



# Parallel Lives, Different Outcomes

## A Twin Study of Academic Productivity in U.S. School Districts

By Robert Hanna and Bo Morris July 9, 2014

Twin studies in the social sciences are powerful tools. When we follow twins raised in different places, we can explore the role that environmental influences play in their development compared to what is inherent and unique to the individual twins. Twins with different life outcomes reveal a great deal about what factors help some people achieve success.

This paper applies a similar type of research methodology to explore what happens to similar groups of children educated in different school districts. In this case, our “twins” are groups of students who live in the same state in similar geographies and who share certain demographic characteristics. For this report, “twin districts” have very similar sizes and they have the following in common:

- The proportion of students who are from low-income families
- The proportion of students who have limited English proficiency or are English language learners
- The proportion of students who receive instruction through individualized educational programs

Our twin districts, however, differ in terms of per-pupil spending and revenues.

The goal of this paper was to study twin districts and use the data culled to provide recommendations for how districts can best leverage their school funding investments—in other words, achieve a bigger bang for their educational buck.

This paper accompanies a CAP report on a much larger set of U.S. school districts, titled “Return on Educational Investment: 2014. A District-by-District Evaluation of U.S. Educational Productivity.” For that report, we compared almost 7,000 districts across the United States in terms of their expenditures and levels of student achievement. This shorter analysis builds off of that work and relies on data from 2009-10 school year. Our analysis adjusts for cost-of-living differences.<sup>1</sup> Student achievement data comes from the Department of Education’s *EDFacts* database of state assessment results, and financial data comes from the department’s Local Education Agency Finance Survey.<sup>2</sup> More on our study approach is in the methodology section below.

Based on our in-depth look at twin districts and our subsequent analysis of the data, we came away with the following findings:

- **When it comes to education, spending does not always equal results.**

Our findings suggest that—at least when it comes to math and reading scores—money is not always spent in ways that boost those outcomes, even when holding demographics constant. Of the more than 400 twin districts studied, we found the higher-spending twin spent on average \$1,600 more per student to educate similar groups of students to similar achievement levels.<sup>3</sup> To put it more simply, some of the districts were getting a bigger bang for their education buck than others. We also found a number of districts that spent equal amounts of money, had the same demographics, but ended up with different levels of student achievement. This again suggested significant differences in productivity among districts.

- **There are significant funding inequities between demographically similar districts.**

Districts rely heavily on local financial resources and that means that funding is often inequitable. In the United States, a district's schools are primarily funded through taxes on local property values, which have a lot to do with a community's affluence. Within each set of twins, one district typically collected on average more than \$1,000 more per student from local resources, primarily property taxes. States and the federal government generally do not fill this funding gap, and as a result, some districts have far fewer resources than others, even though they serve similar student populations.

- **Districts have limited control over their own expenditures.**

Districts have little authority when it comes to exactly how funds will be spent, which significantly influences how these districts can—or cannot—boost productivity. As William Crockett, superintendent of Mound Bayou Public Schools, a small rural district in Mississippi, put it: “We don’t have that flexibility ... It’s kind of a simple budgetary thing that we have to do. We don’t have that flexibility to say we’ll do this or we can do this and it’ll save a whole bunch of money.”

What explains this lack of spending flexibility? First, there are strings attached to state and federal grants, and districts must regularly demonstrate that they have indeed spent money on allowable expenses. Second, most of districts’ budgets are allocated to employee salaries and benefits. About 60 percent of districts’ budgets are committed to instructional costs, which are primarily educators’ salaries. That does not leave much room for district leaders to invest their financial resources in more productive ways.

## Methodology

Using data available from the U.S. Department of Education, we compiled a dataset with over 7,000 K-12 districts from over 15,000 local education agencies across the country. All data on spending and achievement was from the 2009-10 school year. In our analysis of spending and achievement evaluations, we only include regular K-12 districts that had more than 300 students taking tests in either math or English language arts during the 2009-10 school year. Data on student characteristics were mostly from that school year, but we substituted missing demographic information with data from surrounding years; for example, 2008-09 or 2010-11.

In this analysis, we identified 424 pairs of districts to analyze from this larger dataset. We restricted our analysis to districts with fewer than 50,000 students. We assigned districts to one of several bins in a few categories—student enrollment and selected student characteristics—and we also matched on their urban or rural designation. Districts ranged in size and urban characteristics. See Table 1 for descriptive statistics about

the sample. Given that tests and proficiency definitions differ across states, we only identify and compare twin districts within the same state. We distinguish between twins based on which one spends more per student.

We refer to a twin as being more productive if it spends less money to support the same level of student achievement.

Additionally, we also completed interviews with 20 district superintendents from across the United States.<sup>4</sup> Most of the interviews were conducted by phone, but two were done via email exchange. Some superintendents were from our set of twin districts, and others were not. During the interviews, district leaders offered their perspectives on the relationship between spending and academic outcomes. Moreover, they discussed what control they have over their districts' spending and what spending constraints they face from outside governing bodies—the state, the federal government, and school boards.

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### So why are some districts more productive than others?

The question is not easy to answer. For one, our approach to school productivity takes a very limited view of student outcomes. Math and reading test scores do not come close to measuring all that students should learn in school. Students should also, for instance, develop knowledge of American history and a foreign language along with critical thinking skills. For another, the federal survey we used for our productivity analysis did not include financial information at the programmatic level, so we could not explore how districts differed in the programs or services that they provide.

Finally, the data we used in this analysis cannot speak to the quality of teachers in schools. We can identify, for example, how much districts spent on activities related to instruction, including teachers' salaries, but we have no information that could help us meaningfully distinguish between teachers in terms of their effectiveness in classrooms.

The superintendents interviewed for this report understood this dilemma. When asked about the relationship between spending and achievement, Robert Avossa, superintendent of Fulton County Schools in Georgia, said: "They are absolutely related, but [only] if you are strategic in your human capital strategy. ... You may have more applicants, but if you're not picking the right people, it's not going to help kids. So we've been very strategic about that."

From our research, a few things are clear. Perhaps most importantly, it is plain that some districts can get more bang for their buck. We also found numerous districts that had the same demographics and the same spending levels, but one district achieved more than its twin in terms of student outcomes. Furthermore, we also found twin districts that had the same achievement, the same demographics, but one of those districts spent less than the other for the same results.<sup>5</sup> (The former category was more common than the latter.)

Part of the issue is that districts with similar demographics perform very similarly, regardless of how much they spent per student. More importantly, though, is the fact that some districts spent at the same level but had higher achievement rates for those dollars.

Consider, for example, two suburban school districts in Michigan. Both served about 6,000 students and spent about \$9,700 per student. In each district, about 30 percent of students were economically disadvantaged. But there were significant gaps in achievement between the two districts measured over the same period of time. In one district, around 80 percent of students were proficient in math. In the other district, around 90 percent of students were proficient in that subject.

Given the nature of our dataset, we were not able to identify how or why this occurred, but it does make clear that some districts can do more with the resources that they have.

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## Issues of equity

Fiscal inequity has been a long-standing issue in American education. It is no secret that some districts get more money than others based on race or wealth. Our research confirmed this finding across the states. State funding systems contribute to this problem and they do not do nearly enough to overcome differences in local revenues.

Consider two twin districts in New York. Each district served more than 1,700 students during the 2009-10 school year, about half of whom were economically disadvantaged. But one district still ended up having about \$850 more per student to spend. The issue was the local tax base for each district, which resulted in the wealthier district—the one with the more affluent tax base—collecting an additional \$700 per student from property taxes per year. Neither contributions from the state nor the federal government was enough to overcome this clear and large inequity, so the poorer district had significantly less money to spend than its peer. The less-affluent twin received less than \$50 more per student from the state and a little more than \$100 more per student from the federal government.

The superintendents we interviewed described situations where state funding had decreased due to the Great Recession—changes that likely would have impacted their districts after the year of our financial analysis (2009-10). The superintendents talked about state funding formulas—and changes to those formulas over the past

few years—that do not meet their needs. Bob Hunt, superintendent of Chagrin Falls Exempted Village Schools, a large suburban district in Ohio, described one such formula change as “shifting the burden to the local.” In other words, state authorities faced with dwindling budgets had placed the burden of funding schools squarely on the shoulders of the local school district.

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## A lack of authority and innovation

From our study, it appears that part of the issue is that districts have very little control over how money is spent. One problem in particular is that money often arrives in the district with strings attached. District leaders must typically allocate their state or federal funds according to formulas that are usually based on the extent to which students are economically disadvantaged.<sup>6</sup> Moreover, virtually any group that provides money to schools, including taxpayers, places restrictions on how districts can spend money. With that being the case, what actual power do district leaders have?

Not much, it seems. One study from education finance scholar Marguerite Roza shows that district leaders might have discretion over less than 20 percent of their total districts’ budgets.<sup>7</sup> What this suggests is that the financial decisions many district leaders can make have to do with specific programs or services, rather than with the core work of instruction and improving teaching.

In conversations regarding the twin analysis for this paper, superintendents generally agreed with the idea that much of their budget was “locked up” in ways that they could not control. Steven Cohen, superintendent of the 2,500-plus-student Shoreham-Wading River School District on Long Island in New York, said that “we’ve been able to do things on the margin, but not to any great extent.” Similarly, Steve Rose, superintendent of Russia Local Schools, a rural district in Ohio, told us: “To be honest, the discretionary part from a superintendent’s perspective is a very limited amount of the overall budget.” In his district, Rose said that one way to save money is to have staff members share different roles. “I’m a bus driver as well,” offered Rose by way of example.

However, a few superintendents said they believed that they had a good deal of control over how money was spent in their districts, although they acknowledged that they did not have complete autonomy. Greg Hinshaw, superintendent of Randolph Central Schools, a district of about 1,700 students in Indiana, put it this way: “There’s obviously some degree of discretion. I don’t feel highly constrained by most of it. But you don’t spend money with total discretion anytime you’re spending public funds.”

Another way to understand this dynamic is that wealthier districts did not spend their money all that differently than their twins. They just had more of it. Across the board, districts spent the greatest share of their money—60 percent—on instructional costs, primarily salaries and benefits for teachers. Districts used the other 40 percent for

administrative, operations, and support costs—for example, salaries for district staff in the central office, transportation for students, and/or tutoring. Other studies examining district spending confirm these overall patterns.<sup>8</sup>

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## Recommendations

Our study leads to the following recommendations for state education policymakers to increase productivity:

### Move away from rigid funding systems

Districts' budgets are often locked into rigid structures that are not tied to student outcomes. In a time of limited resources, education leaders should use this as an opportunity to think more broadly about how districts fund education.

In order to increase academic productivity, federal and state policymakers should think more broadly about ways to give local leaders more freedom to try new things. States should relax requirements that lock up districts' resources in ways that do not lead to improved student performance.

Louisiana's Empowering Educators initiative provides an example of how a state has approached this issue.<sup>9</sup> The state's department of education has streamlined reporting requirements for federal and state funding and will provide technical assistance to Louisiana districts to enable them to pool various funds or use these dollars in different ways.<sup>10</sup> For example, Louisiana state officials might help district leaders use federal funding to support new activities, such as college- and career-ready assessments, where the U.S. Department of Education has granted new flexibilities.<sup>11</sup>

### Support districts more equitably

Whatever the bundle of materials and services districts provide, students should have equitable access to those opportunities. States that fund their schools more equitably do so by distributing more funding to districts with greater student disadvantage. In 2013, California implemented a new district funding formula using such an approach. Known as the Local Control Funding Formula<sup>12</sup>—commonly referred to as “weighted student funding”—California will distribute funds to schools based on student characteristics. In other words, California will send more money to schools based on student need; for example, students with special education needs, English language learners, and students from poor households or who are homeless.<sup>13</sup>

The state of California achieved this new funding approach through voter referendum and the legislative budgeting process. The referendum was helped by the power wielded by Gov. Jerry Brown (D), who strongly supported the funding measure, and by previous tax increases approved by California voters through Proposition 30, titled “Temporary Taxes to Fund Education.”<sup>14</sup> Other states would do well to follow California’s lead.

## Ensure districts spend money on what matters

It is important that districts get the biggest bang for their buck. To achieve this, districts must:

- **Be held accountable for spending instructional dollars productively**

It is clear that there are productivity differences between school districts. Some districts are getting better results with less money. State policymakers should take a more active role in ensuring that districts spend their dollars more productively without restricting districts’ flexibility to make the best use of their funds.

One way to ensure that districts properly leverage their funding is through benchmarking. The Massachusetts Department of Elementary and Secondary Education’s District Analysis and Review Tool, or DART, system provides an example of how a state might approach this issue. It provides education leaders with systematic and thorough databases to explore spending differences among peer districts. The DART reports include information about employee turnover rates, student-to-staff ratios, and academic performance outcomes.<sup>15</sup> The state’s department of education regularly conducts district quality reviews, which involve monitoring financial management, among other factors, with respect to DART metrics.<sup>16</sup> In our larger productivity report, we also call for states to benchmark districts with respect to their spending.

- **Be transparent and make valuable financial information available to the public**

Clearly, the public cannot address fundamental questions about how public money is spent on education in their states and school districts without access to good information. Broadly speaking, there are scant data available to help education stakeholders better understand how district leaders spend money. Our approach—pairing similar districts—is rarely used to investigate productivity differences.

To be sure, this level of data collection would not be easy to come by, but there are a few states that are already doing just this sort of school-level information gathering. The U.S. Department of Education also continues to develop methods for collecting information on school-level expenditures, particularly in an effort to identify inequities across schools.<sup>17</sup> The Texas Education Agency’s financial reporting approach can serve as a guide. In addition to listing basic expenditures, Texas’ Public Education Information Management System public financial reports include spending information for all school district programs, including athletics and other extracurricular activities.<sup>18</sup>

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## Conclusion

The analysis detailed above calls into question whether districts are spending money in ways that increase academic outcomes. While some districts have greater productivity, others do not. Simply put, districts serving similar groups of students have similar outcomes even with different levels of spending. In fact, without dramatic changes in how school districts in the United States are organized, public education will most likely become more expensive but not necessarily all that more productive.<sup>19</sup> Given the many restrictions on how districts can use money, school district leaders should innovate ways to increase teacher quality in order to improve student outcomes. District leaders might be able to accomplish this through new policies such as teacher evaluation and also more robust professional supports with the money they have.

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**\*Correction, July 11, 2014:** *This issue brief has been updated to include additional information about the twin sample in Table 1. The table now provides data that inform the brief's comparisons across twins. The revised analysis focuses on districts with fewer than 50,000 students. This restricted the dataset by 16 districts to a final 424 pairs and ensured that higher- and lower-spending twin groups were better matched by district enrollment. Lastly, in the introduction, the brief incorrectly summarized the ways in which the twin districts differ. They differ in terms of per-pupil spending and revenues, not achievement. The brief's original findings hold.*

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## Acknowledgments

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## Appendix

**TABLE 1**  
**Twin district dataset**

Descriptive statistics for 424 sets of twins from the 2009-10 school year

	Higher-spending twin districts		Lower-spending twin districts	
	Mean	Standard error	Mean	Standard error
<b>Enrollment</b>	<b>3,233 students</b>	<b>252</b>	<b>3,244 students</b>	<b>254</b>
<b>Expenditures*</b>	<b>\$12,854 per student</b>	<b>\$166</b>	<b>\$11,281 per student</b>	<b>\$134</b>
Percent instruction	61.3%	0.18pp	61.8%	0.19pp
Percent operations	18.9%	0.14pp	18.8%	0.15pp
Percent student and staff support	8.4%	0.15pp	7.9%	0.14pp
Percent administration	11.3%	0.11pp	11.5%	0.12pp
<b>Revenues*</b>	<b>\$13,405 per student</b>	<b>\$217</b>	<b>\$12,394 per student</b>	<b>\$169</b>
Percent federal revenue	9.8%	0.27pp	9.8%	0.25pp
Percent state revenue	43.4%	0.85pp	47.9%	0.76pp
Percent local revenue	46.8%	0.98pp	42.3%	0.87pp
<b>Demographics</b>				
Percent students who are eligible for free or reduced-price lunch	38.4%	0.93pp	38.5%	0.93pp
Percent students who are limited English proficient or English language learners	2.3%	0.29pp	2.2%	0.29pp
Percent students with individualized educational programs	13.8%	0.18pp	13.8%	0.18pp
<b>Achievement</b>				
Achievement – reading/language arts (2009-10)	79.8%	0.56pp	79.4%	0.56pp
Achievement – math (2009-10)	79.7%	0.57pp	79.0%	0.57pp

\* The differences in per-pupil expenditures and revenues are significantly different at the 5 percent level, but not the associated percentage distributions. The authors performed t-tests to compare means across the two samples (i.e., the higher- and lower-spending districts). All other compared means were not significantly different.

Note: pp stands for percentage points.

Source: Authors' calculations based on public data from the U.S. Department of Education. U.S. Department of Education, EDData, LEA Level Results for State Assessments in Reading/Language Arts and Mathematics, School Years 2008-09 and 2009-10, Provisional Data, available at <http://www.data.gov/education/>; National Center for Education Statistics, "Local Education Agency (School District) Finance Survey (F-33) Data," available at <http://nces.ed.gov/ccd/f33agency.asp> (last accessed XX FILL IN MONTH AND YEAR XX); National Center for Education Statistics, "Common Core of Data," 2007-2008, 2008-2009, 2009-2010, and 2010-2011, available at <https://nces.ed.gov/ccd/>. Data adjusted for differences in cost of living using Comparable Wage Index data from Lori Taylor at Texas A&M University. The Bush School of Government and Public Service, Texas A&M University, "Extending the NCEES CWI," available at [http://bush.tamu.edu/research/faculty/taylor\\_CWI/](http://bush.tamu.edu/research/faculty/taylor_CWI/) (last accessed December 2013).

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## Endnotes

- 1 To adjust for geographic differences in cost of living, we adjusted total district expenditures by the Comparable Wage Index, or CWI, from the National Center for Education Statistics. We used the 2010 district CWI produced by Lori Taylor at Texas A&M University. The Bush School of Government and Public Service, Texas A&M University, "Extending the NCES CWI," available at [http://bush.tamu.edu/research/faculty/taylor\\_CWI/](http://bush.tamu.edu/research/faculty/taylor_CWI/) (last accessed December 2013).
- 2 National Center for Education Statistics, "Local Education Agency (School District) Finance Survey (F-33), School Year 2009-10 (Fiscal Year 2010), Provisional File Version 1a," available at <http://nces.ed.gov/ccd/f33agency.asp> (last accessed May 2014); U.S. Department of Education, "EDFacts, LEA and School Results for State Assessments in Reading/Language Arts and Mathematics, School Years 2008-09, 2009-10, and 2010-11. Provisional Data. Restricted-Use Files."
- 3 Authors' calculations based on database described in the "Methodology" section on page 3 of this issue brief.
- 4 We had invited more than 100 district superintendents to speak with us for this project.
- 5 Note that we found that productivity is not generally related to revenues. There are districts with very large revenue differences that did not see commensurate gains in achievement. Consider two twins with some of the largest revenue differences in our sample. Both are large suburbs in Pennsylvania. Each served about 4,000 students, roughly one-fifth of whom were economically disadvantaged. One twin collected about \$5,000 more per student than the other, and both had modest gains in reading and math proficiency. At the end of the year, the districts achieved about 80 percent proficiency in reading and 85 percent in math. We are not sure why this occurs, but we believe that districts are bringing in their dollars and spending those dollars in different years. In fact, some districts carried over around \$4,000 per student in assets. However, the nature of the dataset does not allow us to dig any deeper into this finding.
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- 8 See, for example, David H. Monk, John C. Pijanowski, and Samid Hussain, "How and Where the Education Dollar Is Spent," *The Future of Children* 7 (3) (1997): 51-62; Susanna Loeb, Jason Grissom, and Katharine Strunk, "District Dollars: Painting a Picture of Revenues and Expenditures in California's School Districts" (Stanford, CA: Stanford University, 2006), available at <http://cepa.stanford.edu/sites/default/files/5-Loeb-SACS%283-07%29%5B1%5D.pdf>.
- 9 Louisiana Department of Education, "Louisiana Believes: Empowering Educators: Planning for Success," available at <http://www.louisianabelieves.com/docs/teacher-toolbox-resources/empowering-educators-planning-for-success.pdf?sfvrsn=10> (last accessed January 2014).
- 10 Ibid.; Louisiana Department of Education, "Louisiana's Schoolwide Reform Guidance," available at <http://www.louisianabelieves.com/docs/accountability/guidance--schoolwide-reform.pdf?sfvrsn=2> (last accessed January 2014); Louisiana Department of Education, "Managing Risk," available at <http://www.louisianabelieves.com/docs/default-source/teacher-toolbox-resources/managing-risk-flow-chart.pdf> (last accessed April 2014); Louisiana Department of Education, "Funding Flexibility Executive Summary," available at <http://www.louisianabelieves.com/docs/default-source/teacher-toolbox-resources/funding-flexibility-for-districts.pdf> (last accessed April 2014).
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- 12 California Department of Education, "Local Control Funding Formula Overview," available at <http://www.cde.ca.gov/fg/aa/lc/lcfoverview.asp> (last accessed January 2014).
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- 15 Massachusetts Department of Elementary and Secondary Education, "District Analysis and Review Tool (DART): Quick Reference Guide," available at [http://www.doe.mass.edu/apa/dart/DART\\_ReferenceGuide.pdf](http://www.doe.mass.edu/apa/dart/DART_ReferenceGuide.pdf) (last accessed February 2014).
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