm_outcomegap_q1/3/5
necm_fundinggap_q1/3/5

About the graph

In the "highest poverty" plot, most states fall into the bottom left quadrant (funding below adequate and test scores below average). In the "lowest poverty" plot, most states are found in the top right quadrant (funding above adequate and test scores above average). In general, states spend above adequacy targets in their most affluent districts and achieve commensurately high scores, whereas the opposite situation applies in states' highest poverty districts.

Conversely, in New York's lowest-poverty districts, funding is far above the estimated requirement, but testing outcomes are somewhat lower than would be expected from the overall pattern of the dots. This may be due in part to the fact that many suburban New York districts (e.g., those in Westchester County or on Long Island) with relatively low-needs student populations spend

exorbitantly, but do not achieve testing outcomes commensurate with this spending (a possible "ceiling effect").

Similarly, Alaska's lowest-poverty districts also spend well above the predicted requirements but still have test scores at roughly the national average. This may be attributed in part 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.

In short, adequacy as we measure it (by comparing actual spending with required spending to achieve outcome goals) can vary between states for different reasons, and some of these factors are outside of states' control. Alaska's geography is a unique example of this, but a more common factor is differences among states in actual poverty levels. For instance, the average district in the highest-poverty quintile in Mississippi and New Mexico has a higher actual poverty rate than does the average district in virtually all other states' highest-poverty quintiles (put crudely, the highest poverty districts in Mississippi and New Mexico are even poorer than the poorest districts in almost any other state). As a consequence, Mississippi and New Mexico have to spend more to meet the common goal of national average test scores. Once again, adequacy is a relative concept.

The results presented thus far carry troubling implications for our current pandemic-fueled economic crisis. Although our NECM estimates do not go back in time, there are a couple of general observations that we can offer.

In theory, severe economic downturns should generally result in declines in spending adequacy, as they cause declines in revenue (typically state revenue) as well as, possibly, increases in costs (e.g., more student poverty not offset by declines in labor costs). Typically, however, many wealthier districts will respond to the state aid shortfalls by raising local revenue; lower-income districts have less capacity to do so. Moreover, states apply budget cuts in different ways (e.g., cuts as a percentage of total state aid or as a percentage of total budgets), which also shapes the distribution of the damage across districts (Baker and Di Carlo 2020).

Yet another complicating factor, this one unique to our current situation, is that the pandemic has caused widespread interruptions of in-person schooling. The impact this has had—and will have—on testing and other outcomes remains uncertain (as does, incidentally, the ability even to measure testing outcomes, given suspensions of state standardized testing). But the early evidence suggests that these interruptions may have a stronger negative impact on achievement outcomes among students from lower-income families, and that it may even benefit their wealthier peers (Shores and Steinberg 2019; Kuhfeld et al. 2020). It is also likely that reopening schools safely will require new investment (e.g., more space, additional personnel, etc.).

At this point, then, the most defensible prediction is that state revenue declines will tend to hit harder in higher-poverty districts, which means that in the coming years we can expect greater erosion of funding adequacy in states' higher- versus their lower-poverty districts. This is concerning because spending on higher-poverty districts in the vast majority of states is *already* inadequate, and further widening of these disparities represents even less equality of opportunity for students across poverty levels. Put simply, we are starting a game against a vastly superior opponent, and we are already way behind.

It bears emphasizing, however, that in both good and bad economic times, the root causes of inadequate (or adequate) funding vary among states. There are, for example, inadequately funded states in which lawmakers have the option to raise revenue but refuse to do so, effectively tolerating poor student outcomes. But there are also states that lack the capacity to raise the revenue necessary to meet their students' needs (and, not coincidentally, many of these states also serve particularly high-needs students).

We might illustrate this important distinction by looking at the relationship between adequacy and fiscal effort. Recall that effort measures how much of a state's economic capacity (e.g., its GSP) goes toward K-12 education.

Figure 10 presents a scatterplot of the relationship between our GSP-based effort indicator (from Figure 3) and the adequacy of spending on states' highest-poverty districts (from Figure 8). Adequacy is once again presented in terms of the percentage difference between actual and required spending, with values above zero indicating adequate spending and values below zero indicating spending below our estimated adequacy targets. The dashed horizontal line in the plot is the average state gap (weighted by enrollment). Each red dot is a state, and the blue line represents the average relationship between these two variables.

The scatterplot indicates a positive relationship between effort and adequacy—i.e., the blue line and the dots tend to slope upward. States that put forth higher effort tend to spend more adequately on their highest-poverty districts, and vice versa, though the relationship is of moderate strength (the correlation between the two variables is 0.49).

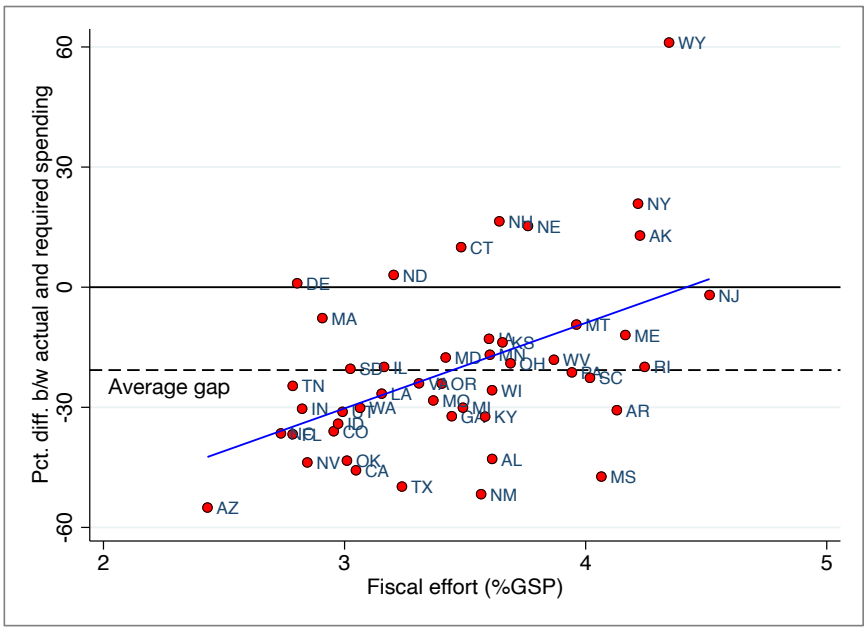


figure 10

Adequacy by fiscal effort

Scatterplot of percent difference between actual and estimated required spending in highest-poverty districts and state fiscal effort (% of GSP), 2018

Notes: U.S. average gap (dashed line) weighted by enrollment. Highest poverty districts are the 20 percent of districts in each state with the highest Census poverty rates. Not available for Hawaii or Vermont. Estimates from the National Education Cost Model (see text).

Variables used: effort; necm_predcost_q5; necm_ppcstot_q5

One area of the figure 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 (spending is a striking 55 percent below our cost targets), as well as the lowest effort of any state (2.43 percent). Other states, including California, Nevada and Oklahoma, 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, Alaska, 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 9, 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 10). These states, such as Alabama, Arkansas, Mississippi, and New Mexico, are devoting a relatively large (or at least above average) share of their economies to schools, but still failing to fund them anywhere near adequately. This is in part because students in these states' highest-poverty districts are especially higher in poverty compared with students in other states' highest-poverty districts (remember that district poverty quintiles are defined state by state). As mentioned above, this means states such as Mississippi and New Mexico have to spend more to achieve the common goal of national average test scores.

But it is also because of the (related) fact that these are comparatively low-capacity states. That is, their high effort levels still generate less revenue than those levels would yield in more affluent states, since their economies are smaller (e.g., 4 percent generates 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 districts properly, but simply lack the capacity to do so.

This relationship between effort and adequacy, specifically the deviations from this relationship, also has implications for the current economic crisis and the revenue shortfalls that states and districts will be seeing in the near future. Any further erosion of adequacy presents an especially difficult situation in states where spending is already inadequate but fiscal effort is high. Federal assistance might be targeted at these states, many of which have small economies that constrain their ability to raise sufficient revenue even in good economic times.

Conversely, states with inadequate spending and low effort levels should be encouraged to boost their effort (e.g., via taxation), perhaps as a condition of receiving federal assistance (see Baker and Di Carlo 2020). These are states in which inadequate spending, and the poor outcomes that usually accompany it, represent, at least in part, a deliberate choice on the part of policymakers to tolerate poor outcomes despite having the capacity to improve them.

2.3 Progressivity

A progressive school finance system is one in which districts serving larger shares of high-needs students (e.g., students from low-income family backgrounds), all else equal, are provided greater resources than their counterparts serving smaller shares of high-needs students.

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 5 percent more revenue. We would say, then, that the first state is more progressive than the second

state. Finally, a state in which the highest-poverty districts actually receive less revenue than the lowest-poverty districts would be characterized as regressive.

Progressivity of inputs is important in light of the consensus that districts serving larger shares of high-needs children require more resources than their counterparts serving smaller shares to provide the same level of education service. Moreover, even when funding is inadequate to meet a given outcome goal, states can still preserve equal opportunity by ensuring that funding is no less adequate (or more inadequate) for some groups of students than for others. To do so, states must direct more resources to higher-needs (i.e., higher-poverty) districts than to lower-needs districts.

The primary measure of states' progressivity in this report ("substantial progressivity") is the comparison of state and local revenue between high-poverty districts (30 percent Census child poverty) and districts with 0 percent poverty.[4] Note that this definition of "high-poverty" districts is different from that used in our adequacy measure (in which districts are sorted by poverty into quintiles).

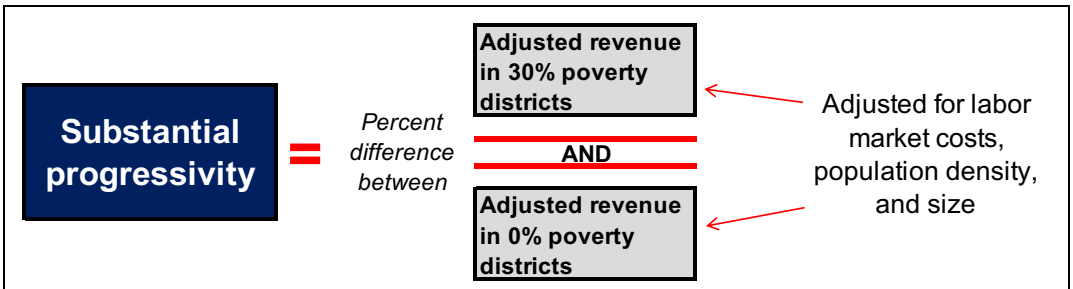


figure 11 | State substantial progressivity measure

As discussed above, these revenue figures are also "adjusted" for district size, labor market costs and population density, which basically means that our estimates compare high- and zero-poverty districts in each state that are also similar in terms of these other factors, all of which affect the value of the education dollar. By controlling for these variables, our estimates allow for better comparisons of revenue within and between states.[5]

Figure 12 presents the percentage difference in adjusted state and local revenue between high- and zero-poverty districts, by state. Estimates greater than zero (green bars) indicate progressive funding (high-poverty districts receive more than zero-poverty districts), whereas those less than zero (red bars) indicate regressivity.

[4] The SID also includes an alternative fairness measure, "systematic progressivity," which is the correlation of district state and local revenue and district poverty (both labor market-centered) in each state and year. Whereas substantial progressivity gauges the size of differences in resources between high- and low-poverty districts, systematic progressivity measures the consistency of the relationship between district poverty and district revenue. We focus here on the former because it provides a more intuitive sense of the differences in resources among districts with different poverty levels (and the two variables are quite strongly correlated).

[5] Also included in the state database are variables for adjusted per-pupil funding at different poverty levels (0, 10, 20 and 30 percent), as well as progressivity measures based on these variables, not only for state and local revenue, but also for revenue by source (federal, state, local), current spending, and resource allocation measures such as student/teacher ratios.

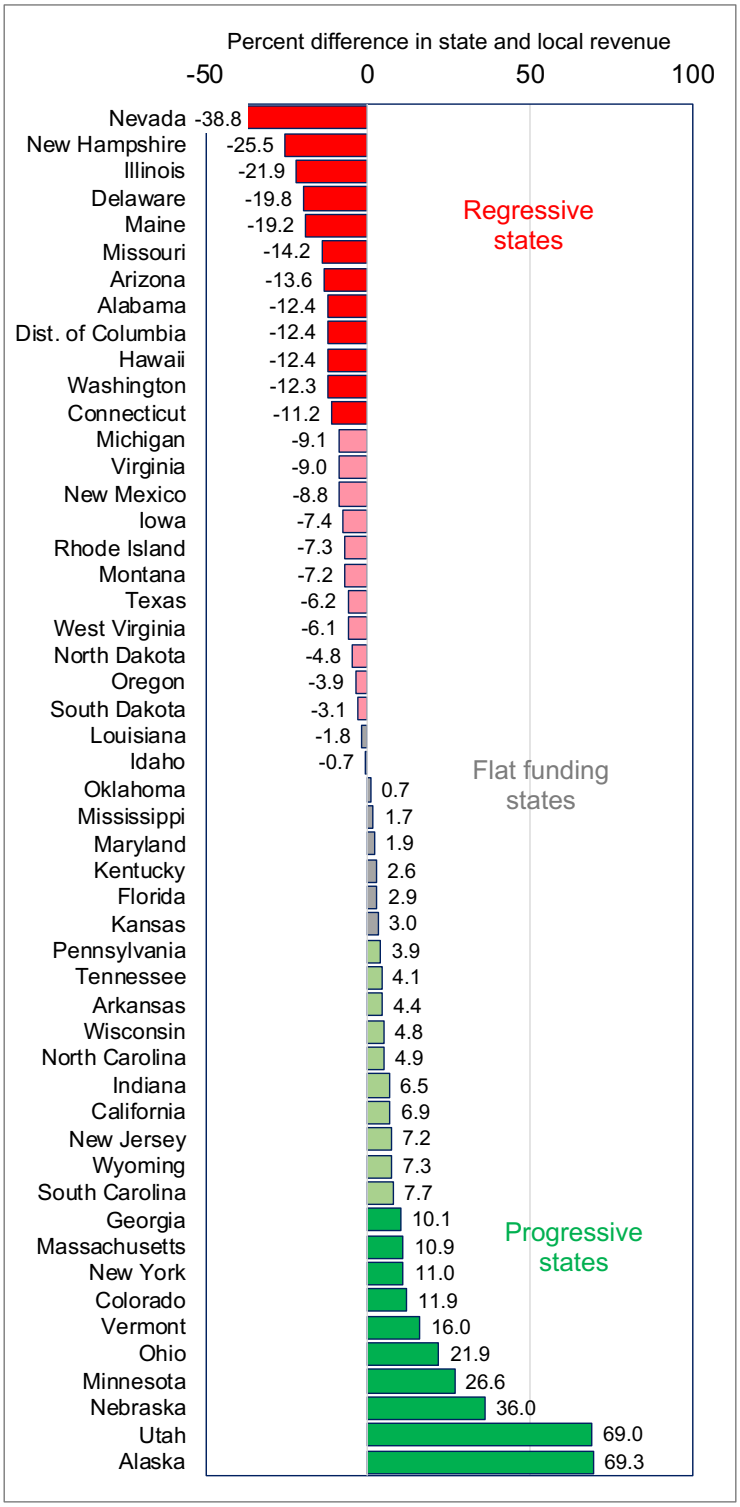


figure 12

Progressivity of state education funding

Percent difference in adjusted state and local revenue between high-poverty (30 percent) and zero-poverty districts, by state, 2018

Notes: Per-pupil revenue predicted for district with 0 and 30 percent Census child poverty, more than 2,000 students, average population density, and average labor costs.

Variables used:
predicted_slocrev0_
predicted_slocrev30_

About the graph

Values greater than zero indicate progressive funding — that is, high-poverty (30%) districts receive more revenue than zero-poverty districts, all else being equal. States toward the top of the graph (with negative values) fund their districts regressively — high-poverty districts actually receive less revenue than do zero-poverty districts. Finally, states with values close to zero might be seen as neither progressive nor regressive, or "flat-funding states."

For instance, the estimate for Nevada is -38.8 percent, which means that Nevada's high (30 percent) poverty districts receive almost 40 percent less revenue than otherwise similar districts with zero-poverty rates. That is, funding in Nevada is regressive, and extremely so. We also find substantial revenue regressivity in New Hampshire (-25.5 percent), Illinois (-21.9), Delaware (-19.8) and Maine (-19.2).

Conversely, half of the states in Figure 12 exhibit at least nominal progressivity, although, in several cases, such as Louisiana, Idaho, Oklahoma, Mississippi, Maryland, Kentucky Florida, and Kansas, the percentages are so close to zero that they might be more accurately described as non-progressive (i.e., neither progressive nor regressive, or "flat-funding states," which are shaded in gray).

Funding is highly progressive in Utah and Alaska, where adjusted revenue among higher-poverty districts is almost 70 percent higher than it is for districts at 0 percent poverty. Nebraska (36.0 percent), Minnesota (26.6) and Ohio (21.9) fill out the list of the five most progressive states in 2018.

In general, though, the key observation in Figure 12 is the large number of states with relatively short bars in either direction—that is, the number of states clustered around the vertical gridline indicating no (0 percent) difference in revenue. For instance, in the 26 states with at least nominally progressive funding (estimates greater than zero), the difference is greater than 5 percent in only 15 states, and greater than 10 percent in only 10 states. From this perspective, one can argue that the vast majority of states' funding systems are either regressive, non-progressive or, at best, only modestly progressive.

Although our estimates are best viewed and interpreted at the state level, it is useful to get a national sense of the fairness of U.S. education funding, and especially how it has changed over time. In Figure 13, we present the trend in national average progressivity between 1998 and 2018. This graph presents not only state and local revenue, but current spending as well. Spending is generally a bit more progressive than state and local revenue, in part because the former includes federal funds, which are specifically targeted at districts serving larger proportions of higher-needs students.

To control roughly for contextual differences, we take a somewhat different approach when calculating national averages than we do for the state-by-state estimates in Figure 12. Namely, for Figure 13, we divide revenue (and spending) in each district by the average revenue (and spending) in that district's labor market (i.e., revenue and spending are "centered" around the labor market mean). We then calculate the U.S. average of "centered" revenue and spending for each poverty quintile nationally, and divide the average for the highest-poverty quintile by that for the lowest-poverty quintile (the variables used for this calculation are available in our District Indicators Database). Poverty quintiles are still defined state by state, so this graph requires cautious interpretation, but it provides an approximate idea of the national picture when it comes to progressivity, and of trends therein.

Values greater than one in Figure 13 indicate progressive funding (the highest-poverty districts receive more funding than the lowest-poverty districts), whereas values less than one represent regressive funding (the highest-poverty districts receive less funding). Note that the vertical axis begins at 0.85 and ends at 1.15, and so year-to-year changes in the graph may appear larger or smaller than they would with different axis scaling.

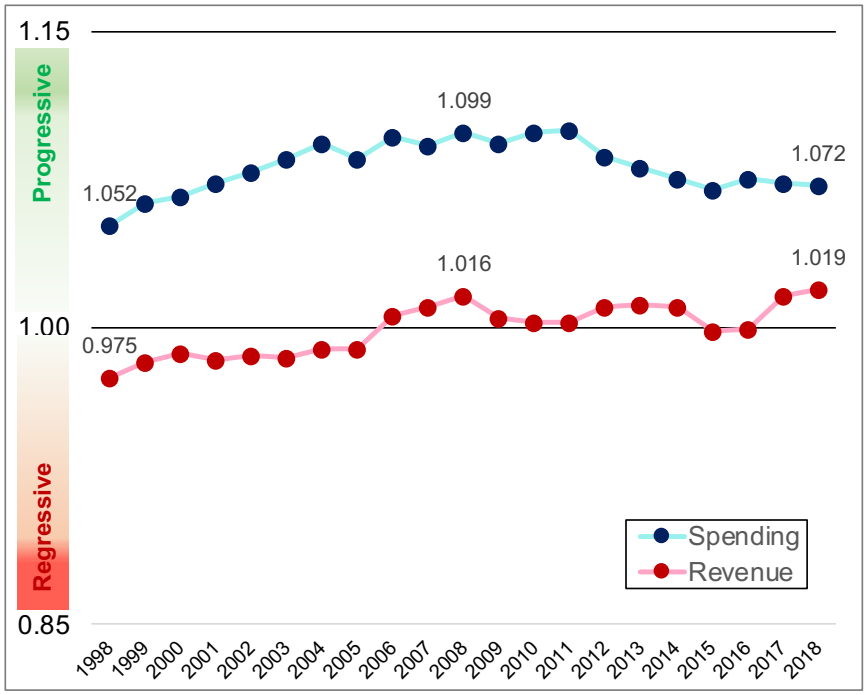


figure 13

National progressivity trend

Ratio of average (labor market-centered) state and local revenue and current spending in highest-poverty districts to revenue and spending in lowest-poverty districts, 1998-2018.

Notes: Revenue and spending centered around the average of each district's labor market. Poverty quintiles defined state by state. Averages weighted by enrollment.

Variables used: (District Indicators Database): ctr_slocrevpp; ctr_curspndpp; povgroup; member_ccdlea

Focusing first on the ratio in the most recent year (2018), we find that revenue (the red line) in the highest-poverty districts is approximately two (1.9) 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. This is consistent with the large number of short bars in Figure 12. Spending (the blue line) is a bit more progressive, but only moderately so, with the highest-poverty districts spending roughly seven (7.2) percent more than the lowest-poverty districts.

The distribution of resources is a state-level policy decision, and 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, on average, and the former spend only moderately more than the latter.

We can now turn to how this national situation has changed over time, starting with revenue (the red line). In Figure 13 there is a steady, albeit rather modest increase in revenue progressivity up until 2008 (the Great Recession began in the middle of this school/fiscal year), followed by a bumpy decline in subsequent years (notice there is also a comparatively small decrease in revenue progressivity coinciding with the recession of the early 2000s).

Specifically, during the decade before the crash in late 2007, revenue went from a minimally regressive 0.975 in 1998 (i.e., revenue in the highest-poverty districts was about 2.5 percent lower than that in the lowest-poverty districts) to a minimally progressive 1.016 in 2008 (revenue was 1.6 percent higher in the highest-poverty districts). This was followed by a large net decrease between 2008 and 2011, particularly between 2008 and 2009, and then some volatility in the trend, ending up at almost exactly 1.00 in 2015 (no difference between highest- and lowest-poverty districts). Finally, there is a net uptick between 2016 and 2018. This *might* signal that revenue progressivity has resumed improvement after almost a decade of decline.

We can also examine trends in revenue progressivity on a state-by-state basis, using net changes in substantial progressivity over different time periods (i.e., changes in the percent difference in state/local revenue between 30 and 0 percent poverty districts, presented in Figure 12 for 2018 only). Consistent with Figure 13, between 1998 and 2008, 35 states saw at least a nominal net increase in progressivity. In contrast, and also consistent with Figure 13, most states saw a net *decrease* during and after the recession—in 32 states, revenue was less progressive in 2018 than in 2008. Even as states' economies began to recover, the damage of the recession on progressivity persisted.

The trend for spending in Figure 13 is similar. The ratio increased from a modestly progressive 1.052 in 1998 to 1.099 in 2008. The subsequent recession-fueled decline in progressivity began in earnest later than is the case for revenue (there is a lag in the impact of revenue changes on spending changes, particularly in this case, as federal stimulus dollars buttressed state budgets between 2009 and 2011), but it bottomed out at 1.070 in 2015 and as of 2018 hadn't yet shown much sign of improvement (given the revenue/spending lag, we may see improvement in the next two pre-pandemic SFID releases).

There are a couple of key takeaways from Figure 13. First, and most generally, K-12 state and local revenue in the U.S. has been neither progressive nor regressive for the past 20 years, while spending has generally been only moderately progressive. Second, it is clear that the Great Recession had a negative effect on the fairness of education funding in the U.S. After a decade of improvement—albeit very slow improvement—between 1998 and 2008, U.S. average revenue and spending progressivity declined in the wake of the recession and in most states had not fully recovered a decade later.

This is largely due to the fact that, in general, higher-poverty districts rely more heavily on state revenue to fund their schools, as their capacity to raise local revenue (e.g., local property taxes) is more constrained than it is for affluent districts. All else being equal, when state revenue declines, as it did during and after the Great Recession, higher-poverty districts take a larger proportional hit, which tends to exacerbate funding inequity (Baker 2014).

Such increased regressivity is very likely to happen again in the coming years, due to the pandemic-fueled economic crisis. In fact, it may be worse.

One of the unusual features of the Great Recession versus most previous recessions was that property tax revenue, normally relatively stable during recessions, decreased due to the collapse of the housing market. Property taxes are the largest source of local revenue, and local revenue is generally regressive—wealthier districts receive more as a share of total revenue. The bursting of the housing market bubble in the late 2000s increased the overall pain level for all districts, but it also hit wealthier districts proportionally harder and for a longer period of time than it did lower-capacity districts.

Because the current downturn seems to be more compositionally "normal" in the sense of it causing large shortfalls in state revenue while local revenue (hopefully) remains more stable, it may actually cause a more pronounced shift in progressivity than did the Great Recession, even with substantial federal assistance (though such aid, distributed properly, will help greatly).

In any case, the next few years will most likely see increasing inequality of school funding between high- and low-poverty districts in most states, just as progressivity levels, at least in terms of revenue, are starting to recover to their (already generally modest) pre-recession levels.

These trends, however, will vary by state. In fact, there were roughly 20 states in which progressivity exhibited a net *increase* during the Great Recession and its long aftermath, although these states tended to be those that were less progressive to begin with (there is a fairly strong inverse relationship between the 2008-2018 net change in states' progressivity and their "starting" 2008 progressivity levels). This makes sense, because state revenue cuts will tend to have a more negative equity impact in states that allocate state revenue progressively.

States' policy responses in the coming months and years will also shape progressivity trends. For instance, when the Great Recession began, and also when federal stimulus aid ran out in 2011, legislatures in many states simply cut all districts' state revenue by the same percentage to make up the shortfalls. This of course hurt more in higher-poverty districts, which tend to rely more heavily on state aid. New Jersey, in contrast, took a different approach when stimulus funding ran out in 2011, applying cuts as a percentage of *total state and local revenue* rather than of state revenue, which meant poor and rich districts all saw the same proportional cuts (Baker and Di Carlo 2020).

What this illustrates is the tremendous variability in the structure and performance of states' school finance systems, as well as the fact that progressivity, unlike adequacy, is almost entirely a function of the policy choices that states make or have made. 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 high-needs students will require more resources than more affluent districts to provide the same level of educational quality, these results are troubling. Without major changes to how states fund their schools, the current economic crisis promises to make a bad situation worse.

part 3

Summarizing state school finance systems

Our three core measures of effort, adequacy and progressivity are specifically chosen to summarize states' systems in terms of how much they raise, who gets the funding, and whether it is enough versus common outcome goals.

We have thus far sifted through a lot of data on each of our three core measures of effort, adequacy and progressivity, but it is important to bear in mind that these measures work as interdependent cogs in a process that moves funding from taxpayers to states to districts and, ultimately, to schools and classrooms where student outcomes are shaped.

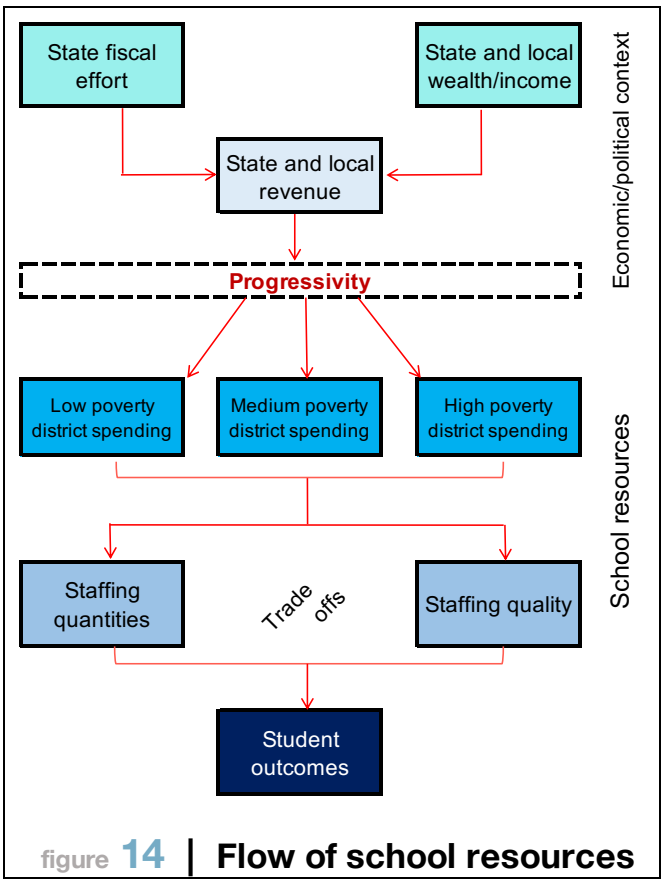


figure 14 | Flow of school resources

The details are different from state to state, and few people truly understand how these systems work under their proverbial hoods, but they all rely on a basic, relatively simple conceptual model, which can be described as follows:

1. Effort, combined with states' capacity, drives state and local education revenue;
2. The progressivity of state and local systems (ideally) 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.

It may be useful to illustrate this interdependency of our three core indicators with hypothetical examples of different state funding systems.

3.1 Three illustrative models of school finance systems

Figure 15 presents three hypothetical state funding models. Our three states share three features in common, all of which represent assumptions that effectively nullify the role of state contextual factors, thus allowing for a "pure" comparison of these three model systems:

1. They have the same economic capacity (e.g., GSP), which means a given level of effort will produce the same amount of revenue in any of the three states.
2. Their adequate (i.e., "required") funding targets by poverty, represented in each graph by the red lines, are identical (these targets also, of course, increase with poverty—i.e., the red lines slope upward).
3. They have identical distributions of students by poverty (this assumption simply allows us to interpret the size of the shaded areas in the graphs as representing total amounts).

(Another way to view these three hypothetical states is that they are *one hypothetical state* with three different model finance systems.)

In each state model, the blue lines represent actual spending (by poverty level). Because we assume that enrollment is equal across poverty levels, the two-tone yellow area underneath the blue spending line represents total spending; a larger area means more total spending.

We begin with State A. This is a high-effort state, and so the blue line representing spending is high up in the plot area, and the size of the two-tone yellow area beneath the blue line is quite large. Total spending in this state is relatively high.

State A is also a progressive funding state, as you can see from the fact that the blue line slopes upward (spending increases with student poverty). The size of the "progressivity triangle" in the model graph is a visual representation of the "amount" of progressivity; larger triangles indicate more progressivity. State A's blue line is sloped upward fairly steeply, making for a nice large triangle. (Note that, in states with regressive

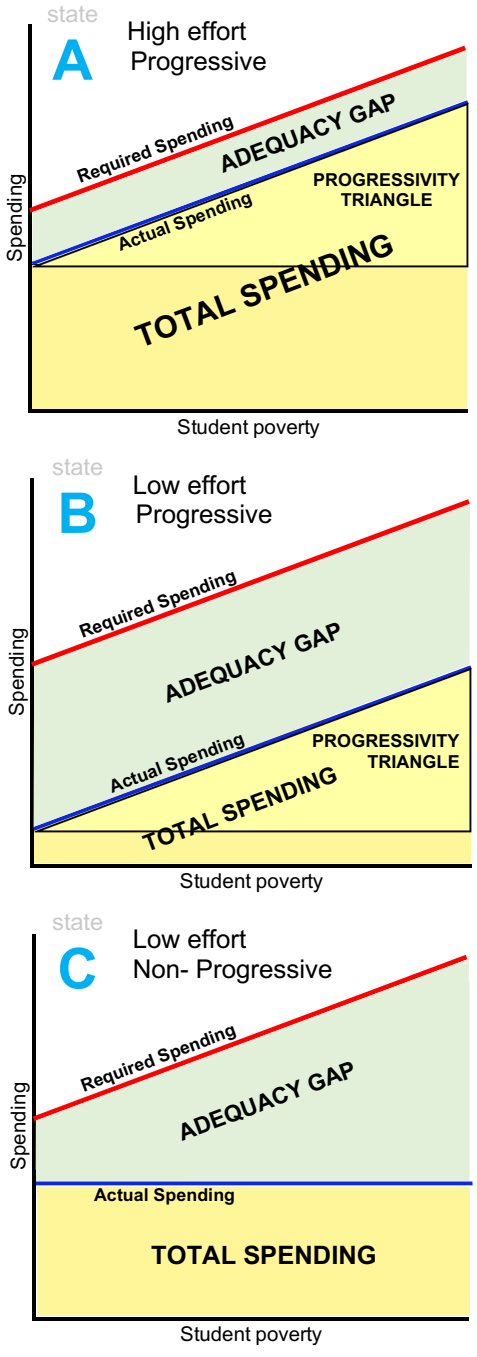


figure 15

Hypothetical state funding models

systems, the blue slope would be downward rather than upward, resulting in an inverted triangle that would represent regressivity rather than progressivity.)

Finally, the space between the blue line (actual spending) and the red line (required spending) represents State A's "adequacy gap." The size of the light green-shaded area between these lines depicts the total amount of additional funding that would be required to achieve adequate outcomes statewide. Due to its high effort, State A's blue line is quite close to its red line (actual funding is inadequate but not tremendously so), and so the total funding gap (in light green) is somewhat modest in size. Moreover, thanks to State A's progressive funding, the adequacy gap is consistent across student poverty (the red and blue lines run parallel), preserving equal opportunity despite inadequate funding.

Now we can move to State B. This state is just as progressive as State A (the blue line's slope is the same in both states). As a result, the yellow "progressivity triangle" is the same size in both states. Unlike State A, however, State B is a low-effort state, and so State B's revenue and thus its spending are lower than State A's. The blue slope in State B is therefore further down in the graph than in State A, and total spending is lower (i.e., the two-tone yellow area under the blue line is smaller).

So, while State A and State B are equally progressive, there is less revenue to go around in State B. The consequence is a much larger green-shaded adequacy gap in State B compared with State A.

This comparison illustrates how two states might be identical in how they distribute education resources (in this case, progressively), but, due to different effort levels, they might still differ drastically in terms of how much they spend, and thus in the degree to which that spending is or is not adequate. In other words, without the horsepower of effort-derived revenue, even the most progressive states may fall short of providing adequate resources. Progressivity alone is not enough.

Now let's consider a third and final hypothetical state, State C. In contrast with State B (and State A), funding in State C is neither progressive nor regressive—that is, districts receive the same amount of funding regardless of their student poverty levels. This is clear from State C's blue spending line. Whereas in States A and B, this line sloped upward; it is perfectly flat in State C. As a result, the "progressivity triangle" has disappeared entirely.

But State C shares something in common with State B: They are both low-effort states. They produce the same amount of revenue (less than State A's), as you can see from the fact that the total yellow space under the blue line is the same size in both states (it is just a different shape). This also means that the statewide gap between total spending and total required spending is the same in States B and C (the size of the light-green area is the same in both states but again is different in shape).

Yet the adequacy situations in States B and C are very different *distributionally*. Their total statewide funding gaps are the same, but in State C they vary by poverty. Specifically, in contrast with the parallel red and blue lines in State B, spending in State C's lower-poverty districts is far closer to adequate (the blue and red lines are closer together) than it is in that state's high-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, the converse is also true: States might spend equal amounts (and exhibit the same *total* gap between actual and adequate funding), but, like States B and

C, they might still differ in terms of how those resources are distributed (i.e., progressivity). This in turn influences whether adequacy varies by poverty—i.e., whether there is equal opportunity to achieve a common outcome goal.

In summary, these models illustrate how our three core measures of effort, adequacy and progressivity are interdependent, as well as how attempts to evaluate a state's finance system based on just one or even two of them may end up generating misleading conclusions. Even when state context is constant (our three assumptions equalize it), it is difficult to judge a state based on any one of our core measures without reference to the others.

3.2 Evaluating state finance systems

We do not offer any overall state ratings or grades based on our three core indicators. The complexity and multidimensionality of school finance systems belie simple characterization, and boiling these systems down to one rating would at this point entail a great many subjective (and, in no small part, arbitrary) decisions. In fact, as is evident in our results and in the three hypothetical models above, it is difficult merely to discuss the results of one measure without referring to the others.

We can, however, 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, and states with inadequate funding might require more effort than states in which funding meets adequacy targets.
2. **Adequacy:** In light of widespread agreement that education 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 desirable common outcomes or improvement toward those outcomes. Adequate funding in one state may be inadequate in another state.
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 differences by district poverty in local capacity, estimated costs or outcomes. Even when funding is inadequate, states can still preserve equal opportunity via progressive allocation of resources.

These general recommendations, like the three hypothetical models discussed above, illustrate the interconnectedness of our core indicators, and how they provide a nuanced but relatively concise portrait of school funding. Even the most progressive school funding systems, for example, might still provide resources that are inadequate vis-à-vis common outcome goals, just as the highest-spending states overall might be shortchanging high-needs students if their systems are regressive or non-progressive. Moreover, the lowest-capacity states may simply be incapable of achieving adequate funding regardless of effort.

State-specific context also matters. There are, inevitably, factors in each state that influence our core measures but may not be apparent when reviewing our results. Wyoming is a good example of this.

In recent years, this state's effort, adequacy and progressivity are all generally strong. But one critical factor our measures cannot capture is that the state has in recent years been able to spend a lot on education and other public services due to unusually high revenue from natural resources (at least for the moment—this revenue can be volatile).

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. In fact, the actual Census child poverty rate in Wyoming's highest-poverty quintile is the third lowest in the nation.

These two factors (natural resource revenue and a relatively flat poverty distribution), in addition to a laudably progressive revenue allocation system, mean that even the highest-poverty districts in Wyoming receive ample funding, and exhibit test scores that are nearly above the national average for all students. Conversely, the same high funding situation applies to Wyoming's lowest-poverty districts, but average test scores in these districts are rather mediocre, 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 very high effort and (moderately) progressive, and its funding meets our estimated adequate targets by a longshot in four of five poverty quintiles (including actual funding that is over 50 percent above estimated targets in the second-highest district poverty quintile). But spending falls just short of our estimated adequacy targets in the highest district poverty quintile. This inconsistency—funding way above targets in all poverty quintiles except the highest—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 highest-poverty districts receive more funding than its lower-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, would have tremendous difficulty raising enough revenue to meet the needs of even its middle-poverty districts, to say nothing of it highest-poverty districts, which have the second-highest average poverty rate in the nation. The state (regrettably) allocates revenue neither progressively nor regressively (see Figure 12), but its low capacity means that funding is woefully inadequate in virtually all districts, regardless of poverty. As a consequence, average testing outcomes of even Mississippi's lowest-poverty districts barely surpass the national average.

These examples are indicative of how each core indicator should be evaluated with an eye on the others, as well as how many states' unique contexts, measurable and unmeasurable, might also be considered when evaluating their systems. A rating system that might address this complexity is not impossible at some point in the future, but in the meantime, assigning simple grades or ratings to states would belie the complexity involved.

part 4

Conclusion

A large and growing body of high-quality empirical research has shown 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 has slowly garnered a 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. This need is particularly salient right now, with the U.S. in an economic crisis due to the global coronavirus pandemic. The severity and duration of the impact of this crisis on school budgets, and ultimately on the outcomes of multiple cohorts of schoolchildren, will in no small part depend on the design and performance of states' finance systems.

Yet these systems 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 researchers and non-researchers alike.

In this report, we have presented data from three types of measures included in our system: effort, adequacy and progressivity. These are the three that we feel provide the most succinct but informative picture of the fiscal resources raised and allocated by states' school finance systems. A detailed review of our results, as well as their implications for the current economic crisis, can be found in the executive summary.

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, 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 majority of states spend well below estimated requirements in their higher-poverty districts, in many cases due to a lack of effort. Given the virtual certainty of at least significant, and perhaps large budget cuts over the next few years, these results are troubling to say the least.

At the same time, however, there are states that allocate resources progressively, devote relatively large shares of their economies to education, and/or spend adequately even in their higher-poverty districts. In this sense, for instance, frequent characterization of middling U.S. performance on international assessments as a "national failure" is missing an important point: The adequacy and fairness of education funding, as well as the outcomes that these investments help determine, vary widely across (and within) states.

It is not hyperbole to say that there are 51 school finance systems in the U.S. They have developed over many years through legislation and court cases. None is perfect, and all but a few have at least some redeeming features. Such diversity can be daunting and frustrating, but it has also allowed researchers over the decades to examine how variation in the design of systems leads to variation in results. The upside is that we generally know what a good finance system looks like, but evaluating and ultimately improving states' systems starts with credible, high-quality data and analysis.

We are once again making all of our data and full documentation freely available to the public at the SFID website (schoolfinancedata.org), along with single-page profiles of each state's finance system, online data visualizations and other resources. It is our ongoing hope and intention that the SFID, including the data presented in this report, can inform our national discourse about education funding, as well as guide legislators in strengthening their states' systems.

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Adjusted spending by state and poverty level

Table A1 Adjusted state and local current spending by poverty level and state, 2018

	District poverty level			
State Name	0%	10%	20%	30%
Alabama	$8,422	$8,568	$8,717	$8,868
Alaska	10,318	13,665	18,096	23,964
Arizona	6,179	6,684	7,230	7,821
Arkansas	7,813	8,339	8,900	9,499
California	9,174	9,778	10,421	11,107
Colorado	8,231	8,634	9,057	9,501
Connecticut	18,034	17,379	16,748	16,140
Delaware	12,183	13,093	14,071	15,123
District of Columbia	17,939	18,250	18,567	18,890
Florida	7,298	7,810	8,357	8,942
Georgia	8,276	8,813	9,384	9,992
Hawaii	13,472	13,706	13,944	14,186
Idaho	5,952	6,715	7,576	8,547
Illinois	13,832	13,200	12,596	12,019
Indiana	7,843	8,686	9,621	10,656
Iowa	9,258	9,850	10,480	11,150
Kansas	8,238	9,378	10,675	12,153
Kentucky	9,131	9,565	10,020	10,496
Louisiana	9,768	9,950	10,136	10,324
Maine	12,894	12,258	11,654	11,079
Maryland	11,861	12,358	12,875	13,413
Massachusetts	13,929	14,442	14,975	15,527
Michigan	9,253	9,610	9,980	10,364
Minnesota	9,295	10,697	12,311	14,169
Mississippi	6,882	7,310	7,765	8,248
Missouri	9,224	9,283	9,343	9,403
Montana	8,500	9,531	10,686	11,981
Nebraska	8,421	10,454	12,977	16,110
Nevada	9,754	8,538	7,474	6,542
New Hampshire	15,231	14,668	14,125	13,603
New Jersey	16,024	15,973	15,922	15,871
New Mexico	6,993	7,578	8,213	8,901
New York	19,256	19,508	19,764	20,023
North Carolina	7,278	7,812	8,385	9,000
North Dakota	10,003	11,815	13,957	16,486
Ohio	9,162	10,008	10,931	11,939
Oklahoma	6,140	6,716	7,347	8,037
Oregon	9,439	9,757	10,086	10,426
Pennsylvania	14,135	13,407	12,717	12,062
Rhode Island	14,613	14,241	13,878	13,524
South Carolina	8,199	8,893	9,646	10,463
South Dakota	7,508	8,617	9,891	11,353
Tennessee	7,477	7,997	8,553	9,149
Texas	7,169	7,634	8,129	8,656
Utah	5,253	6,788	8,772	11,335
Virginia	10,249	10,224	10,200	10,175
Washington	10,251	10,989	11,779	12,627
West Virginia	9,899	10,037	10,177	10,318
Wisconsin	9,841	10,628	11,477	12,395
Wyoming	12,209	14,202	16,521	19,217

Notes: Estimates adjusted for poverty (columns), district size (>2,000), population density (average), and regional wage variation (ECWI=1.0). Table does not include Vermont due to irregularities in that state's 2018 data (but Vermont estimates are available between 1993 and 2017).

appendix B

SFID data sources

Table B1	Information on data sources	
Indicator	**Variable(s)**	**Source**
Fiscal effort	Total state and local expenditures, direct to K-12 education	U.S. Census Bureau—Annual Survey of State and Local Government Finances
	Gross state product	U.S. Bureau of Economic Analysis
Progressivity (and adjusted/equated spending)	Child poverty (5-to 17- year-olds)	U.S. Census Bureau —Small Area Income and Poverty Estimates (SAIPE)
	State and local revenue and current spending per pupil	U.S. Census Bureau—Public Elementary-Secondary Education Finance Survey (F33)
	Regional wage variation	Education Comparable Wage Index (Taylor and Fowler 2006; Taylor 2014)
	District size/enrollment	NCES Common Core of Data—Local Education Agency Universe Survey
	Population density	U.S. Census Bureau—Population Estimates
Adequacy (relative to common goals)	Estimated required and actual spending, by poverty quintile	National Education Cost Model (NECM)[1]
	Nationally-normed test scores (2015-2017)	Stanford Education Data Archive (Reardon et al. 2019)
	Regional wage variation	Education Comparable Wage Index (Taylor and Fowler 2006; Taylor 2014)

Notes: This table includes data sources only 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] The NECM incorporates variables from sources in addition to those listed in the indented rows. For more details, see Baker et al. (2018).

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

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