

Can school finance reforms improve student achievement?

March 2016 | Julien Lafortune, Jesse Rothstein, and Diane Whitmore Schanzenbach

Introduction

The achievement gap between rich and poor students in the United States is large—roughly twice as large as the gap between black and white students—and growing.¹ On average, children from low-income families have lower test scores and rates of high school and college completion, and eventually lower earnings than their peers from higher income families. Addressing these disparities is key to breaking the cycle of poverty and inequality across generations.

Recent education policy discussions have started from the premise that one can't just “throw money at the problem.” Instead, solutions to the achievement gap must come from accountability, school choice, or other reforms designed to obtain better outcomes using a fixed set of resources. But largely outside of the public eye, a number of states have made dramatic changes to their finance systems to redirect funding to low-income school districts. Taken together, these reforms are the largest anti-inequality education effort in this country since school desegregation. Are school finance reforms merely a waste of effort? Or does money really matter, and does funding reform have the ability to make a dent in the achievement gap?

Our recent paper, “School Finance Reform and the Distribution of Student Achievement,” explores these questions.² We examine the impacts of so-called “adequacy”-based finance reforms, designed to ensure that low-income schools have adequate funding to achieve desired outcomes. These reforms began in 1990 in Kentucky, with the Kentucky Education Reform Act. Since then, 26 additional states have enacted their own reforms. We draw on rarely used student-level data from the National Assessment of Educational Progress, or NAEP, to identify the effects of these reforms on the relative achievement of students in high- and low-income school districts.

The importance of additional school resources for student achievement has long been debated, with many researchers arguing that school resources do not matter much in explaining differences in student achievement between schools, and therefore that money does not matter.³ But these studies have generally compared districts or states that spent

more to those spending less, without the ability to control for the factors that determined the disparities in funding. As a result, the estimated effect of resources is confounded by other factors (such as student need) and may not identify the true causal effect of additional funding. By examining state-level reforms, we are able to identify the causal effects of funding through reform-induced changes in the resources available to districts. Importantly, these changes in funding are driven by shifts in state policy rather than unobserved local determinants that might confound the effect of funding. We are therefore able to identify the policy-relevant effect of funding: What is the impact of changes in state policies that send funding to low-income districts, often with few or no strings attached?

We show that school resources play a major role in student achievement, and that finance reforms can effect major reductions in inequality between high- and low-income school districts. Accordingly, while states that did not implement reforms have seen growing test score gaps between high- and low-income school districts over the last two decades, states that implemented reforms saw steady declines over the same period. The effect is large: Finance reforms raise achievement in the lowest-income school districts by about one-tenth of a standard deviation, closing about one-fifth of the gap between high- and low-income districts. There is no sign that the additional funds are wasted. On the contrary, our estimates indicate that additional funds distributed via finance reforms are more productive than funds targeted to class size reduction.

School finance reforms increase school spending in low-income districts

Traditionally, U.S. public schools have been funded through local property taxes. Because wealthy families tend to live in communities with larger tax bases and fewer needs, their children's schools have typically spent much more per student than have schools in poor districts.

Beginning in the 1970s, many states reformed their school finance systems to address this inequality. Often reacting to mandates from courts that found local finance systems unconstitutional, states have moved away from funding based primarily on property taxes and have implemented state aid formulas that direct more money to low-income and low-tax-base school districts.

These reforms can be divided into two waves:

In the 1970s and the 1980s, state school finance reforms were focused on equity, or on reducing funding gaps between districts. These reforms often involved redistribution from high income or high tax base districts to low income or low tax base districts. They have been much studied,⁴ and some scholars have argued that they induced political dynamics that led to reduced funding across the board.⁵

In 1989, the Kentucky Supreme Court ruled in *Rose v. Council for Better Education* that “each child, every child ... must be provided with an equal opportunity to have an adequate education.” This set off a second wave of reforms, beginning in Kentucky and followed by 26 other states, focused on “adequacy” rather than on “equity.” The goal was to ensure an adequate level of funding in low-income school districts, regardless of whether that was more than, the same as, or less than funding levels in high-income districts.⁶ As a consequence, states facing adequacy standards were much less prone to achieve equality by reducing overall funding; instead, they were forced to raise absolute and relative funding in the poor districts. However, there has been little evidence available about their actual impacts. Our new paper helps to close that gap.

Average revenue per pupil in elementary and secondary schools in the United States amounts to roughly \$13,000 a year. In 2011, low-income districts spent an average of 8 percent more per pupil than did high-income districts in states that have implemented reforms. This is a dramatic reversal from historical experience—as recently as 1990, low-income districts in these states averaged 9 percent less than high-income districts.⁷

In order to estimate how much adequacy-based school finance reforms have contributed to this reduction, we use an “event study” design, which essentially looks at the result of three successive differences for each school finance reform. We compare outcomes in high-income and low-income districts (difference #1), in states where school finance reforms have been implemented and where reforms haven’t been implemented (difference #2), and before and after the reform (difference #3). This identification strategy allows us to disentangle the impact of school finance reforms from other contemporaneous changes in school funding and from other differences between states that did and did not implement finance reforms.

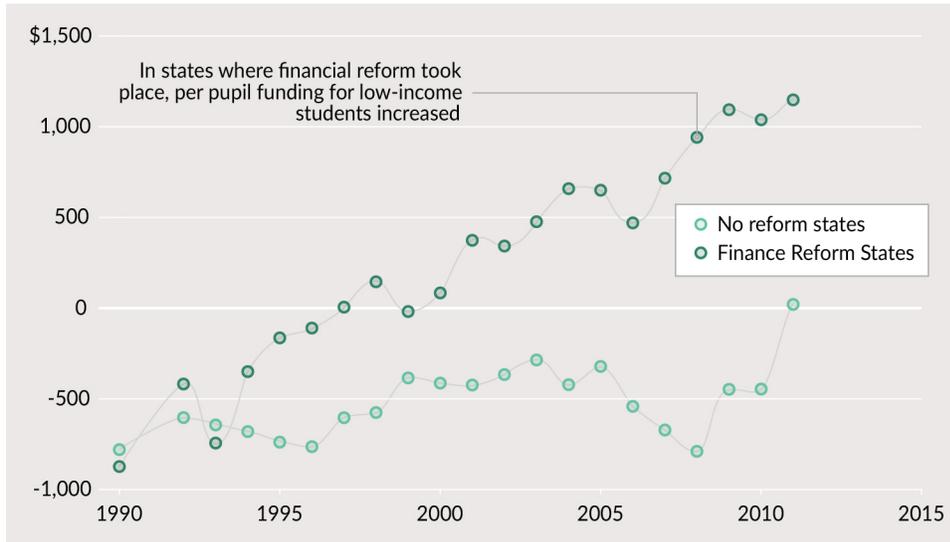
Figure 1 shows the evolution of funding gaps between high and low-income districts. We divide states into two groups: those that have reformed their finance systems since 1990 and those that have not. In 1990, rich districts in both groups of states were spending an average of \$750 more per year per pupil than poor districts. (Average spending between 1990 and 2011 was about \$10,000 per pupil.) Over the next two decades, not much changed in the states that did not reform their finance systems: The gap remained \$800 in 2008, narrowing only during the 2009-2011 state fiscal crisis and never doing better than parity. By contrast, the states that implemented reforms saw dramatic reversals, so that by 2011 they spent an average of \$1,150 more per pupil in low-income than in high-income districts.

Our more formal event study analysis confirms this basic pattern, while zeroing in on the timing of school finance reforms to ensure that we distinguish the effects of these reforms from other factors. It shows that state-level school finance reforms markedly increased the progressivity of school spending, and that this increase was not accomplished by redistributing money from rich to poor districts, but rather by increasing state funding across the board, with larger increases in low-income districts.

FIGURE 1

Evolution of the funding gap between low-income and high-income school districts

Funding per pupil for students in low-income districts minus funding per pupil in high-income districts



Source: Authors' calculations using our database of school finance reforms, district-level finance data from the National Center for Education Statistics' (NCES) Common Core of Data (CCD) school district finance files and the Census of Governments, and district household distributions from the 1990 Census School District Data Book.

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Increasing school spending helps students achieve better outcomes

Did this sharp and immediate increase in funding for low-income school districts lead to better student outcomes? This is the most important question about school finance reform, but has been the hardest to answer due in large part to a shortage of nationally comparable student achievement data. We take advantage of rarely-used student-level data from the National Assessment of Educational Progress, which are ideally suited for this purpose.

We find that finance reforms did indeed produce higher achievement for students in low-income school districts, helping to reduce the achievement gap between high- and low-income districts. (See Figure 2.) In states that did not implement reforms, test scores in low-income districts deteriorated relative to high-income districts between 1990 and 2011, a reflection of rising inequality over this period. But in states that implemented reforms, the gap closed slightly.

Again, the event study strategy confirms this basic story. Ten years after a reform, test scores in low-income school districts had risen by about 0.08 standard deviations relative to those in higher-income districts. Reforms raised relative funding in the low-income districts by about \$500 per pupil, which implies that increasing funding by \$1,000 per pupil—about 10 percent of average funding over the period—raises test scores by 0.16 standard deviations.

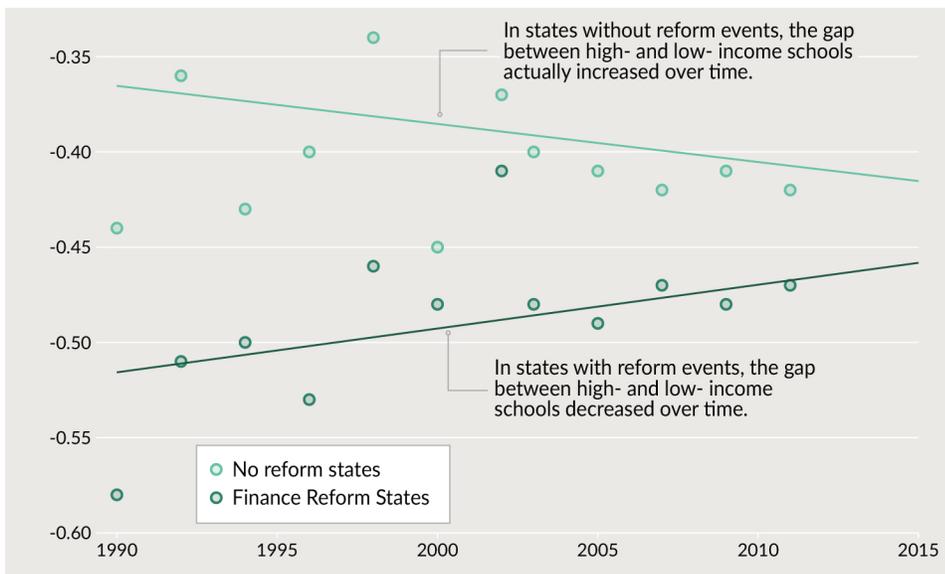
One way to get a sense of the size of this impact is to compare it with the effect of other investments of similar size. The effect that we estimate of school finance reforms is twice as large as the effect implied by a \$1,000 investment in class-size reduction, as measured by Project STAR—a much-studied four-year experiment in the state of Tennessee in the mid-1980s. The school finance reform impact is also large when we compare the costs of the extra funds to the additional earnings that students benefitting from those funds can be expected to earn later in life.

One important result of our study, therefore, is that granting additional funds to school districts, largely without strings, does not lead to the money being wasted—the funds are used productively. This does not necessarily mean that districts spend the money as efficiently as possible—it is possible that some alternative use would have been even more productive. But their usage compares favorably to other activities that might have been thought to contribute importantly to student achievement (and that, indeed, the cost of the additional funds is outweighed by the benefits on student learning). The extra funding has important impacts that, while not enough to close the achievement gap between high- and low-income districts, can contribute toward narrowing it. Indeed, we find that a reform closes about one-fifth of the pre-reform gap. There are no other policies that have been implemented at a large scale that have had impacts of this size.

FIGURE 2

Evolution of the achievement gap between low-income and high-income school districts

Mean test scores in high-income districts minus mean test scores in low-income districts



Source: Authors' calculations using our database of school finance reforms, student achievement data from the national assessment of Educational Progress (NAEP), and household income distributions from the 1990 Census School District Data Book.
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A final result of our study is less encouraging. While school finance reforms did successfully reduce achievement gaps between high- and low-income districts, they did not have measurable impacts on gaps between high- and low-income students. This is

because low-income students (and, for that matter, minority students) are not overwhelmingly concentrated in low-income school districts, so an improvement in the relative performance of those districts does relatively little for the relative performance of low-income students. To make substantial progress on closing overall achievement gaps, policies to address disparities in outcomes within school districts are still needed.

Conclusion

School finance reforms are perhaps the largest national effort we have made to increase equality of educational opportunity since the school desegregation movement. Although national attention has been focused elsewhere, there have been dramatic improvements in equality of school funding over the last two decades, many spurred by a series of state court rulings demanding more adequate school funding. We show that these reforms translated into sharp and immediate increases in funding in low-income districts.

We also find that reforms lead to improvements in student achievement in low income districts—that money matters for student achievement. Our findings are consistent with a new strand of research⁸ revisiting the impact of school resources on student achievement, and generally finding positive effects.

There are still 22 states that have not implemented school finance reforms since 1990.⁹ These states in general have larger gaps in funding between high- and low-income districts that have not shrunk much in two decades. By moving aggressively to ensure adequate funding in low-income districts these states could markedly reduce funding gaps and move toward equal opportunity and more equitable outcomes.

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Endnotes

- 1 Here, “rich” and “poor” families are those at the 90th and 10th percentiles of the income distribution, respectively. See Sean F. Reardon, “The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations,” in Greg J. Duncan and Richard Murnane, eds., *Whither Opportunity? Rising Inequality, Schools, and Children’s Life Chances* (New York: Russell Sage Foundation, 2011).
- 2 Julien Lafortune, Jesse Rothstein, and Diane Whitmore Schanzenbach, “School Finance Reform and the Distribution of Student Achievement,” *Working Paper No. 22011*, National Bureau of Economic Research (2016).
- 3 See, for example, Eric A. Hanushek, “School resources,” in Eric A. Hanushek and Finis Welch, eds., *Handbook of the Economics of Education*, vol. 2. (The Netherlands: North Holland, 2006).
- 4 Eric A. Hanushek and Alfred A. Lindseth, *Schoolhouses, Courthouses and Statehouses: Solving the Funding-Achievement Puzzle in America’s Public Schools* (Princeton: Princeton University Press, 2009); Sean Corcoran and William N. Evans, “Equity, Adequacy, and the evolving State Role in Education Finance,” in Helen F. Ladd and Margaret E. Goertz, eds., *Handbook of Research in Education Finance and Policy*, 2nd edition (New York: Routledge, 2015); David Card and A. Abigail Payne, “School finance reform, the distribution of school spending, and the distribution of test scores,” *Journal of Public Economics* 83 (1) (2002): 49-82; Sheila E. Murray, William N. Evans, and Robert M. Schwab, “Education-finance reform and the distribution of education resources,” *American Economic Review* 88 (4) (1998): 789-812.
- 5 See, for example, William A. Fischel, “Did Serrano cause Proposition 13?,” *National Tax Journal* 42 (4) (1989): 465-473; Caroline M. Hoxby, “All school finance equalizations are not created equal,” *Quarterly Journal of Economics* 116 (4) (2001): 1189-1231.
- 6 We record that the following states implemented school finance reforms between 1990 and 2011: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Idaho, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Tennessee, Texas, Vermont, Washington, West Virginia, Wyoming.
- 7 High- and low- income districts are defined here as districts with average household incomes in the top and bottom quintiles, respectively, of the state’s distribution.
- 8 See, for example, David P. Sims, “Suing for your supper? Resource allocation, teacher compensation, and finance lawsuits,” *Economics of Education Review* 30 (5) (2011): 1034-1044; Raj Chetty and others, “How does your Kindergarten classroom affect your earnings? Evidence from Project STAR,” *Quarterly Journal of Economics* 126 (4) (2011): 1593-1660; C. Kirabo Jackson, Rucker C. Johnson, and Claudia Persico, “The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms,” *Quarterly Journal of Economics* 131 (1) (2016): 157-218.
- 9 We do not count Hawaii or the District of Columbia, each of which has only a single school district.

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