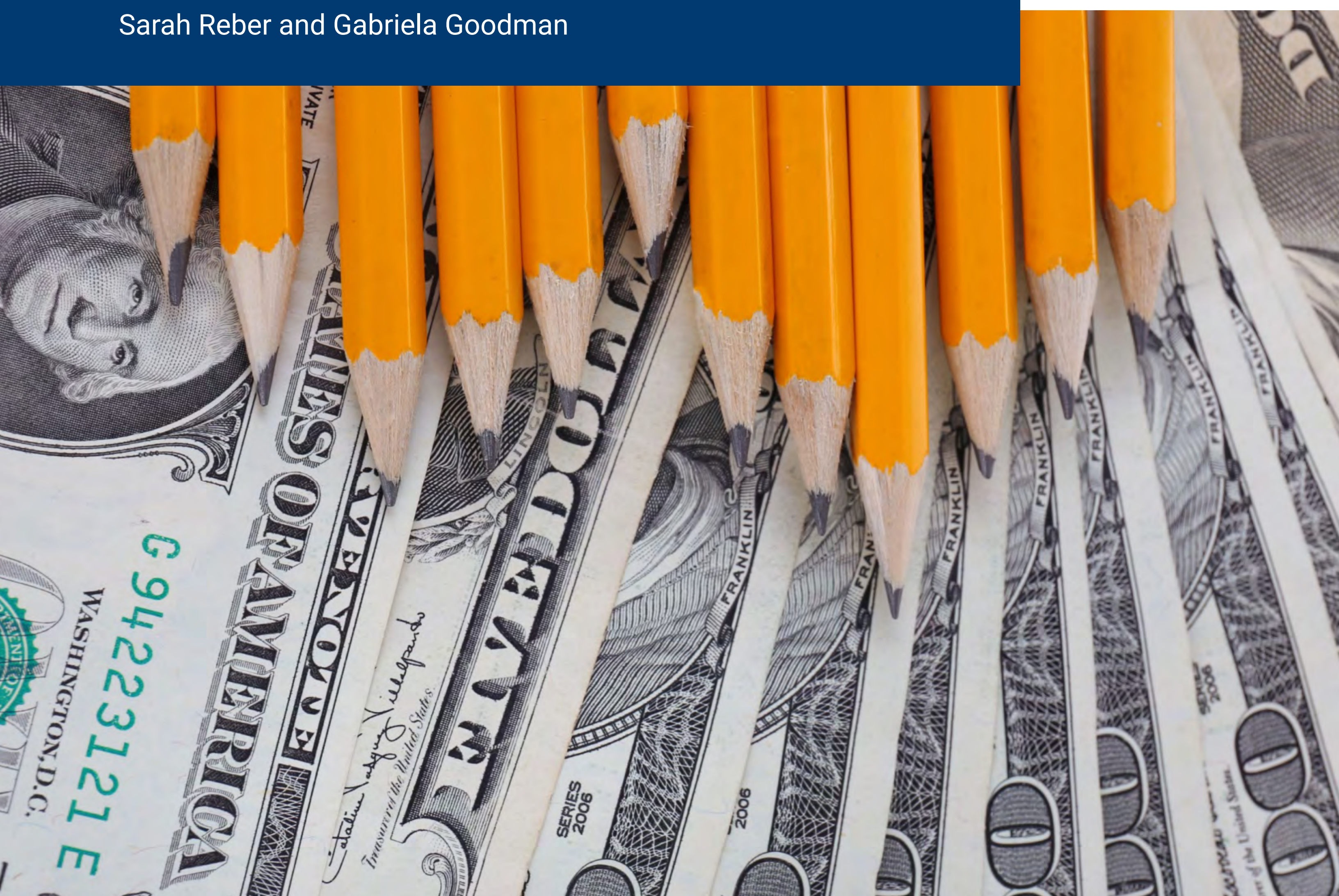
Center for Economic Security and Opportunity at BROOKINGS

SEPTEMBER 2025

A STATE-LEVEL PERSPECTIVE ON SCHOOL SPENDING AND EDUCATIONAL OUTCOMES

Sarah Reber and Gabriela Goodman



AUTHOR NOTES AND ACKNOWLEDGEMENTS

Sarah Reber holds the Cabot Family Chair and is a senior fellow in Economic Studies at Brookings. Gabriela Goodman is a former research assistant with the Center for Economic Security and Opportunity at Brookings.

The authors are grateful to Gabriel De Luca Vinocur, Elizabeth Link, and Sophie Pinkston for exceptional research assistance.

DISCLOSURES

The Brookings Institution is committed to quality, independence, and impact. We are supported by a diverse array of funders. In line with our values and policies, each Brookings publication represents the sole views of its author(s).

1. Introduction

Elementary and secondary schools prepare young people to enroll in higher education, succeed in the labor market, and engage as active citizens. Quality education is also an important driver of innovation and economic growth, and improving schools for children growing up in low-income families or disadvantaged communities is a long-standing policy project. A hotly debated element of this effort in recent decades is the question of how much additional funding alone—without changes to the incentives, institutions, and regulations governing how schools operate—could improve student outcomes.

Starting with the Coleman Report in 1966, early studies came to a surprising conclusion: Spending and educational outcomes were weakly related (Coleman et al. 1966; Hanushek 1997; Jencks 1972). The academic literature on the relationship between funding and outcomes came to be known by the shorthand "Does money matter?" That framing of the issue is, at best, imprecise.[1] Spending proponents and skeptics alike agree that schools are important and need money to function; in that sense money "matters." More recently, researchers have come to a consensus more in line with the common intuition that, on average, additional funding improves educational outcomes (Handel and Hanushek 2023; Jackson and Mackevicius 2024). But that leaves open the questions of how much and under what conditions money affects outcomes and whether other approaches to improving schools might work better. Policymakers, advocates, and other observers might ask whether underfunding is the primary barrier to school improvement.

On the one hand, it is deeply intuitive that additional funding could solve the kinds of problems Jonathan Kozal chronicled in his influential best-seller, "Savage Inequalities"—crumbling infrastructure, lack of critical supplies, understaffing, and overcrowding (Kozol 2012). On the other hand, although modern studies show positive effects of school spending, the effects are arguably small on average and sometimes negligible, and substantial increases in per-pupil spending over time have often been met with stagnant academic achievement. This raises questions about the significance of other barriers to improving schools, such as rules related to staffing and teacher pay, standards and curriculum, or incentives for schools and students. It may be that addressing those barriers is critical to improving school quality and productivity.

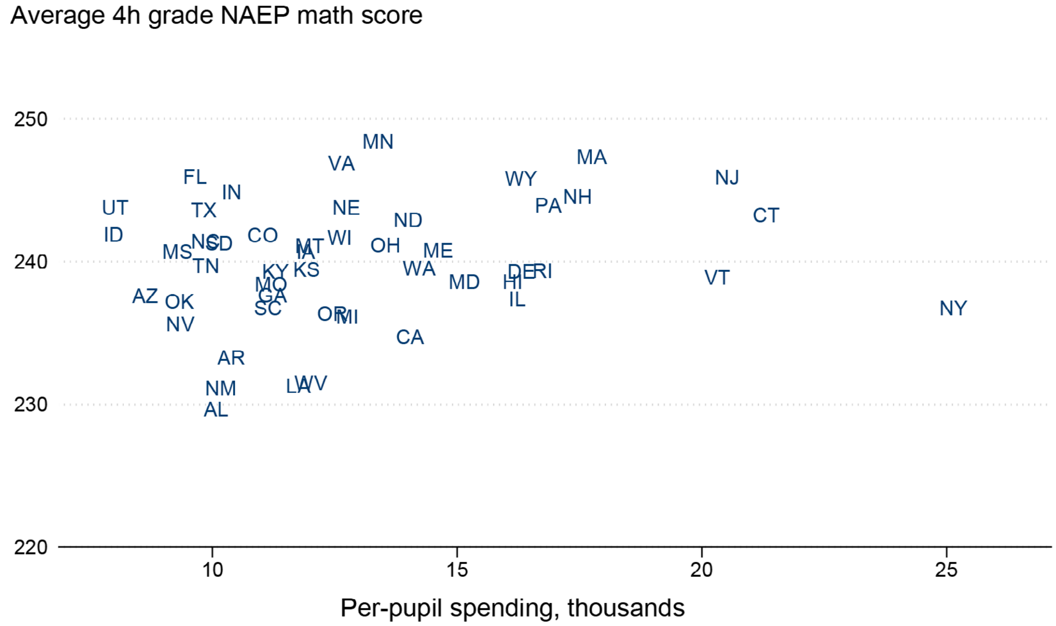
To improve schools, should policymakers and advocates focus primarily on increasing funding or other reforms? Of course, these options are not mutually exclusive, but policy and research attention are limited. This question is especially important for state policymakers since that is the most important level of government when it comes to school funding.

Figure 1 shows that differences in average per-pupil spending across states are substantial but not strongly related to average test scores (in this case, the average fourth grade NAEP math score for 2018-19, the last school year before the COVID-19 pandemic). What should policymakers and other observers make of this fact? To shed light on this question, in this report we analyze cross-state differences in spending and outcomes in-depth—and show how this has changed over time.

Interpreting cross-sectional spending–output relationships is difficult. Both student needs and prices for the key inputs schools must buy vary across states. These variables could be correlated

FIGURE 1

School spending and test scores, 2018-19



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), and National Assessment of Education Progress (NAEP) data.

Notes: NAEP score is the average 4th grade math score in spring 2019; horizontal axis is current expenditure divided by total enrollment for the 2018-19 school year.

B | Center for Economic Security and Opportunity at BROOKINGS

with both spending and outcomes, meaning the relationship cannot be interpreted causally. This is exactly the reason recent research has focused on finding ways to address this "omitted-variables" problem to estimate causal effects of spending on educational outcomes (Jackson and Mackevicius 2024).[2]

Still, as we show below, differences in per-pupil spending across states are large and persistent. Schools in the highest-spending states spend two times as much—or more—compared to those in the lowest-spending states. It would have cost almost $600 billion in 2018-19 to increase per-pupil spending in all states to the average in the highest-spending state (New York), which would almost double total current expenditure and is an order of magnitude larger than the existing federal aid for elementary and secondary education (around $60 billion in 2018-19). New York is particularly high spending, but even increasing spending to the level of the next-highest-spending state (New Jersey) would have cost about $360 billion. So, while other factors may influence educational outcomes, differences in funding across states are large enough that—if money is a key driver of school quality—we would expect to see differences in outcomes across states; and we believe examining that relationship systematically has merit.

Focusing on the 2018-19 school year, the last before the pandemic disruption, we find a weak relationship between per pupil school spending and educational outcomes as measured by test scores and high school dropout rates. As a benchmark, we compare the magnitude of the spending–outcome slope with the average causal effect of spending on test scores and educational attainment from a recent meta-analysis by Jackson and Mackevicius (2024) (henceforth, JM). Without controlling for any other characteristics of states, the spending–outcome slope is about half of the average effect in JM for test scores and one-quarter or less as large for high school dropout/graduation. We show that this finding largely does not depend on the choice of test scores, grade, subject, whether we weight by enrollment or exclude New York (a high-spending, low-outcome outlier), or whether we adjust spending to account for differences in input costs. The small positive slope appears to be driven by differences in socioeconomic status across states: Controlling for the state poverty rate and/or per-capita income generally reduces the slope close to zero.

The relationship between per-pupil spending and outcomes for economically disadvantaged students is of particular interest for several reasons. First, policymakers are especially interested in the outcomes of disadvantaged students. Second, we show that economically disadvantaged students living in higher-income states are exposed to higher school spending compared to their counterparts in lower-income states. That is, economically disadvantaged students in richer, higher-spending states experience higher spending even though they themselves are not high-income. Third, families might increase out-of-school investments when spending is low, obscuring the relationship between spending and outcomes, but the families of economically disadvantaged students are less able to compensate in this way. Finally, the JM meta-analysis suggests that the causal effects of spending are larger for disadvantaged students. We do not, however, find a steeper spending–outcome slope for economically disadvantaged students. In fact, the relationship between school spending and test scores or high school graduation is, if anything, flatter for more disadvantaged students.

Analyzing the spending–outcome relationship since the early 2000s suggests that the slope may have been steeper in the past and approached the average causal effect in JM, but again, controlling for per-capita income and/or poverty reduces that relationship substantially. Overall, the general conclusion one might draw from looking at Figure 1 holds up: Average spending varies across states, as do average test scores, but the two are not very correlated. The picture for high school graduation rates is similar.

We also examine how spending choices differ in lower- and higher-spending states. Overall, spending appears to be more-or-less scaled up in higher-spending states. That is, the allocation of spending across functional categories is similar across states, and higher-spending states employ more staff across all categories and pay teachers more. The higher teacher salaries in higher-spending states are partially due to higher wages for college educated workers generally, but higher-spending states also pay more relative to prevailing wages.

We conclude by exploring some potential explanations for the unexpectedly small relationship between school spending and educational outcomes that we document. We are particularly interested in distinguishing between explanations that imply that schools in higher-spending states do not use their funding as effectively as those in lower-spending states and explanations related to differences in student needs or input prices, which would not necessarily imply productivity differences across states. Overall, we think the findings suggest that improving schools is not, in general, a mere matter of money (although more money would probably help in some circumstances). This means that policymakers and researchers should devote as much attention to understanding and improving productivity in education as they do to the level and distribution of funding. The weakening relationship between spending and outcomes over time also warrants more attention.

2. How and why does average spending vary across states?

Below, we examine the relationship between school spending and educational outcomes at the state level in some detail. To inform the interpretation of the spending–outcome relationship, we first describe how we measure school spending and present several key facts about how and why school spending varies across states and over time.

2.1. MEASURING SCHOOL SPENDING

Total revenue, total expenditure, and current expenditure per pupil are the most commonly used "school spending" measures.[3] The JM meta-analysis does not find significant differences in the effects of current and capital expenditure. A new study looks at variation in the effects of different types of capital projects and finds that spending on basic infrastructure and pollutant removal has effects on test scores, while investments in athletic facilities do not (Biasi et al. 2024).

In this analysis, we use current expenditure per pupil to measure school spending. This excludes debt service and capital expenditure, which can be more volatile year-to-year.[4] In any case, per-pupil revenue, total expenditure, and current expenditure are highly correlated within year at the state level (with a correlation coefficient above 0.98), so the choice of resource measure does not affect the findings.

Throughout the discussion we refer to school years by the fall; for example, we refer to the 2018-19 school year as 2018. All spending and income measures are adjusted to the 2018 U.S. price level. See the Data Appendix for more detail on the data sources.

2.2. KEY FACTS ABOUT STATE-LEVEL SCHOOL SPENDING

First, per-pupil spending varies substantially across states. Schools in the highest-spending state spend almost three times as much as schools in the lowest-spending state. This variation is not attributable to a few outliers: Spending at the 90th percentile is about twice that at the 10th percentile.[5]

Second, per-pupil spending has generally increased over time, except in recessions, growing by about 50% (adjusted for inflation) during the last three decades. As spending grew, the per-pupil spending rank across states was highly stable. The correlation between per-pupil spending in 1993 and 2021 was about 0.9, whether per-pupil spending is measured in levels, logs, or ranks. This means that students who experience relatively high spending in the current year have generally experienced higher-than-average spending throughout their schooling. Given the stability of spending rank over time, the determinants of spending at a point in time are informative about the sources of persistent differences in spending at the state level.

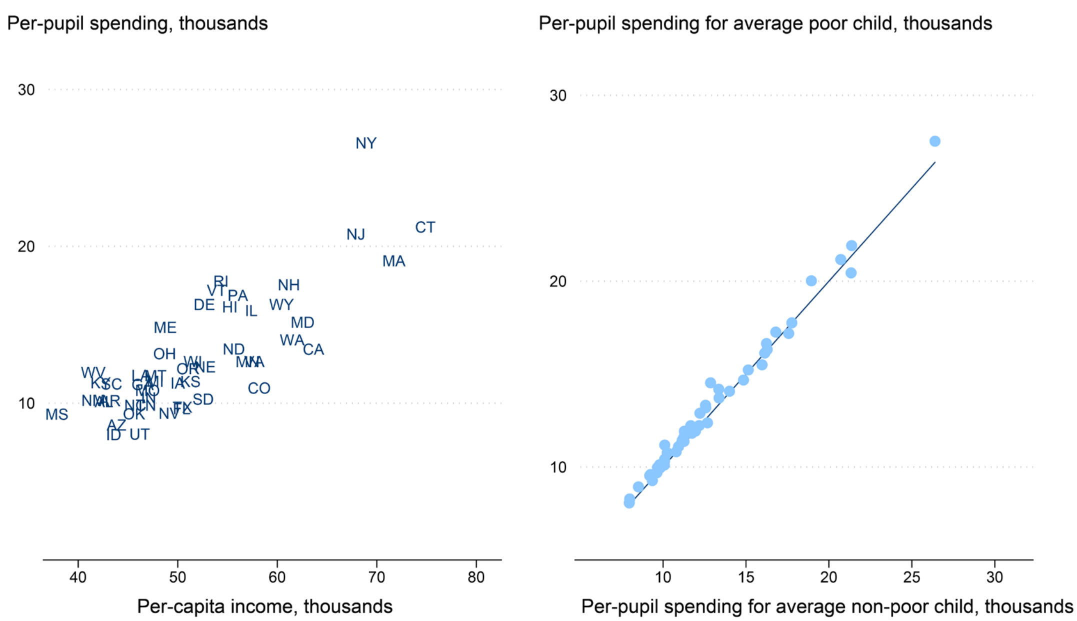
Third, per-capita income–which is closely related to the total tax base that state and local governments can draw on to fund schools–is the most important determinant of school spending at the state level. Variation in per-capita income accounts for around 60% of variation in per-pupil spending, depending on the year. A state's political leanings also matter: Spending is higher in less-Republican states, and Trump's share of the two-party vote in 2016 explains about a third of the variation in per-pupil spending on its own but does not add considerable explanatory power conditional on per-capita income. Together, four variables—per-capita income, the state poverty rate, the white or Asian share of enrollment, and Trump's share of the two-party vote in 2016—explain 75-80% of the variation in per-pupil spending, with per-capita income being by far the most important.[6]

Finally, it is important to note that, in most states, school districts that low-income students attend spend about the same or a little more on average compared to districts higher-income students attend (Gordon and Reber 2021; Tyner 2023). This means that both lower- and higher-income students experience higher school spending in richer states. The first panel of Figure 2 plots per-capita income against per-pupil spending. For the second panel of Figure 2, we plot average per-pupil spending at the district level, weighted by enrollment of students in poverty (vertical axis) against average per-pupil spending weighted by enrollment of students not in poverty (horizontal axis).[7] The points are all close to the 45-degree line, confirming that students in poverty experience higher spending when they live in a higher-spending state to a similar extent as non-poor students.[8]

In Appendix Figure 1, we show that the average spending experienced by students from each race/ethnicity group also tracks very closely with the average spending for the state as a whole.[9] We return to these key facts when interpreting the spending–outcome relationship in the analysis below.

FIGURE 2

Per-pupil spending and per-capita income



Source: Authors' calculations based on Census Bureau and Bureau of Economic Analysis (BEA) data. See Data Appendix for details.

Notes: Per-capita income is for the 2018 calendar year. Per-pupil spending (2018-2019) for the average non-poor child in each state is the weighted average of per-pupil spending at the district level, weighted by enrollment of non-poor students; per-pupil spending for the average poor child is calculated analogously. To estimate the number of poor students in a district, we multiply enrollment by the child poverty rate from the Small Area Income and Poverty Estimates (SAIPE) from the Census Bureau.

B | Center for Economic Security and Opportunity at BROOKINGS

3. How are school spending and educational outcomes related?

In this section, we document the state-level relationship between school spending and educational outcomes. But how steep should we expect the relationship between spending and outcomes to be if "money matters"? Because they aggregate systematically across a large number of causal studies and the estimates have been highly discussed and cited, the average effects reported in the JM meta-analysis serve as a useful benchmark for comparison. We do not wish to imply, however, that a disconnect between the observed spending–outcome slope at the state level and the JM benchmark means that the JM estimate is biased or incorrect, though it could. We discuss potential interpretations and implications of the findings in Section 6 and hope they can spark additional discussion and research about how to improve schools.

This comparison is not entirely straightforward, as there are many potential outcome measures. Also, education is a cumulative process—since achievement depends not only on investments in the current grade but also investments in earlier years. For example, the achievement of eighth graders in 2018 could be affected by school spending between 2010 and 2018.

The JM meta-analysis standardizes the causal estimates to represent the effect of an additional $1,000 (in 2018 dollars) per year for four years.[10] What spending should we attach, for example, to the scores of eighth graders in 2018 to be comparable to the JM approach? As discussed above, state-level differences in average spending are highly correlated over time; eighth graders who experienced high spending in 2018 generally also experienced higher spending throughout their schooling (assuming they lived in the same state). The spending–outcome relationship in a single year could be biased down compared to the approach in JM because each additional $1,000 of per-pupil spending in a single year corresponds to a somewhat smaller difference in spending over four years: For example, an additional $1,000 in 2018 corresponds to $966 per pupil per year averaged over four years.[11] On the other hand, since differences in average state spending are persistent over time, students in high-spending states have generally been exposed to higher spending not just for four years but throughout their schooling. For simplicity, we compare outcomes to spending in the same year.

There are also questions of whether and how to adjust spending for differences in input costs, which test scores to consider and how to scale them, and how to measure educational attainment. We discuss these issues together with the findings about the relationship between spending and outcomes in the remainder of this section.

To illustrate some of the issues that arise and analytic choices we made, we first walk through the analysis for NAEP scores in 2018-19 (the last pre-pandemic test score data).[12] We then extend the analysis of test scores to include more years before turning to the analysis of educational attainment.

3.1. HIGHER SPENDING STATES HAVE MODESTLY HIGHER TEST SCORES

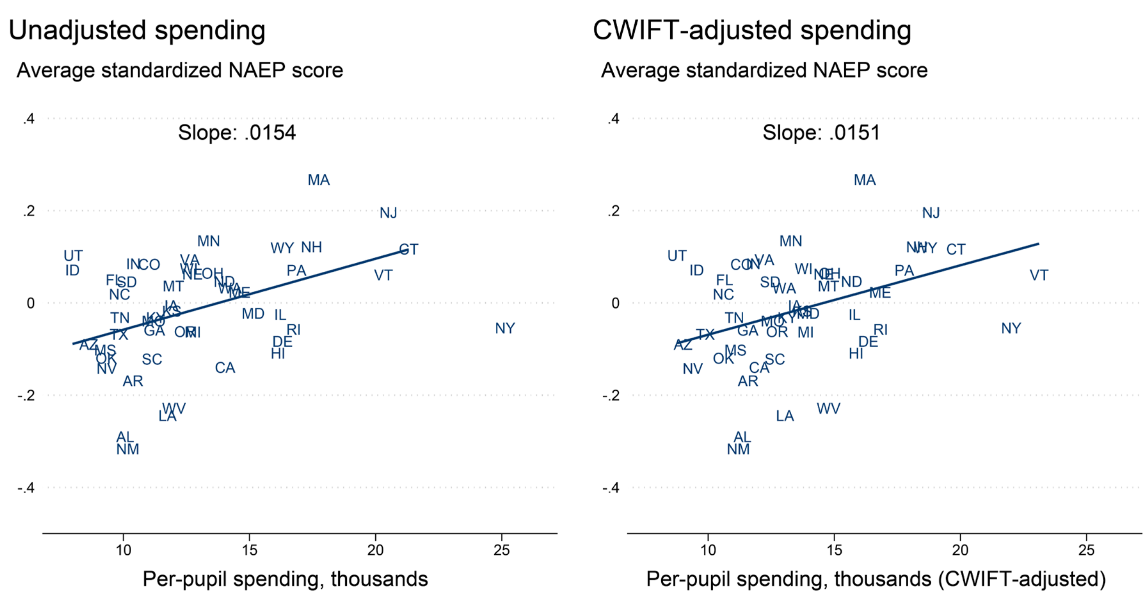
Figure 1 plots a single, state-level average NAEP score (fourth grade math) against spending, but the NAEP test is also consistently administered in reading and in eighth grade. (The Stanford Education Data Archive (SEDA) offers additional test score data; we return to this below.) To generate a state-level spending–outcome slope that can be compared to estimates in JM, we adjust the state-level NAEP scores to student-level standard deviation units, with mean zero (see the Data Appendix for more detail). To reduce noise and avoid cherry-picking, we take the simple average of the fourth and eighth grade standardized math and reading scores.

Figure 3 plots average per-pupil spending described above against average standardized NAEP scores (fourth and eighth grade reading and math) and the "best-fit" line from a simple linear regression excluding New York. For the second panel, we adjust per-pupil spending to account for differences in wage costs using the Comparable Wage Index for Teachers (CWIFT).[13] CWIFT is an index developed by the National Center for Education Statistics (NCES) to capture differences in the wages of college-educated workers, an important input to K-12 schooling, to facilitate comparisons of spending across places.

Because we have standardized the scores using the year-subject-grade student-level mean and standard deviation, positive values mean that the state's average test score is above the mean and vice versa.

FIGURE 3

Per-pupil spending and test scores



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), and National Assessment of Education Progress (NAEP) data. See Data Appendix for details.

Notes: Per-pupil spending is for the 2018-19 school year. New York is excluded in calculating the best fit line. CWIFT is the Comparable Wage Index for Teachers.

B Center for Economic Security and Opportunity at BROOKINGS

The slope of the best-fit line in the first panel indicates that for every additional thousand dollars of spending average test scores are higher by 0.0154 student-level standard deviations. This is about one-half the average causal effect of 0.03 reported in the JM meta-analysis.

New York is a clear outlier, spending about $25,000 per pupil in 2018-19—well above the mean—but posting slightly below-average test scores. If we include New York when calculating the best-fit line, the slope is 0.011, about one-third of the average causal effect reported in JM.[14] The picture looks remarkably similar when per-pupil spending is adjusted for differences in the price of college-educated labor using CWIFT: New York is less of an outlier and instead Vermont is the highest-spending state, but the slope of the best-fit line is virtually the same. The simple relationship between spending and outcomes is much flatter than the causal estimates would predict whether we adjust for differences in wages or not.

Next, we establish that this simple spending-test score relationship is not overly sensitive to analytic and data choices. In addition to the NAEP data, we can also use the state-level assessment data from the Stanford Education Data Archive (SEDA), which have been equilibrated for comparisons of tests scores across states, subjects, and grade levels (Reardon et al. 2024). SEDA includes scores for third grade through eighth grade in both math and reading by subgroup. Because these data are based on the universe of students taking the state accountability test and cover more grades, they offer more statistically precise estimates of average achievement, especially for sub-groups.

Between NAEP and SEDA, we have up to 16 test score averages for each state: math and reading for grades three through eight in SEDA (12 scores) and math and reading for fourth and eighth grades in NAEP. In addition to checking if the slope differs across these different test score measures, we also examine whether the slope depends on whether we weight by enrollment, include or exclude New York (since it tends to be an outlier), or adjust spending using CWIFT. Figure 4 reports the results, showing how the estimated slopes and 95% confidence intervals depend on these choices.[15]

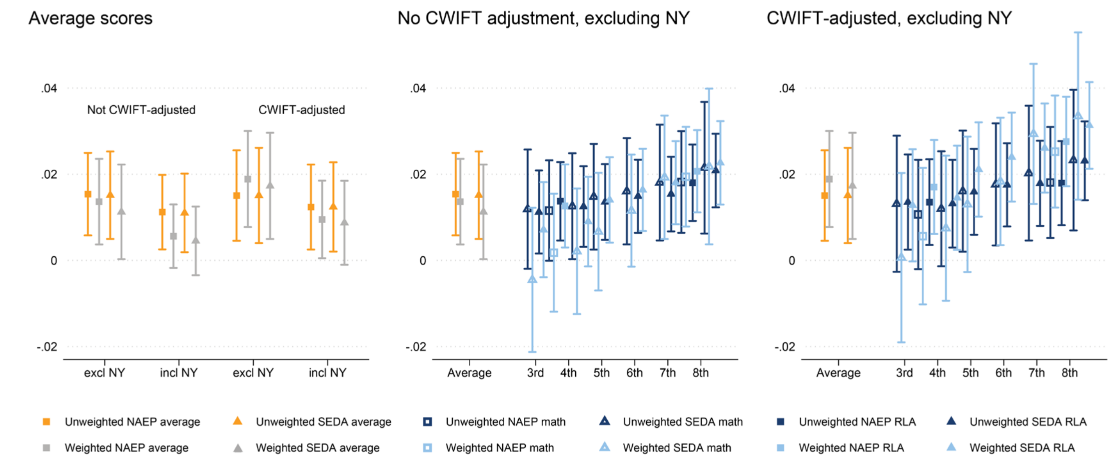
The first estimate in the first panel uses the average NAEP scores (fourth and eighth grade), is unweighted, not adjusted for CWIFT, and excludes New York (the same as in the first panel of Figure 2). The remainder of the points in the first panel show how this estimate depends on whether we consider NAEP or SEDA scores, weight by enrollment or not, and include or exclude New York from the sample. The estimated slope using NAEP and SEDA data are remarkably similar; the slopes are modestly steeper for unweighted estimates and/or if New York is excluded, but all the estimates are less than 0.02.

The second and third panels show how the estimated slopes vary by grade, subject, and test (NAEP or SEDA) without and with the CWIFT adjustment. SEDA data are missing for New York in 2018 (the most recent data are from 2013), so we only have fourth and eighth grade NAEP scores for New York. For that reason and because New York is a (negative) outlier, we exclude New York when we estimate the slopes shown in panels 2 and 3.[16] The results provide some suggestive evidence that the slope is slightly larger at higher grades, consistent with a cumulative effect of spending (or something correlated with spending) on test scores.

Overall, the estimates generally fall between zero and 0.025, regardless of grade, sample, weighting, or data source. There are some estimates that are consistent with the estimate of

FIGURE 4

Slope of per-pupil spending versus test scores, by source and grade



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), National Assessment of Educational Progress (NAEP), and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: The figure plots the coefficients with 95% confidence intervals from univariate regressions of test scores on per-pupil spending (2018-2019). CWIFT is the Comparable Wage Index for Teachers. RLA is Reading and Language Arts. Weighted regressions are weighted by enrollment.

B | Center for Economic Security and Opportunity at BROOKINGS

0.03 found in the JM meta-analysis, especially at the top of the 95% confidence interval, but there are also some that are negative. All in all, the relatively flat slope shown in Figure 2 is robust to a range of reasonable analytic choices. And here we have not controlled for differences in socioeconomic status, which is expected to generate a positive relationship between spending and outcomes due to the positive relationship between per-capita income and per-pupil spending.

Going forward we use SEDA data, averaging across all the available grades and subjects because it is based on the universe of test takers rather than a sample, making it more reliable for sub-group analysis. Our analysis suggests that New York's extreme outlier status is mostly explained by a combination of particularly high input costs and a high share of economically disadvantaged students (shown below). Still, for simplicity, we usually exclude New York from the sample when estimating slopes going forward for several reasons: It is not always possible to adjust for these factors; we do not have recent SEDA data for New York; and the estimates are more sensitive to other choices (like weighting) if New York is included.

3.2. THE SPENDING–OUTCOME SLOPE IS FLATTER CONTROLLING FOR SOCIOECONOMIC STATUS OR WITHIN GROUPS

Higher-spending states are richer, on average, compared to lower-spending states. As shown above, state per-capita income—which is closely tied to the tax base—is a key determinant of average spending in a states' schools. Given the strong relationship between income and educational outcomes at the individual level, we'd expect a positive relationship between spending and outcomes at the state level. This would bias the slope upward because higher-spending states serve fewer economically disadvantaged students.

We only have 48 observations (excluding Alaska and New York), so we cannot include too many control variables without over-fitting the regression. In Table 1, we examine how the slope is affected by adding a parsimonious set of controls one at a time and then all together. The first column shows the base case using SEDA average scores and per pupil expenditure (adjusted for CWIFT), unweighted and excluding New York. In the next four columns, we add the state's poverty rate, per-capita income, the percent of enrollment that is white or Asian, and the 2016 Trump vote share; in the last column, we include all three together.

Controlling for differences in economic status across states reduces the already small spending–outcome relationship; this is not surprising since richer, lower-poverty states have higher spending, which would be expected to have an independent positive impact on outcomes. The percent of enrollment that is white or Asian positively predicts average test scores, and controlling for this variable reduces the spending–test score slope slightly. Individually, the Trump vote share does not predict test scores or affect the coefficient on per-pupil spending.

Controlling for either the poverty rate or per-capita income reduces the coefficient on spending to near zero; the other variables have the expected signs and add some explanatory power but do not change the slope of the spending–outcome relationship much.

TABLE 1

Relationship between per-pupil spending and 2018-19 SEDA scores, all students

	Base	+ Poverty	+ Per-capita Income	+ White/ Asian	+ Trump Vote Share	+ All Controls
Per-pupil spending in thousands (CWIFT adjusted)	0.015*** (0.005)	-0.000 (0.003)	-0.005 (0.007)	0.012** (0.005)	0.018*** (0.006)	-0.008 (0.008)
Poverty Rate (0-100)		-0.034*** (0.006)				-0.022** (0.010)
Per-capita income (thousands)			0.011*** (0.004)			0.007* (0.004)
Percent White or Asian (0-100)				0.279** (0.117)		0.221* (0.121)
Trump % Two-Party Vote (0-100)					0.001 (0.002)	0.001 (0.002)
Constant	-0.209*** (0.068)	0.418*** (0.095)	-0.504*** (0.120)	-0.340*** (0.082)	-0.322* (0.163)	-0.160 (0.260)
Observations	48	48	48	48	48	48
R-squared	0.156	0.554	0.341	0.285	0.168	0.640

NOTE: Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

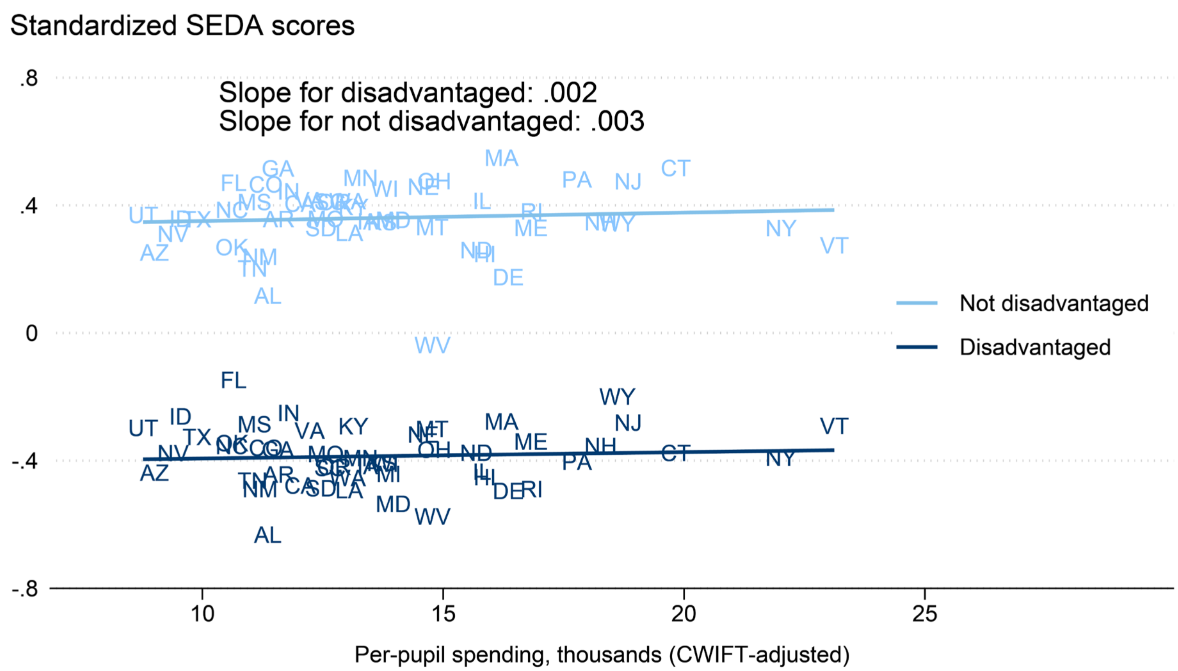
Examining the spending–outcome relationship separately by economic disadvantage is a simple way to control for differences in the socio-economic composition of students. Also, some causal studies suggest that spending matters more for disadvantaged students, so we might expect to see a steeper slope for that subgroup. Figure 5 plots average test scores from SEDA against CWIFT-adjusted per-pupil spending, separately by economically disadvantaged status (this variable is based largely on eligibility for free or reduced-price meals).

Both lines are flat, suggesting that even the small positive slope shown in Figure 3 is likely driven by differences in the composition of students (consistent with the results in Table 1). Economically disadvantaged students in high-spending states are exposed to much higher levels of school spending, but they do not have better test scores. To take one example, average spending in Texas was about $10,000, compared to around $18,000 in Pennsylvania or New Hampshire, but average scores for economically disadvantaged students in all three states are similar (at about 0.4 standard deviations below the average for all students).

Figure 5 also illustrates the large gap in test scores by socioeconomic status: On average, test scores for economically disadvantaged students are nearly 0.8 student-level standard deviations lower than for their non-disadvantaged counterparts. These gaps are extremely large compared to both the average differences in test scores across states and the estimated causal effect of additional spending on outcomes.

FIGURE 5

Per-pupil spending and test scores, by economically disadvantaged status



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: Per-pupil spending is for the 2018-19 school year. New York is excluded in calculating the best fit line. CWIFT is the Comparable Wage Index for Teachers.

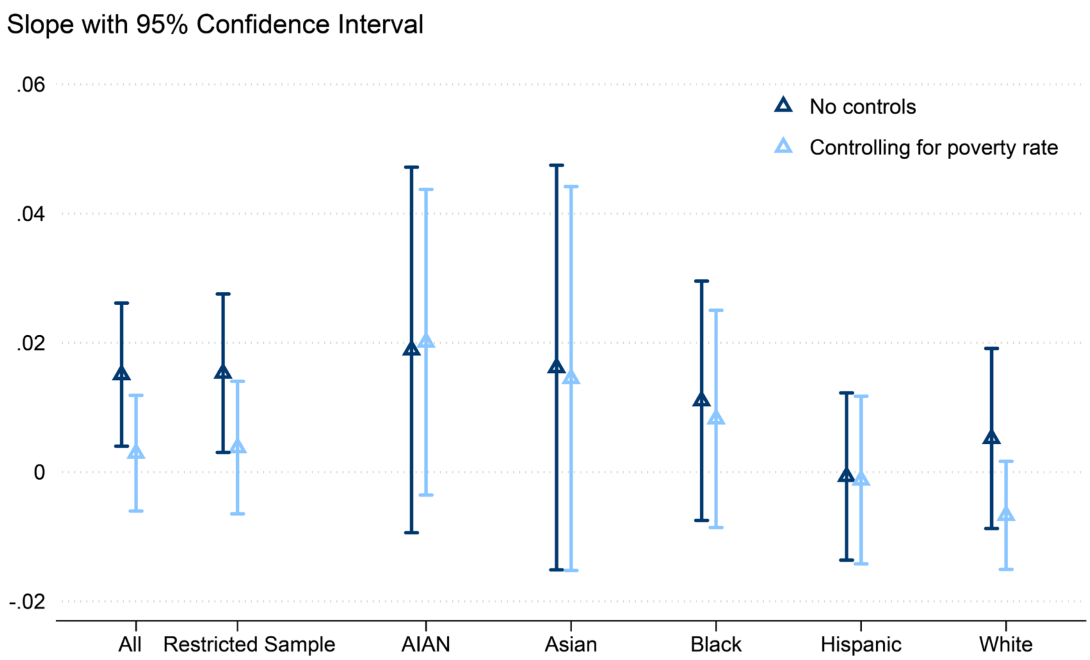
B Center for Economic Security and Opportunity at BROOKINGS

Next, to assess whether the spending–outcome slope varies by race/ethnicity, we conduct an analysis similar to that in Table 1, separately for each of the five race/ethnicity groups available in the SEDA data. The results are presented graphically in Figure 6, showing the coefficients and 95% confidence intervals from the regression without controls and controlling for the race-specific poverty rate.[17] Not all states report data disaggregated by race, so we restrict the sample to states that reported for all five groups. To confirm that this set of states is broadly representative, the first set of results shows the coefficients for average test scores for all students for the full and restricted samples.

The dark blue triangles represent the slope from the simple regression without controls, and the light blue triangles show the slope when a control for race-specific poverty rate is included. Both with and without controls, the slopes are somewhat larger for American Indian and Alaska Native (AIAN) and Asian students, but the confidence intervals are also large, likely because state-level averages are noisier for these smaller groups. Across the groups, the estimates are around 0.02 or smaller and closer to zero when the poverty control is included.

FIGURE 6

Slope of per-pupil spending versus SEDA scores, by race



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: The figure plots the coefficients with 95% confidence intervals from separate unweighted univariate regressions of SEDA test scores (spring of 2019) on per-pupil spending (2018-19), adjusted using the Comparable Wage Index for Teachers (in thousands of 2018 dollars). New York is excluded; the restricted sample is all states that reported test scores by race.

B Center for Economic Security and Opportunity at BROOKINGS

3.3. THE RELATIONSHIP BETWEEN SPENDING AND HIGH SCHOOL GRADUATION IS ALSO WEAK

Some causal studies estimate the effects of school spending on educational attainment in addition to or instead of test scores. The JM meta-analysis estimates an average effect on high school graduation and college enrollment of 2.0 and 2.8 percentage points, respectively, per thousand dollars of spending sustained for four years. These effects are substantively large, likely large enough that the additional spending is cost effective.[18] In this section we compare the state-level relationship between school spending and educational attainment with the average causal effect reported in JM, similar to the analysis for test scores above.

Measuring high school graduation and college enrollment at the state level is surprisingly difficult. The Digest of Education Statistics reports a national college enrollment rate for 18- to 24-year-olds based on the education supplement to the Current Population Survey (CPS), a household survey which asks individuals whether they are enrolled in school. But this is difficult to interpret at the state level since many young people may have moved to another state for college. Instead, we focus on two measures of high school graduation and dropout: the Average Cohort Graduation Rate (ACGR) and the “status dropout rate.”

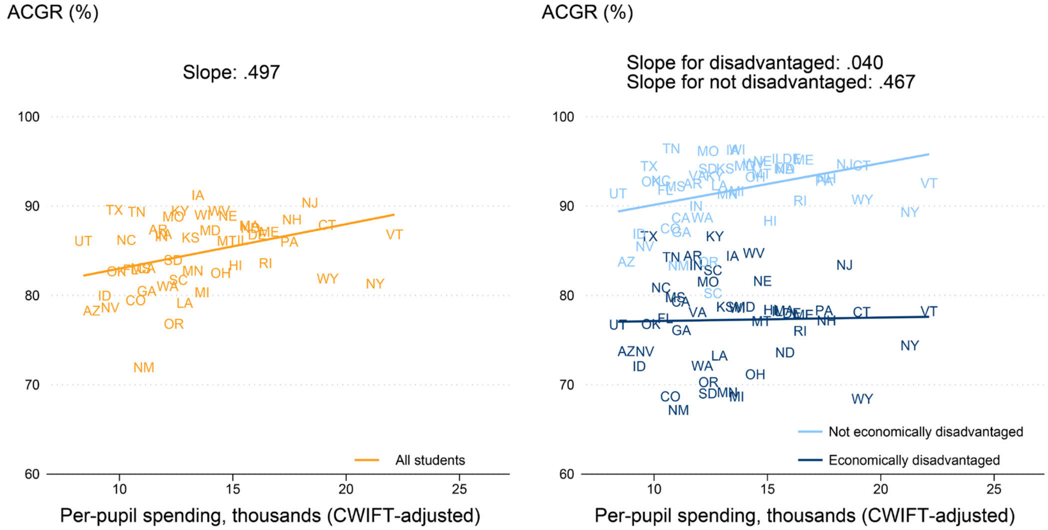
ACGR is calculated by states using administrative data; it is the share of each ninth-grade cohort that graduates within four years, and states report it separately for the overall population and economically disadvantaged students. To construct this measure, states must accurately distinguish between students who drop out of school versus those who transferred to a different school. Concerns have been raised that states inaccurately classify dropouts as having transferred and that the measure is not comparable across states (Harris et al. 2020); still, it is the best available measure.

The status dropout rate is the percent of people (in a specific age range) who are not in school and do not have a high school diploma; we calculate it by state using the American Community Survey (ACS).[19] Most 17-year-olds are still living in the same state where they went to high school (and usually with their parents or guardians), so the status dropout rate at this age should not be affected too much by cross-state mobility. However, the sample sizes are small when we restrict the sample to 17-year-olds, so we also construct a measure based on 17- to 25-year-olds, even though older people are more likely to have moved to another state. Figures 7 and 8 show the relationship between spending and the educational attainment measures.

The first panel of Figure 7 plots ACGR averaged over 2014-2018 against CWIFT-adjusted per-pupil spending. The slope is 0.5, indicating that for each additional $1,000 in spending, the high school graduation rate increases by 0.5 percentage points, about a quarter of the two percentage points reported in the JM meta-analysis.

FIGURE 7

Per-pupil spending and average cohort graduation rate



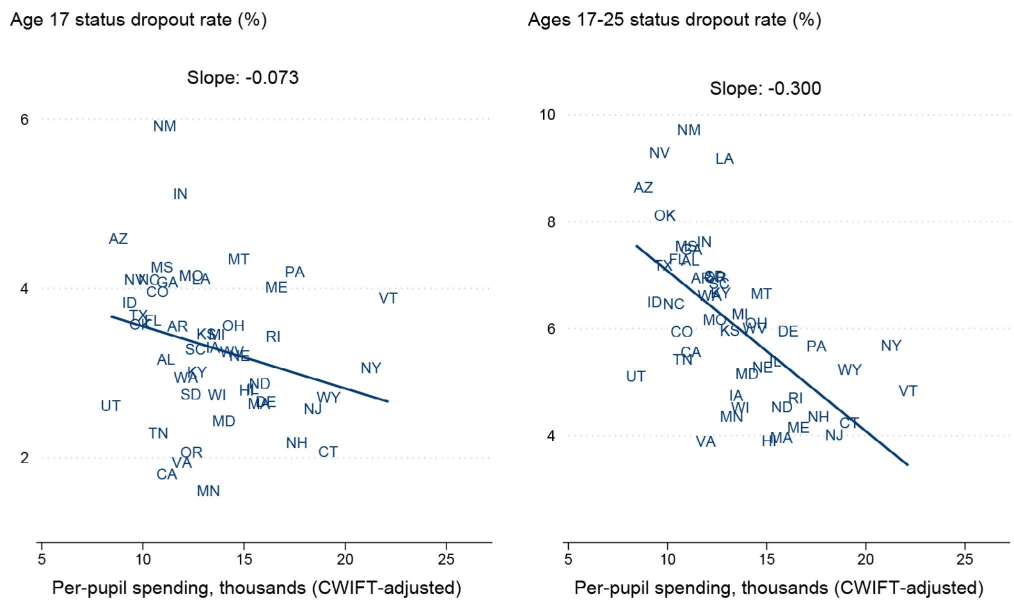
Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), Bureau of Labor Statistics (BLS), U.S. Department of Education Office of Elementary and Secondary Education, and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: New York is excluded in calculating the best fit line. CWIFT is the Comparable Wage Index for Teachers. ACGR the average for the 2014-15 to 2018-19 school years.

B | Center for Economic Security and Opportunity at BROOKINGS

FIGURE 8

Per-pupil spending and status dropout rate



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), Bureau of Labor Statistics (BLS), and American Community Survey (ACS) data. See Data Appendix for details.

Notes: New York is excluded in calculating the best fit line. CWIFT is the Comparable Wage Index for Teachers. The status dropout rate is the percent of people in the relevant age group who are not enrolled in school and have not completed a high school degree (including GED); the figure plots the average for the 2014 to 2018 school years.

B | Center for Economic Security and Opportunity at BROOKINGS

The second panel of Figure 7 plots high school graduation separately by economically disadvantaged status. As for test scores (Figure 5), the slope for economically disadvantaged students is flatter than for the total.

Figure 8 shows similar findings using the status dropout rate (the slope is negative because this is a dropout rather than graduation rate). The slope is larger when we consider the broader age range but still small compared to the JM estimate (and smaller than the estimate based on the ACGR).[20]

Overall, Figures 7 and 8 point to some relationship between school spending and educational attainment in the expected direction. However, even the most impressive slope in the second panel of Figure 8 is much flatter than the JM estimates would imply, and this does not adjust for the fact that higher-spending states are richer so would likely have lower dropout rates regardless of spending. Indeed, there is no relationship between school spending and high school graduation rates for economically disadvantaged students, consistent with the findings for test scores.

4. The spending–outcome slope was higher in the past

In the previous section, we show that the slope of the state-level relationship between school spending and student achievement in 2018-19 was much flatter than causal studies of the effects of spending would suggest. That finding is similar across grades and subjects and robust to a range of analytic choices, including adjusting spending for differences in the price of college-educated labor, weighting by enrollment, and excluding New York, a high-spending outlier. The story is similar for high school graduation and dropout rates.

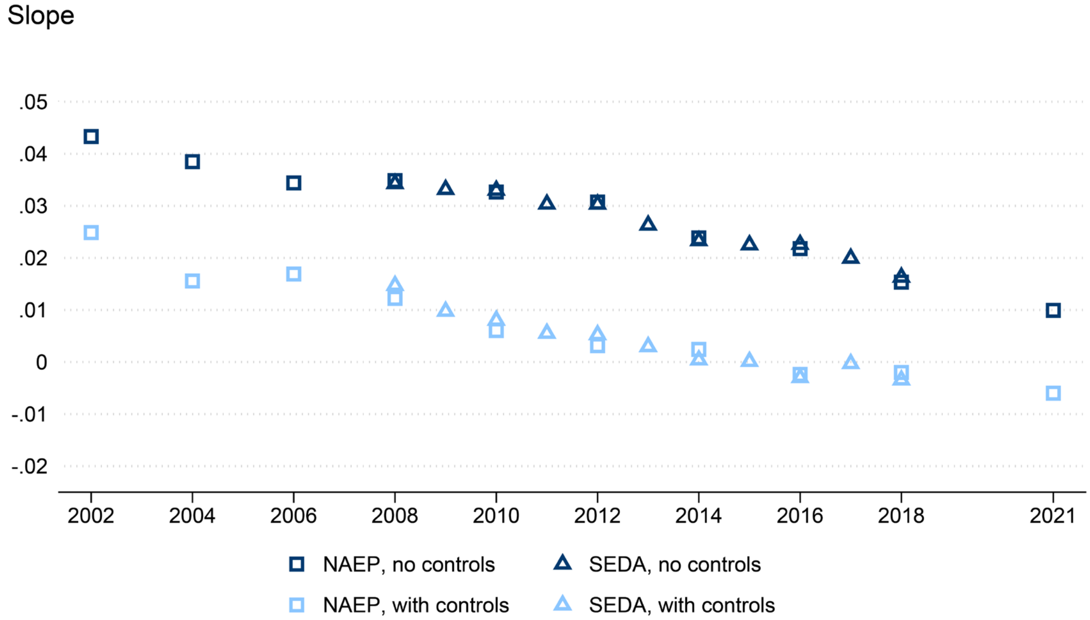
In this section, we ask whether the spending–outcome relationship has changed over the last two decades, focusing on test scores because we do not have reliable and consistent annual data on educational attainment. We also explore how controlling for per-capita income and poverty affects the slope, as we did for 2018-19 above (Table 1); we do not include the other control variables since we have few observations, and they did not influence the coefficient of interest.

Because CWIFT is not available historically and is not designed to facilitate comparisons over time, we use unadjusted per-pupil spending for this analysis. We also drop New York since it is sometimes an influential outlier when unadjusted for CWIFT and because New York is missing from the SEDA data after 2013. As shown above, however, the results are not that different if we adjust for CWIFT where available or include New York. Finally, we limit this analysis to a consistent set of states that have data for all the years so that changes in the slope are not driven by changes in the composition of states in the sample.[21]

Figure 9 shows the coefficients from year-by-year regressions of average test scores on per-pupil spending for NAEP (squares) and SEDA (triangles); the estimated slopes without controls are dark blue and controlling for the poverty rate and per-capita income are light blue. The estimated slope for 2018 is nearly identical to that shown in Figure 3 despite the smaller sample, and where both NAEP and SEDA scores are available, the slopes are nearly identical.

FIGURE 9

Slope of per-pupil spending versus test scores over time



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), Bureau of Labor Statistics (BLS), National Assessment of Education Progress (NAEP), and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: The figure plots the coefficients from separate unweighted regressions of SEDA test scores on per-pupil spending (in thousands of 2018 dollars); the regression with controls includes llinear controls for per-capita income and the poverty rate. The sample is restricted to states for which test score data are available in all years; New York is excluded.

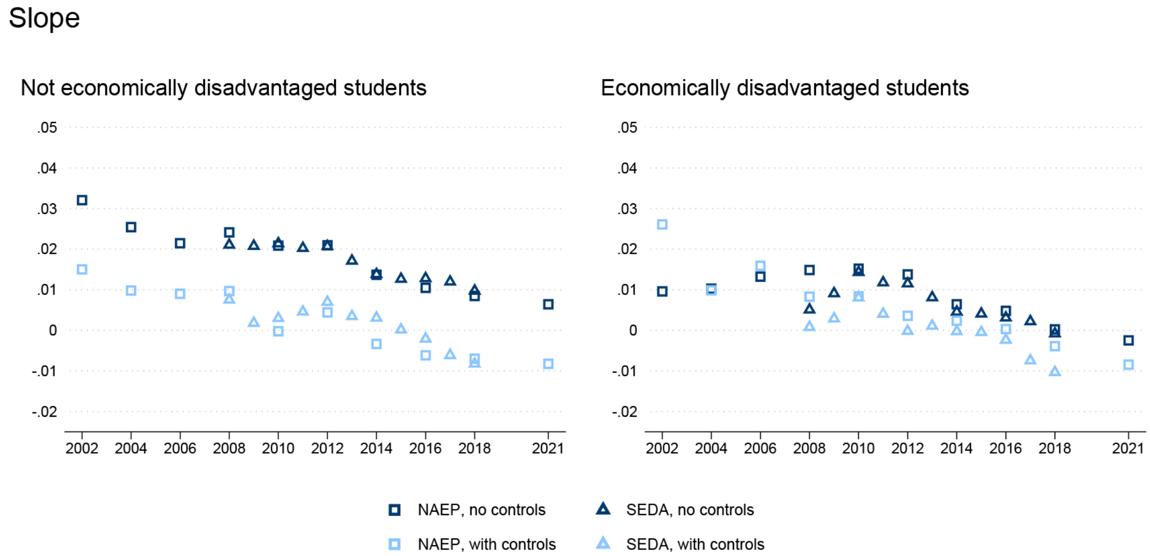
There is a clear downward trend in the coefficient since 2002.[22] Before about 2014, the coefficient was around 0.03 or higher, consistent with the JM estimate. However, controlling for per-capita income and the poverty rate, the slopes are generally less than 0.02 in the earlier years and around zero starting in 2014. (The downward trend continued between 2018-19 and the most recent available year, 2021-22, but we do not make too much of this because both spending and student outcomes were affected by the COVID-19 pandemic. NAEP data for 2023-24 are available, but spending data are not, so we cannot extend the series further.)

Figure 10 repeats the results in Figure 9, separately for students who are economically disadvantaged or not. Consistent with the findings above for 2018-19, the slopes are smaller when we examine the data separately by economic-disadvantage status. Adding controls does not matter as much for economically disadvantaged students, which makes sense since we have in some sense already controlled for socioeconomic status by analyzing subgroups separately.

What explains this trend? It could be that the benefit of additional spending has declined over time as average levels of spending increased, but the JM analysis does not find evidence for that hypothesis. Still, many of the studies included in JM were based on data from earlier years, so the state-level spending–outcome relationship is closer to the JM estimates in the time periods considered in the underlying causal studies (though less so if we control for poverty and per-capita income). Understanding this trend is an important topic for further discussion and research.

FIGURE 10

Slope of per-pupil spending versus test scores, by economically disadvantaged status



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), Bureau of Labor Statistics (BLS), National Assessment of Education Progress (NAEP), and Stanford Education Data Archive (SEDA) data. See Data Appendix for details.

Notes: The figure plots the coefficients from separate unweighted regressions of SEDA test scores on per-pupil spending (in thousands of 2018 dollars); the regression with controls includes llinear controls for per-capita income and the poverty rate. The sample is restricted to states for which test score data are available in all years; New York is excluded.

B | Center for Economic Security and Opportunity at BROOKINGS

5. What do high-spending states buy?

Above we show that the cross-state relationship between school spending and educational outcomes is weak. For the most part, states that consistently spend double—or more—compared to other states have only marginally better test scores and high school graduation rates. And the small positive relationship is likely mostly because they serve a more advantaged student population. Economically disadvantaged students in higher-spending states do not have systematically better educational outcomes. This raises the question of how high-spending states allocate resources compared to their lower-spending counterparts. What do higher-spending states buy with the extra funding?

Ideally, we would decompose differences in spending to see how much is attributable to differences in the inputs used (e.g., do high-spending states have more teachers, tutors, supplies, student support staff, administrators, etc.?) and the prices they pay for those inputs (e.g., are staff paid more or supplies more expensive?). Unfortunately, we do not have data with that level of detail that is comparable across states. Nevertheless, in this section we draw on three types of data to address the question of how high-spending states spend differently: spending by category, staffing levels, and average teacher salaries.

5.1. HIGHER-SPENDING STATES BUY MORE OF EVERYTHING

For Figures 11 and 12, we use the spending data to assess whether the additional spending in high-spending states is particularly concentrated in certain categories. We divide states into quintiles based on per-pupil spending and show the average spending by category within each quintile. Recall that throughout the analysis we examine current expenditures, so spending on debt service and capital is excluded.

Of particular interest is the possibility that higher-spending states spend more on things that would not be expected to improve outcomes measured by test scores or high school graduation. Spending that doesn't improve those specific outcomes isn't necessarily unproductive or useless—it may serve other functions. For example, if schools in higher-spending states spend more on athletics, extra-curricular activities, nutrition programs, or special education services for students with disabilities, that spending might not translate to better average educational outcomes (though there are arguments that spending in those areas could affect academic achievement). But that would not mean that spending is inefficient or that additional spending in other categories doesn't improve test scores or reduce high school dropout rates. Unfortunately, the available data cannot support such detailed analysis. However, the analysis suggests this is likely not the main story since schools in higher- and lower-spending states allocate funds similarly; higher-spending schools just spend more.

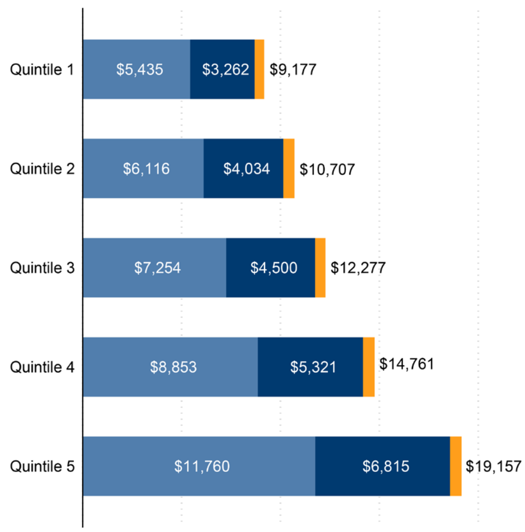
For Figure 11, we divide spending into three broad categories by function: instruction, support services, and other expenditures. The first panel shows the level of spending across these categories. In the 10 lowest-spending states (the first quintile), total current expenditure was about $9,200 in 2018-19: about $5,400 for instruction, $3,300 for support services, and $500 for other expenses. Average spending in the top-quintile states is $19,200. In the highest-spending quintile, instructional spending is substantially larger than all spending in the bottom quintile, at about $11,800; and in the fourth quintile, instructional spending is only slightly less than total expenditure in the bottom quintile, at $8,900.

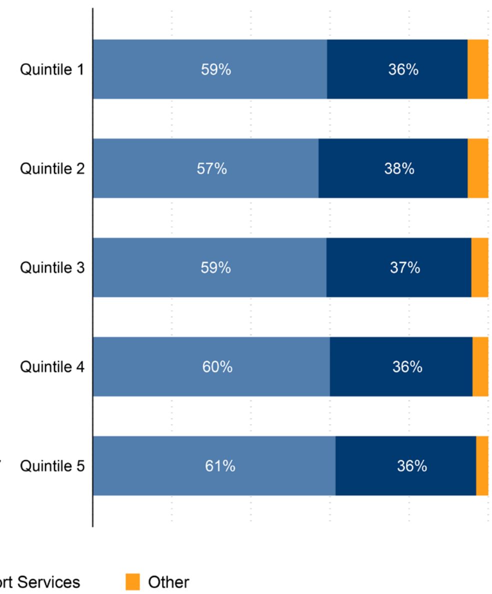
The second panel shows the distribution of spending across the three categories, which is quite similar across quintiles. The percentage of spending in the "other" category is slightly lower in the higher-spending quintiles. This is because the level of "other" spending is similar across quintiles, so it is a smaller percentage as total spending goes up but never accounts for more than about 5% of spending. The share of spending that goes to instruction versus support services is quite similar across spending quintiles. Analyzing data on the distribution of spending across more detailed categories within support services reveals that states in the top spending quintile devote a somewhat higher share of spending to student support services, but these differences are not large.[23]

Figure 12 divides spending into that for salaries, employee benefits, and other, in levels (first panel) and proportional to total spending (second panel).

FIGURE 11

Average per-pupil spending, by quintile





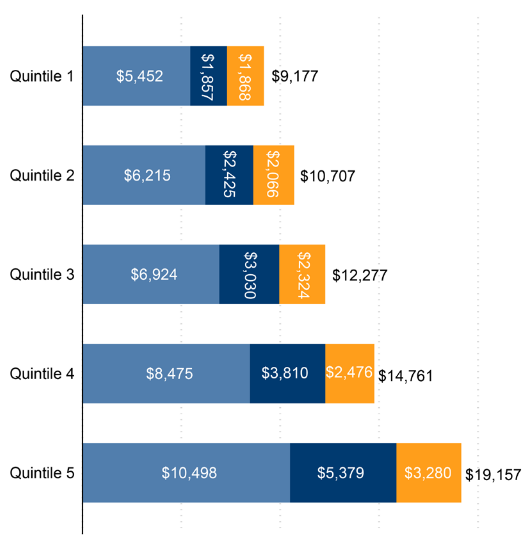
Source: Authors' calculations based on Census Bureau and National Center for Education Statistics (NCES) data. See Data Appendix for details.

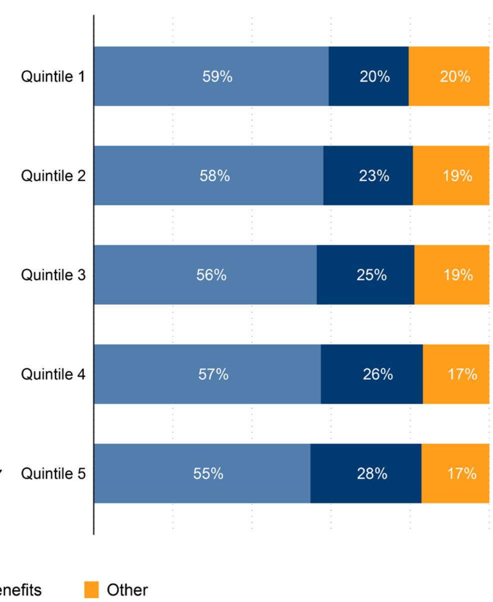
Notes: Per-pupil spending is for the 2018-19 school year.

B Center for Economic Security and Opportunity at BROOKINGS

FIGURE 12

Average per-pupil spending, by quintile





Source: Authors' calculations based on Census Bureau and National Center for Education Statistics (NCES) data. See Data Appendix for details.

Note: Per-pupil spending is for the 2018-19 school year. Categories may not sum to the total due to rounding.

B Center for Economic Security and Opportunity at BROOKINGS

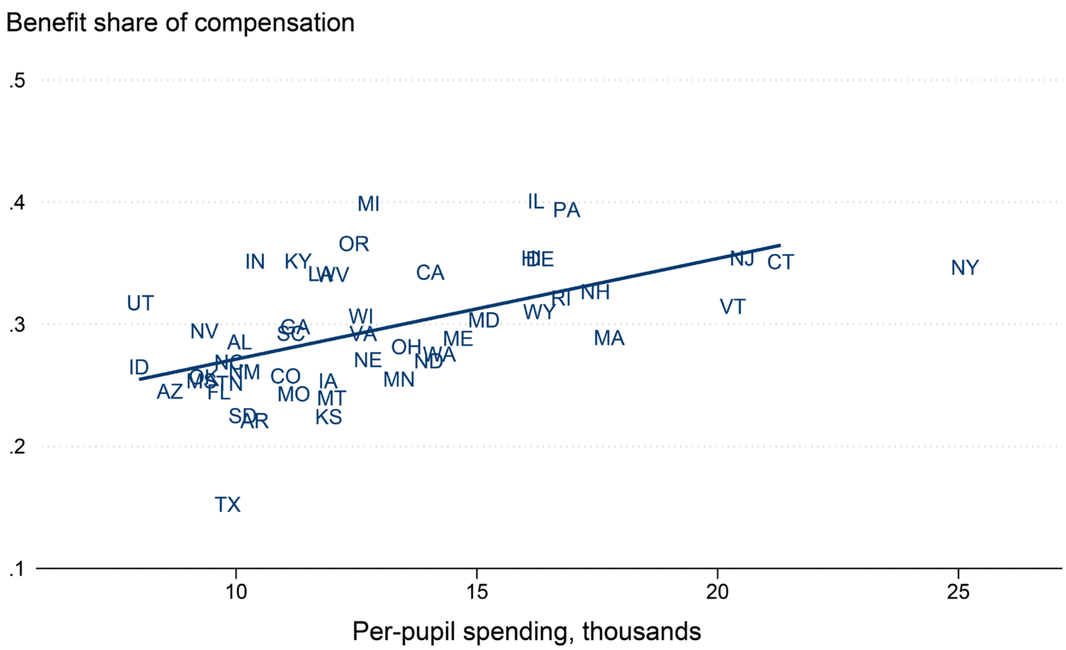
Again, the distribution of spending across these categories is mostly similar for higher- and lower-spending states. Employee compensation accounts for around 80% of spending across quintiles. This cannot tell us, however, whether the higher spending on employee compensation is because higher-spending states have more employees, pay them more, or both. Although the data limits our ability to decompose those differences in detail, we explore this more below.

Benefits are a somewhat higher share of total compensation (salary plus benefits) in higher-spending states. For example, benefits are 34% of total compensation in the top quintile compared to 25% in the bottom quintile. Although the difference is moderate in percentage terms, this means that the level of spending on employee benefits is much higher in higher-spending states.

Figure 13 shows the relationship between the benefit share of employee compensation and per-pupil spending for all states. School staff in higher-spending states take a larger share of total compensation in the form of benefits. Current spending for legacy pension costs is mostly not "productive" in that it essentially amounts to payments for work that has already occurred. Figure 13 is consistent with the idea that higher-spending states have more such costs, but it is also consistent with other stories. And in any case, legacy pension costs are not the only benefits, and the entire benefits category does not explain a large share of the spending differences between higher- and lower-spending states.

FIGURE 13

Per-pupil spending and benefit share of compensation



Source: Authors' calculations based on Census Bureau and National Center for Education Statistics (NCES) data. See Data Appendix for details.

Notes: Per-pupil spending is for the 2018-19 school year. New York is excluded in calculating the best fit line.

Center for Economic Security and Opportunity at BROOKINGS

Overall, with a few modest exceptions, higher-spending states allocate funding across broad categories similarly to their lower-spending counterparts. Spending is more-or-less scaled up across functions and types of spending. But because levels of total spending are quite different, it follows that the level of spending in each category differs across quintiles dramatically. Top-quintile states spend more just on instruction than the bottom two quintiles spend in total. Spending just on salaries in the top quintile is more than all spending in the bottom quintile and almost as much as all spending in the second quintile. Average per-pupil spending on benefits in the top quintile is about the same as average per-pupil spending on salaries in the first quintile. These comparisons again highlight the fact discussed in Section 2 and shown in Figure 2: Cross-state differences in per-pupil spending are very large.

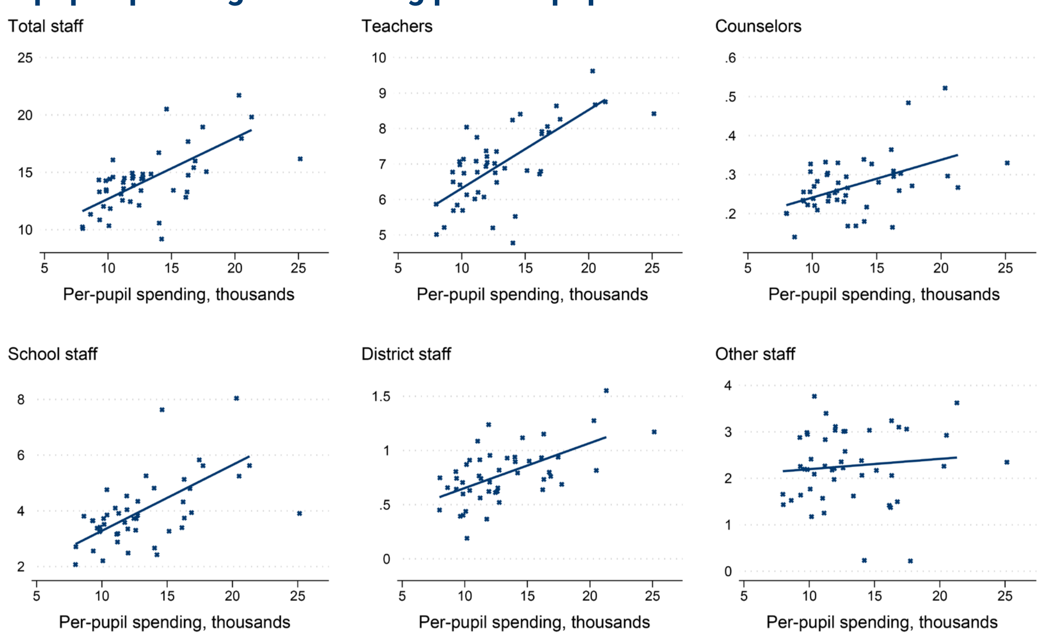
5.2. HIGHER-SPENDING STATES HAVE MORE STAFF AND PAY TEACHERS MORE

To shed some light on the potential contributions of differences in the number and type of employees versus compensation per employee to differences in total spending, we use staffing data from the state-level Common Core of Data. Unfortunately, the data on employee compensation is limited. We only have information on average salaries (not benefits) and only for teachers (not other staff).

Figure 14 plots staff per 100 pupils for total staffing and the five categories available in the Common Core; note that the vertical axes differ across panels. Again, we show New York on the figure but exclude it when calculating the best fit line.[24] Higher-spending states employ more staff per pupil. This is not surprising and confirms that differences in spending are not entirely because employees in higher-spending states are better compensated.

FIGURE 14

Per-pupil spending and staffing per 100 pupils



Source: Authors' calculations based on Census Bureau and National Center for Education Statistics (NCES) data. See Data Appendix for details.

Notes: Per-pupil spending is for the 2018-19 school year. New York is excluded in calculating the best fit line.

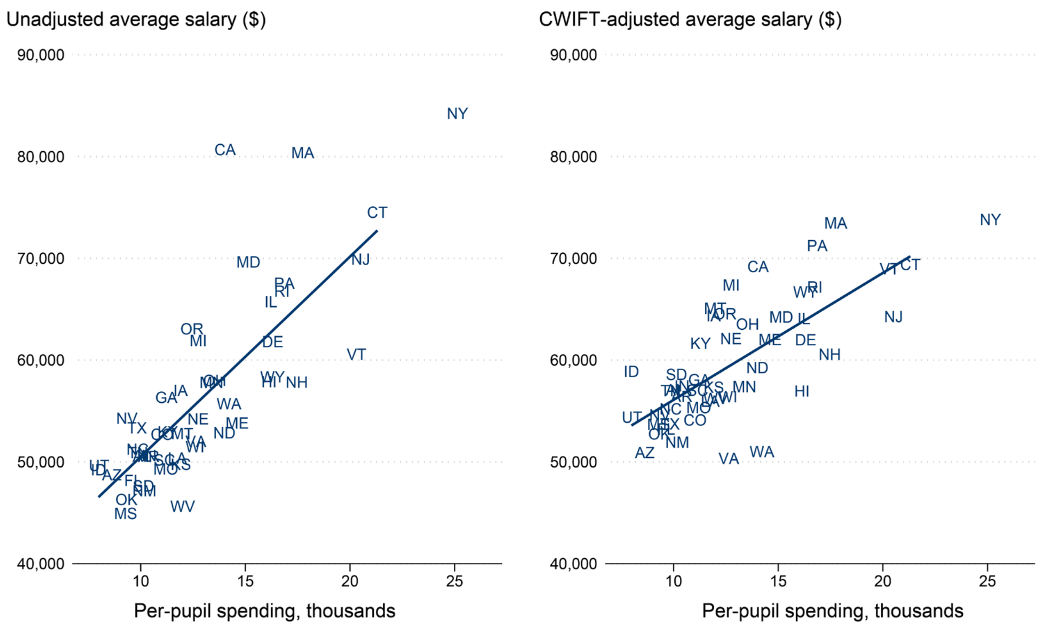
Center for Economic Security and Opportunity at BROOKINGS

How can we interpret the magnitude of the slope? As a benchmark, if average compensation did not differ across higher- and lower-spending states and all spending was for staffing, then, for example, a doubling of spending would be associated with a doubling of staffing. Based on the best-fit line in the first panel of Figure 14, the predicted staffing at $20,000 of per-pupil spending is about 40% higher than at $10,000 of per-pupil spending. This means that, in addition to employing more staff per pupil, higher-spending states also pay higher average salaries and benefits and spend more on non-staff costs (which we also showed above).

The first panel of Figure 15 shows that teacher salaries are higher in higher-spending states. This is partly because prevailing wages for college-educated workers are higher in higher-spending states. In the second panel, we adjust salaries for CWIFT. This adjustment brings many of the outlier salaries in the first panel closer to the best-fit line, but the slope of the line is still positive, indicating that high-spending states pay teachers a larger premium relative to other college-educated workers. Teachers in California, New York, and Massachusetts are highly paid partly because all college-educated workers in those states get paid more. Interestingly, adjusting for CWIFT creates some negative outliers, too: Relative to other college-educated workers, teachers in Virginia and Washington have low salaries.

FIGURE 15

Per-pupil spending and teacher salaries



Source: Authors' calculations based on Census Bureau, National Center for Education Statistics (NCES), and National Education Association (NEA) data. See Data Appendix for details.

Notes: Per-pupil spending is for the 2018-19 school year. New York is excluded in calculating the best fit line. CWIFT is the Comparable Wage Index for Teachers.

B | Center for Economic Security and Opportunity at BROOKINGS

6. Why is the spending–outcome relationship not steeper?

Above, we show that no matter how we cut the data, the state-level relationship between spending and test scores is small; it is essentially zero for economically disadvantaged students. For high school graduation, there is more evidence of a spending–outcome connection, but the relationship is much weaker than expected based on the results of a recent meta-analysis (JM benchmark) and, again, essentially zero for economically disadvantaged students. The findings for economically disadvantaged students are particularly striking. Economically disadvantaged students who live in higher-income states benefit from a "fiscal externality"—spending in their schools is higher due to the larger tax base. Yet we do not see stronger educational outcomes. We compare to the JM benchmark because those estimates have been widely discussed, but other benchmarks could be relevant. For example, one might ask how large the effect of spending on outcomes would need to be to consider additional spending cost effective, which would require an accounting and valuing of all the benefits associated with additional spending.

In this section, we discuss potential explanations for the low correlation across states between school spending and educational outcomes. For policy, it is useful to distinguish between explanations having to do with omitted variables and those that imply differences in productivity in the "production of education" across states. To the extent that omitted variables are not masking a more positive spending–outcome relationship, the findings point to important differences in productivity across states. We begin with "omitted variables" explanations before turning to "productivity" explanations.

These explanations are, of course, not mutually exclusive, and we will not come to any definitive conclusion. Instead, the goal here is to identify and weigh alternative interpretations of the (lack of) spending–outcome relationship to inform discussions about how to improve schools.

6.1. "OMITTED VARIABLES" EXPLANATIONS

Recall that the strongest predictor of per-pupil spending is per-capita income. Higher-spending states are more advantaged along other dimensions, which would be expected to lead to a spurious positive spending–outcome relationship, but instead the slope is mostly flat (or at least flatter than expected based on JM). So, in this section we are looking for omitted variables that would go the other way—reasons higher-spending states would be expected to have worse educational outcomes.

The adjustment for differences in input costs is incomplete

One possibility is that CWIFT does not accurately capture differences in input costs, and if we could control for differences in costs properly, the spending–outcome slope would become more positive. This is possible, and in fact we see that higher-spending states do pay teachers higher salaries, conditional on prevailing wages for non-teacher college-educated workers. That could be because CWIFT does not fully capture differences in prevailing wages, and if we had a more accurate measure, we would not see the same differences in salaries. Or it could be that higher-spending states pay above-market (or less below-market) wages compared to their lower-spending counterparts. This would not necessarily be inefficient: Paying higher salaries could be a productive use of additional funding if it allows schools to attract and retain better teachers.

The prices of some inputs are also not captured by CWIFT. In particular, prices for real estate vary, and population density affects both transportation costs and the possibility for schools to operate at an efficient scale.[25] In this analysis, we focus on current expenditures, which excludes the cost of acquiring land and building schools, so real estate and building costs do not account for the spending differences we analyze. It is widely recognized (and intuitive) that, below some threshold, smaller districts and schools are more expensive to run on a per-pupil basis since they do not benefit from economies of scale. However, the correlation of spending with population density or the share of students enrolled in small schools goes in the other direction.[26] Furthermore, while small schools often have high per-pupil spending, by definition they enroll few students and so tend not to drive average per-pupil spending in a state.

All in all, we cannot rule out the possibility that unaccounted-for differences in input prices mask a more upward-sloping spending–outcome relationship, but this is unlikely to be the full story. Regardless of the reasons for higher salaries in higher-spending states, differences in input prices do not explain all the variation in spending, so incomplete adjustment for input costs cannot be the whole explanation for the weak spending–outcome relationship. Higher-spending states employ more staff per pupil—that is, they use more inputs.

Students in higher-spending states are needier or receive more special services
If students in higher-spending states have greater educational needs, then those states must spend more to achieve the same outcomes. Because higher-spending states are also higher-income, their students are more, not less, socioeconomically advantaged on average. Students with disabilities (SWD) and English Learners (EL), who require additional educational services and tend to have worse outcomes, are generally over-represented in lower-income populations; this would push the slope up, not down. EL classification and the prevalence of Individualized Instruction Plans (IEPs, which indicate a student has accommodations for a disability) are imperfect proxies for the true prevalence of English Learners and Students with Disabilities because state, district, and school policies can influence how a student is classified, especially for SWD. IEP prevalence could be higher because the prevalence of disabilities is higher or because students are more likely to have an IEP, conditional on disability status.

Despite these limitations, we use data on the percent of students with an IEP and the percent who are English Learners to see how these variables correlate with spending.[27] The correlation between per-pupil spending and EL share is small and negative. The share of students with an IEP is modestly higher in higher-spending states, especially controlling for the poverty rate, suggesting that higher-spending states may be more likely to provide special education services.

Higher spending states pursue different or additional goals
Student achievement in math and reading and high school graduation are important, but they are not the only "output" that schools "produce." Spending is not necessarily wasted if it does

not increase test scores or high school graduation rates. For example, improving academic outcomes is not the main goal of spending on field trips, sports teams, clubs, and the like (though it could be a side benefit), but those activities have other benefits. The same could be true for some spending on meals, counseling, and other support services. The analysis of spending by category does not support the idea that there are major differences in how lower- and higher-spending states allocate their spending, though the available data are not that detailed.

Parents or communities in lower-spending states compensate

It could be that when school spending is low, parents or communities provide more resources to schools—or spend more on out-of-school services—to compensate. That could include private support for schools through parent teacher associations (PTAs) or out-of-school support. In this case an omitted variable—private spending on education—would mask a positive spending–outcome slope. Some evidence shows that PTAs serving higher-income schools raise more money, but even for the highest-spending PTAs spending is small compared to total spending or between-state differences in average spending (Brown et al. 2017; Nelson and Gazley 2014).[28] Since higher-spending states are richer, parents in those states have more capacity to spend on out-of-school enrichment, so we'd expect the spending–outcome slope to be even flatter if we could control for private spending. Conditional on income, however, this story might hold more water. That is, in two places with the same income, parents will do more to compensate out of school if school spending (or quality) is lower. In that case it could be that, conditional on income, if we could control for out-of-school parental investments the spending–outcome slope would be positive. That story seems unlikely when it comes to economically disadvantaged students, however, since their parents have limited ability to increase out-of-school investments.

Higher-spending states are more segregated

In Figure 2 and Appendix Figure 1, we show that, within states, students are exposed to nearly the same average level of per-pupil spending regardless of economically disadvantaged status or race and ethnicity.[29] That analysis is based on district-level data, however. It is possible that, within school districts, economically disadvantaged students are in schools that receive less funding if schools are segregated, though the best available evidence suggests the opposite (Gordon and Reber 2021; 2022; Shores et al. 2023; Chingos and Blagg 2017; Blagg et al. 2022; Hansen et al. 2022). Socioeconomic segregation might also harm economically disadvantaged students through non-funding channels if, for example, higher income parents can contribute to or advocate for school quality more easily than their lower-income counterparts or if concentrated poverty creates additional challenges. While several high-spending states do have high levels of socioeconomic segregation, the correlation between spending and segregation is positive but not terribly strong.[30]

6.2. "PRODUCTIVITY" EXPLANATIONS

To the extent there is not an omitted variable masking a more positive relationship between spending and outcomes, our findings suggest there are important differences in productivity across states. In this section, we discuss potential explanations that, if true, imply that higher-spending states are systematically less productive. It's important to note, though, that this does not necessarily imply that additional funding could not or would not improve outcomes or that the causal estimates are wrong. Even if productivity is lower in some states such that they must spend more to get the same outcomes, it could still be true that additional funding would improve outcomes (more so in the higher productivity states). An important question is whether the source of lower productivity could be identified and addressed to get more bang for buck. This would require not only identifying productivity as an issue but finding the sources of low productivity and developing policies to address them, which is difficult to be sure.

States adjust spending in response to outcomes

One possibility is that the average causal effect of additional spending on student outcomes is similar in magnitude to the JM benchmark, but states increase spending until they reach the desired level of achievement and attainment. That is, spending is endogenous to student outcomes. The political economy of this argument does not strike us as particularly plausible. In theory, such a mechanism could operate through the legal system if courts require states to provide more funding until economically disadvantaged students perform at a certain level, but school finance cases typically focus more on the level and distribution of funding than educational outcomes. And the main driver of differences in spending is per-capita income. In any case, this would still suggest there are important productivity differences across states. To square this endogenous spending story with the observed non-relationship between spending and outcomes (absent an omitted variable explanation), productivity would need to be systematically lower in higher-spending states, such that they need to spend more to reach the target educational outcome.

Something changed

We find evidence that the spending–outcome slope was steeper in the past, and most of the studies reviewed by JM are based on older data, although they don't find evidence of diminishing returns to spending. Focusing on the earliest years in Figures 9 and 10, one might conclude that the estimated slope is close enough to be consistent with the JM benchmark given the confidence interval and the possibility of some omitted variable working in the other direction from socioeconomic status. This explanation would imply that more recent spending increases have not been as effective at improving student achievement or that spending is more productive in the presence of other policies such as No Child Left Behind (NCLB) style accountability—or other policies affecting schools that have changed since the early 2010s.

The "local average" effects in the causal studies don't apply

Causal studies of the type reviewed in JM estimate a "local average treatment effect" which might not apply to other settings. For example, the marginal dollar in high-spending states might be spent differently than the marginal dollar in the causal studies. Existing data are not detailed enough to fully answer this question, but our analysis shows that when states spend more, they buy more of everything. This is likely similar to what happens when districts receive more revenue due to a school finance reform, though Jackson et al.(2016) suggest that SFR-induced spending increases are somewhat more likely to be spent on instruction and support services compared to the average dollar.

Many of the quasi-experimental studies analyze funding changes that are targeted to more disadvantaged school districts which might otherwise be more constrained in how much they spend. If additional funding is more productive for these districts than for the average district, that could explain the divergence between the causal estimates and the spending–outcome slopes at the state level. JM find evidence of "essential heterogeneity," meaning the effect of funding is context specific. We focus on current expenditure here, but another recent paper also finds evidence that the effects of capital spending depend on how the new money is spent (Biasi et al. 2024). Perhaps the spending that higher-spending states do is the type that has smaller treatment effects. In addition, the confidence intervals in our analysis sometimes come close to including 0.03, especially in earlier years as discussed above.

Putting all these factors together, perhaps the slope here is consistent with the JM benchmark, though it is harder to make that case for the high school graduation estimates, since the divergence between the JM benchmark and the slopes we estimate here is larger than for test scores. By this argument, the effects of spending on outcomes are simply small relative to other factors.[31] It would not be surprising if many other factors (including non-school factors such as parental inputs and neighborhoods) are more important than school spending (or school quality) for student outcomes. This was, in some sense, what scholars such as Jencks took from the Coleman data: Schools do not play that large a role in economic inequality, so efforts to reduce inequality should focus on out-of-school factors.

Schools get used to higher spending, lose flexibility

By their nature, the causal studies look for effects around the time that funding has changed, almost always increasing. New money is flexible, so it may be particularly valuable if it allows school leaders to spend flexibly on inputs that are most productive. But over time, additional funding may become "committed," so district and school leaders once again find themselves unable to afford what's needed most. Some evidence, though indirect, points in this direction. For example, some districts hired new staff using temporary COVID-19 funds and now face difficulties downsizing efficiently or preserving effective programs (Roza et al. 2025). When budgets get tight, schools often prioritize keeping existing staff or do layoffs on a last-in-first-out-basis rather than based on performance or student needs. These strategies could arise for a range of reasons and are not necessarily inefficient, but the situation does suggest schools are not able to freely allocate their budgets to the most productive uses. If schools could easily reallocate budgets, why not allocate temporary funding to the most productive inputs and reallocate when the funding runs out? A recent study found substantial benefits of a relatively small increase in funding for schools; based on interviews with principals, the authors speculate that the funding was particularly valuable because it was flexible (Candelaria et al. 2024).

This explanation is also consistent with the steeper spending–outcome slope in the past because per-pupil spending for the highest-poverty districts increased substantially during the "adequacy era" (the late 1990s through about 2010) (Reber et al. forthcoming). During that period until the effects of the Great Recession took hold in the early 2010s, many districts had recently experienced increases in funding; thus, this may have been a time when funding was more flexible.

The policy implications of this explanation, if true, are tricky. It could mean that funding needs to be consistently increased to be effective. Alternatively, policymakers could look for ways to provide more flexible funding or to make it easier to reallocate funding to more productive uses over time, though it is not clear what specific policies would accomplish this.

Political factors affect non-fiscal constraints on how money is spent

States that are politically more Republican (proxied by Trump's share of the two-party vote in 2016) spend less on schools per pupil. This is partly, though not entirely, due to the negative correlation between per-capita income and the Trump vote share. A wide range of policies affecting how schools spend money might differ depending on a state's political leanings, including the power of teachers' unions, various regulations, and curricular choices. Notably, Republican-dominated states have been more likely to adopt evidence-based approaches to reading instruction, and teachers' unions tend to exert more power over education policy in more Democratic states. The union issue is a complicated one, and union power could improve or impede productivity. And some non-fiscal constraints could arguably be placed in the "additional or alternative goals" bucket above. For example, blue state electorates may value offering school staff a good benefits package because they are important members of the community, even if it doesn't improve student outcomes. Perhaps some of the same factors that make it difficult to build high speed rail or enough housing may also make it harder to build an efficient education system.

7. Discussion and policy implications

Quality schools are among the most important potential contributors to intergenerational mobility, labor productivity, and economic growth. How can schools be improved? Many will suggest the solution is obvious: Give schools more money. A meta-analysis of rigorous causal studies of the effects of school spending on educational outcomes (the JM study) finds that an additional $1,000 in school spending for four years increases test scores by 0.03 student-level standard deviations and high school graduation by two percentage points.

Meanwhile, spending on schools is much higher in some places than others. This naturally raises the question of whether the higher-spending places have better educational outcomes, as the causal estimates in the meta-analysis, and common intuition, would suggest. But spending varies across schools and school districts for a wide variety of reasons—when comparing higher- and lower-spending schools or districts, all else is not equal. In particular, the distribution of funding is often compensatory. For example, states often direct more funding to districts that serve more students who are learning English or have disabilities, and those students also tend to have lower test scores. This could mask a positive causal relationship between spending and test scores—a classic omitted variables bias. This is exactly the reason the studies reviewed in JM use policy-induced changes in funding to estimate causal effects.

Our analysis shows that at the state level, the relationship between spending and educational outcomes is nearly flat, and certainly smaller than the estimates in JM would suggest. Although the concerns about omitted variables described above could also apply to this state-level analysis, we argue that this type of analysis is worthwhile for several reasons.

First, the allocation of spending across districts within states or schools within districts is quite complex, so it is difficult to know even the sign of the omitted variables bias. On the other hand, the potential omitted variables in a cross-state analysis are easier to assess. The primary driver of differences in spending at the state level is per-capita income, which would tend to bias up the relationship between spending and outcomes relative to the causal effect. The main potential omitted variable working in the other direction is input prices: States where per-capita incomes are higher may need to pay more for the same quality of staff. But adjusting for differences in wages for college-educated workers does not affect the picture much.

Second, spending differences between states are large: Average spending in some states is more than double that in other states. If "money matters" a lot, it should be possible to see differences in outcomes when spending differences are large. This is particularly the case for economically disadvantaged students who, while not rich themselves, experience higher school spending when they live in a richer, higher-spending state, compared to their economically disadvantaged counterparts living in poorer, lower-spending states.

Third, between-state spending differences are policy-relevant. For decades, policymakers and advocates focused on reducing school funding inequities within states, and economists used the funding changes those efforts produced to estimate causal effects of school funding on educational outcomes. But most of the variation in spending across school districts occurs between, rather than within, states. The importance of state-level factors, which have been central since at least the 1960s (Cascio and Reber 2013; Reber et al. forthcoming), has only grown as spending within states has become more equitable (Shores et al. 2023).

It is not that advocates haven't recognized the importance of between-state differences in spending. Rather, they focus on within-state factors because that is where the action is: Nearly all state constitutions have relevant provisions related to funding for schools, and one cannot sue New Jersey to provide funding for a school district in Arkansas. Researchers have also long noted the importance of between-state variation. One of the first studies of school finance reforms pointed out that two-thirds of the variation across districts in per-pupil spending was between states and only one-third within states (Murray et al. 1998). Congress added the Education Finance Incentive Grant (EFIG) to the Title I program in 1994 (though it was not funded until 2002) to encourage states to increase average spending from state and local funds. The program was poorly designed and could not be expected to affect states' incentives much but nevertheless demonstrates federal policymakers' recognition of the between-state component of funding inequality (Gordon and Reber 2023).

Finally, and most important, we have highlighted here that economically disadvantaged students in high-spending states do not have systematically stronger academic achievement or educational attainment. We hope this evidence can refocus attention on how to improve the productivity of spending for schools to improve educational outcomes. The "does money matter" debate was never really about whether schools matter or could function without funding. Rather, it is a question of emphasis. To improve schools, should focus be primarily on the level and distribution of funding? Should Arizona be encouraged to spend more like Illinois? Should the federal government provide more funding to close that gap? Or should policymakers at all levels focus more on understanding and improving the "production function for education," changing incentives for teachers and schools, and identifying and addressing barriers to spending money in productive ways? Of course, these are not mutually exclusive approaches, but attention and resources are scarce. Although we do not think our findings argue for turning away from school funding to improve quality altogether—especially in schools with high needs and little funding—they do suggest well-funded schools don't always perform better.

References

Baker, Bruce D, Mark Weber, Ajay Srikanth, Robert Kim, and Michael Atzbi. 2018. The Real Shame of the Nation.

Biasi, Barbara, Julien M. Lafortune, and David Schönholzer. 2024. "What Works and For Whom? Effectiveness and Efficiency of School Capital Investments Across the U.S." Preprint. National Bureau of Economic Research, January. https://doi.org/10.3386/w32040.

Blagg, Kristin, Julien Lafortune, and Tomas Monarrez. 2022. "Measuring Differences in School-Level Spending for Various Student Groups." Urban Institute, October 12. https://www.urban.org/research/publication/measuring-differences-school-level-spending-various-student-groups.

Brown, Catherine, Scott Sargrad, and Meg Benner. 2017. Hidden Money. Center for American Progress. https://www.americanprogress.org/article/hidden-money/.

Burtless, Gary, ed. 1996. Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success. Brookings Institution Press. https://www.jstor.org/stable/10.7864/jj.16971619.

Candelaria, Christopher A., Angelique N. Crutchfield, and Dillon G. McGill. 2024. "The Impact of Additional Funding on Student Outcomes: Evidence from an Urban District Using Weighted Student Funding and Site-Based Budgeting." Preprint. https://doi.org/10.26300/KBQ5-0B25.

Carnevale, Anthony P., Stephen J. Rose, and Ban Cheah. 2011. The College Payoff. The Georgetown University Center on Education and the Workforce. https://files.eric.ed.gov/fulltext/ED524300.pdf.

Cascio, Elizabeth U, and Sarah Reber. 2013. "The Poverty Gap in School Spending Following the Introduction of Title I." American Economic Review 103 (3): 423–27. https://doi.org/10.1257/aer.103.3.423.

Chingos, Matthew, and Kristin Blagg. 2017. "Do Poor Kids Get Their Fair Share of School Funding?" Urban Institute. https://www.urban.org/research/publication/do-poor-kids-get-their-fair-share-school-funding.

Coleman, James S., Ernest Q. Campbell, Carol J. Hobson, et al. 1966. Equality of Educational Opportunity. U.S. Dept. of Health, Education, and Welfare, Office of Education. http://files.eric.ed.gov/fulltext/ED012275.pdf.

Costrell, Robert, Eric Hanushek, and Susanna Loeb. 2008. "What Do Cost Functions Tell Us About the Cost of an Adequate Education?" Peabody Journal of Education 83 (2): 198–223. https://doi.org/10.1080/01619560801996988.

Gordon, Nora E., and Sarah J. Reber. 2022. "School vs. District Level Views of School Spending Inequality and Progressivity: Evidence from Florida and Illinois." Peabody Journal of Education 97 (4): 412–26. https://doi.org/10.1080/0161956X.2022.2107373.

Gordon, Nora, and Sarah Reber. 2021. Addressing Inequities in the US K-12 Education System. Rebuilding the Post-Pandemic Economy, edited by Melissa S. Kearney and Amy Ganz. Washington, DC: Aspen Institute. https://doi.org/10.5281/ZENODO.14057550.

Gordon, Nora, and Sarah Reber. 2023. "Funding High-Poverty School Districts: Federal Policy Tools and the Limits of Incentives." Education Finance and Policy 19 (1): 169–81. https://doi.org/10.1162/edfp_a_00408.

Handel, Danielle Victoria, and Eric A. Hanushek. 2023. "US School Finance: Resources and Outcomes." In Handbook of the Economics of Education, vol. 7. Elsevier. https://doi.org/10.1016/bs.hesedu.2023.03.003.

Hansen, Michael, Jon Valant, and Nicolas Zerbino. 2022. Do School Districts Allocate More Resources to Economically Disadvantaged Students? Brookings Institution. https://www.brookings.edu/articles/do-school-districts-allocate-more-resources-to-economically-disadvantaged-students-2/.

Hanushek, E. A. 1997. "Assessing the Effects of School Resources on Student Performance: An Update." Educational Evaluation and Policy Analysis 19 (2): 141–64. https://doi.org/10.3102/01623737019002141.

Harris, Douglas N., Lihan Liu, Nathan Barrett, and Ruoxi Li. 2020. Is the Rise in High School Graduation Rates Real? High-Stakes School Accountability and Strategic Behavior. Brookings Institution. https://www.brookings.edu/wp-content/uploads/2020/02/Is-the-Rise-in-High-School-Graduation-Rates-Real-FINAL.pdf.

Jackson, C. Kirabo, and Claire L. Mackevicius. 2024. "What Impacts Can We Expect from School Spending Policy?

Evidence from Evaluations in the United States." American Economic Journal: Applied Economics 16 (1): 412–46. https://doi.org/10.1257/app.20220279.
Jackson, Kirabo, Rucker Johnson, and Claudia Persico. 2016. "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms." The Quarterly Journal of Economics, 157–218. https://doi.org/doi:10.1093/qje/qjv036.
Jencks, Christopher. 1972. Inequality: A Reassessment of the Effect of Family and Schooling in America. Basic Books. https://archive.org/details/inequalityreasse00jenc/page/n5/mode/2up.
Kozol, Jonathan. 2012. Savage Inequalities: Children in America's Schools. Reprint edition. Crown. https://dn790009.ca.archive.org/0/items/SavageInequalities-Eng-JonathanKozol/savage-inequalities-jonathan-kozol.pdf.
Mattoon, Richard. 2004. "School Funding Ten Years after Michigan's Proposal A: Does Equity Equal Adequacy?" Chicago Fed Letter, no. 203 (June).
Meer, Jonathan, and Hedieh Tajali. 2021. "Charitable Giving Responses to Education Budgets." Preprint. National Bureau of Economic Research, October. https://doi.org/10.3386/w29331.
Murray, Sheila E., William N. Evans, and Robert M. Schwab. 1998. "Education-Finance Reform and the Distribution of Education Resources." The American Economic Review. https://www.jstor.org/stable/117006?seq=1.
Nelson, Ashlyn Aiko, and Beth Gazley. 2014. "The Rise of School-Supporting Nonprofits." Education Finance and Policy 9 (4). https://www.jstor.org/stable/educfinapoli.9.4.541.
Owens, Ann, Sean F. Reardon, Demetra Kalogrides, Heewon Jang, and Thalia Tom. 2022. Measuring Segregation with the Normalized Exposure Index. Stanford Education Data Archive. https://edopportunity.org/papers/Measuring-Segregation-with-the-Normalized-Exposure-Index_Rnd6.pdf.
Reardon, Sean F., Andrew D. Ho, Benjamin R. Shear, Demetra Kalogrides, and Jim Saliba. 2024. "Stanford Education Data Archive (Version 5.0)." https://purl.stanford.edu/cs829jn7849.
Reber, Sarah, Beyond Deng, and Gabriela Goodman. forthcoming. "School Funding Equity since 1976." The Brookings Institution.
Roza, Marguerite, Katharine Meyer, and Isabel McMullen. 2025. What Comes next Now That Pandemic Aid for Education Has Ended? Brookings Institution. https://www.brookings.edu/articles/what-comes-next-now-that-pandemic-aid-for-education-has-ended/.
Ruggles, Steven, Sarah Flood, Matthew Sobek, et al. 2025. "IPUMS USA: Version 16.0." Version 16.0. With United States Census Bureau. Minneapolis, MN: IPUMS. https://doi.org/10.18128/D010.V16.0.
Shores, Kenneth A., Christopher A. Candelaria, and Sarah E. Kabourek. 2023. "Spending More on the Poor? A Comprehensive Summary of State-Specific Responses to School Finance Reforms from 1990–2014." Education Finance and Policy 18 (3): 395–422. https://doi.org/10.1162/edfp_a_00360.
Tyner, Adam. 2023. Think Again: Is Education Funding in America Still Unequal? The Thomas B. Fordham Institute. https://fordhaminstitute.org/national/research/think-again-education-funding-america-still-unequal.

Endnotes

1 References to this phrase predate the publication of a Brookings Institution volume edited by Gary Burtless titled "Does Money Matter? The Effectiveness of School Resources on Student Achievement and Adult Success" in 1996, but that influential volume may have increased the use of this unfortunate terminology (Burtless 1996).

2 Another strand of analysis attempts to estimate the cost of providing an "equitable" or "adequate" education, or the cost of meeting academic standards, for schools serving populations with varying educational needs, often as part of school finance litigation (Mattoon 2004). For example, Baker et al. (2018) use a "cost model" approach to estimate the cost of reaching average student achievement based on student and other characteristics of school districts; they find a positive state-level relationship between "funding gaps" (based on the model) and "outcome gaps" (based on test scores). Determining the minimum cost of meeting educational targets is a challenging task, and the cost modeling approach has both conceptual and practical limitations (Costrell et al. 2008). We take a simpler approach, examining how actual spending relates to outcomes for different groups.

3 Total revenue is all the revenue collected by school districts, including from local taxes and transfers from state and federal governments; total expenditure includes all spending by the school district and is generally approximately equal to total revenue over longer time frames since school districts cannot run deficits in the long run.

4 Current expenditure also excludes expenditures for adult education, community services, and other nonelementary-secondary programs.

5 This ratio increased somewhat since the 1990s, when it was about 1.7.

6 See Appendix Table 1 for simple regressions predicting per-pupil spending. The magnitudes of these estimates are somewhat sensitive to whether New York is included, but the pattern is similar.

7 For this figure, we use the Census of Governments/F33 data but at the district level. For the first panel, we use the weighted average of current expenditure, weighted by total enrollment. The second panel is the same thing, weighted by the estimated number of students living in poverty. To estimate the number of students in poverty, we multiply enrollment by the child poverty rate at the district level from Small Area Income and Poverty Estimates (SAIPE) available from the Census Bureau.

8 The Census of Government/F33 collects finance data at the school district level—that is the government responsible for taking in revenue and making expenditures for schools. Schools do tend to be segregated by socioeconomic status, so spending in schools attended by students in poverty and not in poverty could differ even if spending in districts is similar. Analyses of recently available school-level spending data suggests that, within districts, per-pupil spending is similar or higher in higher-poverty schools compared to lower-poverty schools. Overall, spending at the school or district level varies considerably, but on average it does not appear to be very correlated with poverty.

9 This appears at odds with a widely circulated analysis arguing that spending in predominately Black and Hispanic districts was $23 billion less than spending in predominately white school districts, even though total enrollment in the two categories of districts was similar. That analysis excluded federal revenue, which disproportionately benefits lower-income districts (which are also more likely to be predominately Black and Hispanic) and is sensitive to how spending is adjusted to account for price differences and other analytic choices (Gordon and Reber 2021).

10 This is challenging, though, because the quasi-experimental variation that identifies each effect doesn't necessarily correspond to four years of additional spending, depending on when spending changed and when outcomes were measured.

11 Specifically, if we regress average per-pupil spending from 2015-16 through 2018-19 on spending in 2018-19, the coefficient is 0.966, indicating that for each additional $1,000 in spending in 2018-19, average spending in the same state was $966 higher over four years.

12 The coronavirus pandemic had substantial effects on both school spending—due to an influx of federal emergency funding—and student achievement. Standardized testing was disrupted in 2020. In addition, the school funding data are released with a significant lag. For these reasons, we focus primarily on pre-pandemic data; however, the findings are broadly similar in more recent years where data are available.

13 CWIFT is designed to facilitate comparisons of relative spending across areas. After adjusting spending using CWIFT, we multiply spending by a year-specific constant so that the national enrollment-weighted average of the adjusted per-pupil spending is the same as the enrollment-weighted average of actual per-pupil spending.

14 Here and throughout, we exclude Washington, D.C. and Alaska from the analysis. Washington, D.C. is a city (not including the suburbs), not a state, so is not comparable to other states. Alaska has particularly high per-pupil costs due to the extreme sparsity of the population. Neither jurisdiction enrolls a large share of students.

15 Three states (New York, New Mexico, and Vermont) were missing SEDA data entirely for 2018. To avoid losing these states from the SEDA sample we impute the NAEP scores for these states in the SEDA data.

16 Not all states have data for all grades and subjects, so there are some differences in which states are in the sample across the estimates. However, New York is the only state that sometimes has a significant effect on the estimate, so we exclude it consistently.

17 We do not control for per-capita income here since it is not race-specific, but doing so does not change the results much. Nor do we control for the racial composition of enrollment since we are examining each group separately.

18 A full cost-benefit accounting would require information about the causal returns to schooling induced by additional spending as well as other benefits of spending and is beyond the scope of this report. However, the cost per additional high school graduate is $200,000 ($1,000 for four years produces an increase in high school graduation of two percentage points); the additional lifetime earnings for a high school graduate compared to a drop-out are typically higher than that (Carnevale et al. 2011), and the spending likely has benefits beyond high school graduation per se.

19 We accessed the ACS data through Integrated Public Use Micro Sample (IPUMS) (Ruggles et al. 2025).

20 In theory, we could calculate the status dropout rate by socioeconomic status for the 17-year-olds since they are typically still living with their parents or guardians, but in practice the sample sizes are too small. We instead rely on the ACGR estimates to separate the analysis by student characteristics.

21 For this reason, we exclude Colorado, Nebraska, Vermont, and Washington from the SEDA analysis and Oregon from the NAEP analysis (in addition to Alaska and New York).

22 Average spending has increased over time, so a $1,000 difference is smaller proportionally in later years. This does not appear to explain the downward trend in Figure 9: The trend is similar if we use the log of per-pupil expenditure instead of the level of per-pupil expenditure.

23 This finding holds whether New York is included in the top quintile or not. The other categories are instructional support services, administrative support, and "other" (which accounts for almost half of support services).

24 We also drop Ohio from this figure because it is a substantial outlier in the other staff category, most likely due to a reporting error.

25 Population density is technically not an "input price," but it increases the "price" of bringing enough students to a single location to operate a school at sufficient size and, critically, is beyond the control of schools (assuming all students have a legal right to a free public education). This is equivalent to differences in prevailing wages.

26 School size reflects policy choices in addition to constraints related to population density and transportation logistics, so this is an imperfect proxy for "price" differences. States with higher population density spend more and those with more small schools spend less, on average.

27 For IEP prevalence, we use the number of 3- to 21-year-olds served by the Individuals with Disabilities Education Act (IDEA) divided by enrollment. (The age range for the numerator is not the same as for enrollment, but this is how the National Center for Education Statistics (NCES) calculates the identification rate, and it should provide a reasonably consistent measure across states.) A $1,000 increase in per-pupil spending is associated with an increase in IDEA participation of 0.35 percentage points.

28 A Center for American Progress (CAP) report (Brown et al. 2017) found that in 2013-14, the richest 50 PTAs spent an average of $867 per enrolled student. That is substantial but small compared to the cross-state differences, and those PTAs served one-tenth of a percent of all students; the vast majority of PTAs spend much less than that. Meer and Tajali (2021) find evidence that private giving to teacher GoFundMe campaigns increases in response to budget cuts, but the magnitudes are inconsequential.

29 Whether this explanation belongs here or in the "productivity" category is a bit of a judgment call. Segregation is partly determined by geography and demographics, but policy also plays an important role. If segregation is bad for outcomes and states pursue or allow policies that increase segregation, those policies are reasonably thought of as contributors to low productivity rather than an "omitted variable" over which policymakers have no control.

30 We constructed two measures of segregation between students who are and are not eligible for free and reduced price lunch across schools within states (ignoring district boundaries): the dissimilarity index and the normalized exposure index (Owens et al. 2022). The two measures are highly correlated with each other (0.98) and weakly correlated with per-pupil spending (0.21).

31 It is also possible that some of the causal estimates are biased. Because redistributing a fixed pie is difficult, school finance reforms are commonly implemented during good economic times when it is possible to increase total spending. Perhaps some of the studies that use that type of variation in spending to identify causal effects are picking up the effects of economic growth. Or states that adopt school finance reforms also make other changes to educational or other policies that disproportionately benefit more disadvantaged students. This is difficult to assess since there are many studies, and the point of the meta-analysis is to glean more information by combining estimates. But a meta-analysis is only as good as the studies that contribute to the estimates. The studies summarized in JM all attempt to address these issues, but some may fall short.

BROOKINGS

1775 Massachusetts Ave NW,
Washington, DC 20036
(202) 797-6000
www.brookings.edu