Diminishing Returns in K-12 Education

Has Wisconsin hit a wall where an additional dollar in education spending will not bring improvements in student outcomes?

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EXECUTIVE SUMMARY

Over the years, school choice has made significant gains in Milwaukee and Racine. Since the voucher enrollment cap was lifted in 1998, the Milwaukee Parental Choice Program expanded by an average of 11% per year to about 28,000 students. Enrollment in the Racine Parental Choice Program more than doubled each year between 2012 and 2014. Yet, throughout Wisconsin, the traditional "one-size-fits-all" public school remains dominant – 88% of all students in Wisconsin are enrolled at a traditional public school. There is relatively little difference among these schools. The districts hire teachers under similar compensation schemes, and teach the same curriculum. All teachers must be licensed by the state, and teachers with licenses from out of state must jump through many hoops to obtain a Wisconsin license. All schools are overseen by a central administration.

Governor Scott Walker has proposed an expansion of independent charter schools and lifting the caps on the statewide voucher program. Opponents to these alternatives to traditional public schools argue that there is no reason to extend these choices to low-income families. They say that the present model – in which such students go to the public school that is assigned to them with the limited ability to move to another such school – is just fine. If it's not broke, don't fix it.

But the system is broke, particularly for low-income families. Public perceptions that most of Wisconsin's public schools are excellent or even above average are not true. This report examines the state of K-12 education in Wisconsin and analyzes the effectiveness of spending on public education. The main findings are:

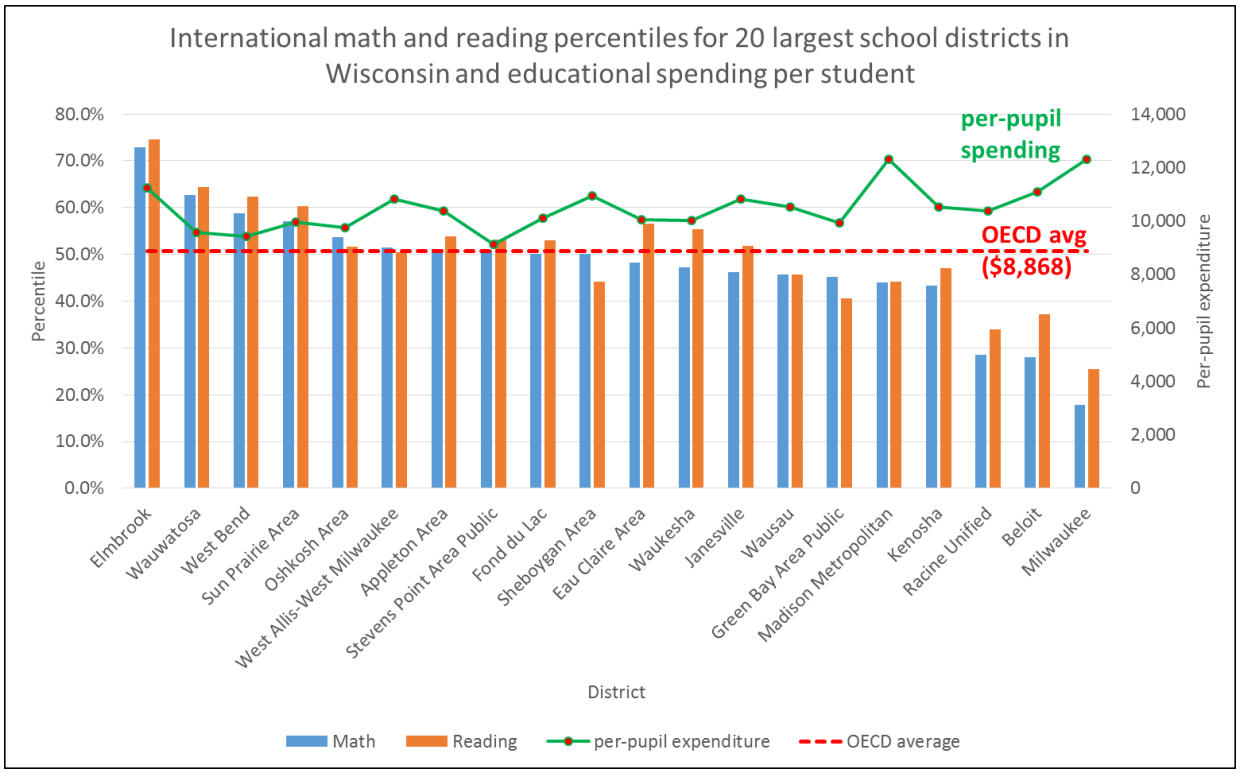
1. The U.S. spends more on education than other nations, yet lags behind in student outcomes (see page 9 of report). In 2011, the United States spent $11,841 for every student enrolled in primary and secondary public schools. This level is the 5th highest among economically developed countries (OECD) and $2,973 per pupil (or 34%) higher than the OECD average (p. 9). And yet, despite spending lavishly, the United States has not created a world-class educational system. Among the OECD countries, the U.S. ranks 27th in math, 17th in reading, and 20th in science (p. 10).

These struggles abroad are reflected at home. Less than one-third of students in the United States are proficient in math and reading. The number of children born into low-income families who eventually "beat the odds" by improving their educational outcomes is lower in the United States than most every other country (p. 12). Moreover, employers complain about not finding people with the skills needed for their job openings.

2. The K-12 education system in Wisconsin is a microcosm of the United States (p. 13). In a country that spends more on public education than nearly every other OECD country, Wisconsin spends over $1,000 more than the U.S. average, ranking 16th out of 50 states. Yet, like the U.S., Wisconsin does not seem to be receiving a good return when measured against global benchmarks.

When students in Wisconsin's K-12 education system are compared to students in other economically developed countries, it becomes evident that Wisconsin is spending a lot for, at best,

mediocre outcomes. By using OECD data from the Global Report Card, we were able to compare the average student in Wisconsin and in individual school districts to those in other economically developed countries. The average public school student in Wisconsin scores better than only 52% of students in the international group on reading and 47% of students in math. While this could be defended as average – for those willing to settle for mediocrity – remember that Wisconsin spends $3,078 more per pupil than these other countries. The average student in 10 of the largest school districts in Wisconsin scores lower than half of all students in the international group in math – even though these districts spend well above the OECD average (see graph below).



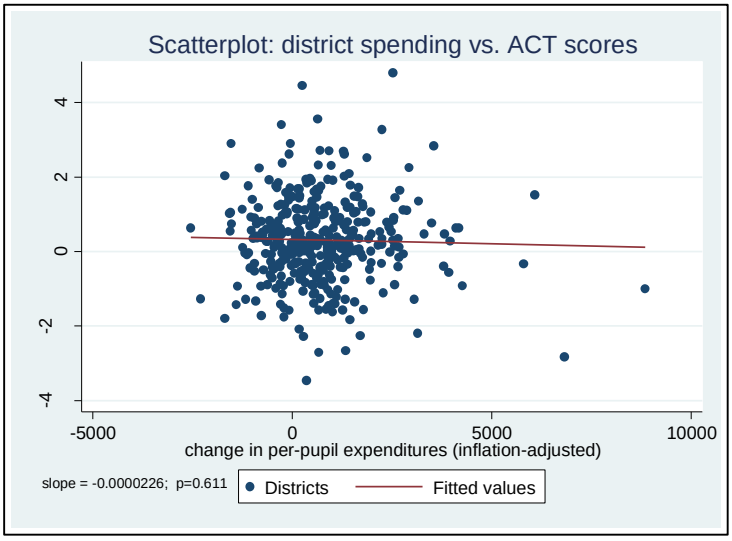
These results are worse when Wisconsin is compared to Canada, a country that resembles the U.S., as well as being the U.S.'s largest trading partner, and other countries. Overall, the average student in Wisconsin scores higher than only 39% of the Canadian students in math and 41% in reading (p. 17). What about Wisconsin's best school districts? The average student in only 4 of the top 20 school districts reaches the 75th percentile in the international group of students (p. 17). The average student in Mequon-Thiensville, for example, scores higher than 55% of all students in Singapore, 66% in Finland, and 66% in Switzerland.

In short, when stacked up against our international competitors, there appears to be trends – despite outspending the OECD nations: Wisconsin's lowest-performing schools are struggling to compete, the average Wisconsin student is very mediocre, and Wisconsin's best schools are not the best in the world. These outcomes do not bode well in a 21st century global economy.

3. Econometric Modeling: The relationship between spending and student outcomes in Wisconsin (p. 21). To improve academic outcomes, the political instinct of many is to call for increased spending. In order to further understand the effect of public spending in Wisconsin on

education, we search for evidence for a relationship between schools districts' educational spending and student academic achievement. To do this, we employed a set of econometric models using a rich, longitudinal data set. These data allow us to employ statistical techniques that control for any unobserved or unmeasured factors that do not change over time (i.e. so-called fixed effects) in addition to the relevant factors that we can observe. We analyze the impact of spending on different student outcomes - ACT test scores, graduation rates, college readiness in reading, math, English, and science, and WKCE math and reading scores. We observed the following results from our econometric analysis (p. 23):

- No consistent relationship between real (i.e. inflation-adjusted) per-pupil spending by districts and student performance on the ACT.
- No consistent relationship between real per-pupil spending by districts and the proportion of students in a district who finish high school as college-ready.
- No consistent relationship between real per-pupil spending by districts and students' performance on the WKCE exams.
- No consistent relationship between real per-pupil spending by districts and graduation rates.



Has Wisconsin hit a wall where an additional dollar in education spending will not bring improvements in student outcomes? The results of our research indicate that this may be the case.

4. Is more school choice the answer to Wisconsin's woes? (p. 26) Our study concludes that Wisconsin's K-12 public education system needs drastic reform. We spend too much for too little in student achievement. While school choice – the allocation of vouchers and growth of independent charter schools – may not be a silver bullet, it could be part of the solution. Consider:

More for less. Significant - and unfair - funding disparities exist between traditional public schools and private schools in the choice program, as well as independent charter schools (p. 26). Yet, despite the disparity, research shows that student outcomes in charter and private schools in the choice program are as good, if not better, than public schools.

A study released recently by the Center for Research on Education Outcomes at Stanford University found that students in Milwaukee charter schools experienced greater academic growth than similar students in traditional public schools (p. 29) (CREDO, 2015). In addition, research by the School Choice Demonstration Project indicated that students who used a voucher to attend a private school in Milwaukee perform at least as well academically as a matched group of similar peers in traditional public schools (p. 28) (Wolf, 2012). They were also more likely to graduate from high school in four years, enroll in a 4-year college, and persist in college through the first year (Cowen et al., 2012). These findings are similar to those studies elsewhere. There have been at least

thirteen studies based on random assignment (i.e. the "gold standard" of research), and all but one of those studies showed that vouchers had beneficial outcomes (the other study found no impact).

School choice could work in rural Wisconsin. If school choice can succeed in Milwaukee – which the vast majority of highly respected studies indicate as much – can it have an impact in rural and small town areas in Wisconsin? There is likely to be a marketplace for it, with a demand for vouchers from families and a supply line of private schools.

In two-thirds of Wisconsin's school districts, the number of children (5 to 17 year old) in poverty increased by at least 50% during the last decade. As a result, more than 107,000 children outside Milwaukee and Racine who live under the Federal Poverty Limit would likely qualify for a voucher under Governor Walker's proposed budget (p. 31). On the supply side, private schooling is not only an urban or suburban phenomenon; almost half (47%) of all private schools in Wisconsin are located in towns and rural districts (p. 31).

School choice is popular. Poll after poll shows that a majority of Wisconsinites, as well as Americans nationwide, support school choice. In every case but one, the margin of support for school choice policies in Wisconsin is positive and in the double-digits (p. 32). In one Wisconsin poll, the margin of support for the formation of charter schools was 17 percentage points (Howell, 2012). Another poll found that 63% of respondents in Wisconsin favored the use the tax dollars to send their children to the public or private school of their choice (NMB Research, 2014). The majority of respondents in this poll favored expanding the statewide parental choice program to include "any working class Wisconsin parent," and 56% favored eliminating the current cap.

While one-size-fits-all government educational systems may have been enough to educate children in the past, this model is outdated for today's rapidly changing world. There is clearly a need for systemic change that creates a more robust and responsive education for different people.

I. Introduction

Over the years, school choice has made significant gains in Milwaukee and Racine. Since its enrollment cap was lifted in 1998, the Milwaukee Parental Choice Program (MPCP) has expanded by an average of 11% per year to about 28,000 students, while enrollment in the Racine Parental Choice Program (RPCP) more than doubled each year between 2012 and 2014. In the Wisconsin Parental Choice Program (WPCP), the number of applicants significantly outnumbered the seats available. Applications totaled over six times the number of new seats in the program in 2014 (School Choice Wisconsin, 2014). Charter school enrollment has expanded by about 10% each year over the last ten years to over 44,000 students in 2013.

Yet, the number of children exercising choice represents a small portion of students in Wisconsin. State law currently limits vouchers by geography, income-level, and, throughout most of the state, arbitrary caps.[1] It prohibits independent charter schools outside of Milwaukee.[2] There are still many more Wisconsin families who have no – or very limited – options for their children.

By and large, the traditional public school K-12 "one-size-fits-all" education model remains dominant. **Throughout Wisconsin, 88% of all students are enrolled at a traditional public school**.[3] Schools within most public school districts are governed by the same board, hire teachers under similar compensation schemes, and teach the same curriculum. All schools are overseen by a central administration. All teachers must be licensed by the state. In fact, the Wisconsin Constitution requires some sort of uniformity.[4] The problem is that we still do not know how to best educate kids; yet, we impose a top-down one-size-fits-all system with public education. There is no single model, certainly none that has been proven, to be superior to any other model for educating all students.

But Governor Walker's proposed budget would expand independent public charter schools and lifting the caps on the statewide voucher program. **Under the Walker plan, more than 107,000**

[1] The Milwaukee Parental Choice Program (MPCP) started in 1991 under Act 336 and is one of the oldest education voucher programs in the nation (LFB, 2013). The Racine Parental Choice Program (RPCP) began in 2011-2012. These two programs service students who reside within the Milwaukee and Racine public school districts. In 2013, the Wisconsin Parental Choice Program (WPCP) was launched and services students who reside outside of the Racine and Milwaukee school districts. There are currently no caps on the MPCP and RPCP while access to the WPCP is presently limited to 1,000 students.

[2] Independent charter schools must be located within the boundaries of Milwaukee Public Schools (LFB, 2015).

[3] Act 10 gives school districts greater flexibility to move away from the "one-size fits all" model. However, this reform is still relatively new and its impact cannot yet be measured yet. In addition, there are a small number of public schools in Milwaukee that differ from the traditional education model, such as Montessori schools and International Baccalaureate schools.

[4] Article X, Section 3 of the Wisconsin Constitution defines public schools as the following: "The legislature shall provide by law for the establishment of district schools, which shall be as nearly uniform as practicable."

children living outside of Milwaukee and Racine under the Federal Poverty Limit would likely qualify for a voucher.[5] Many of **these children, over 42,000, are currently enrolled in failing schools by state standards**.[6] It is worth considering whether such reforms are necessary. This study analyzes the efficiency of the traditional Wisconsin K-12 education system.

II. Wisconsin's K-12 Education System

a. The U.S. Spends More than Others, Lags in Results

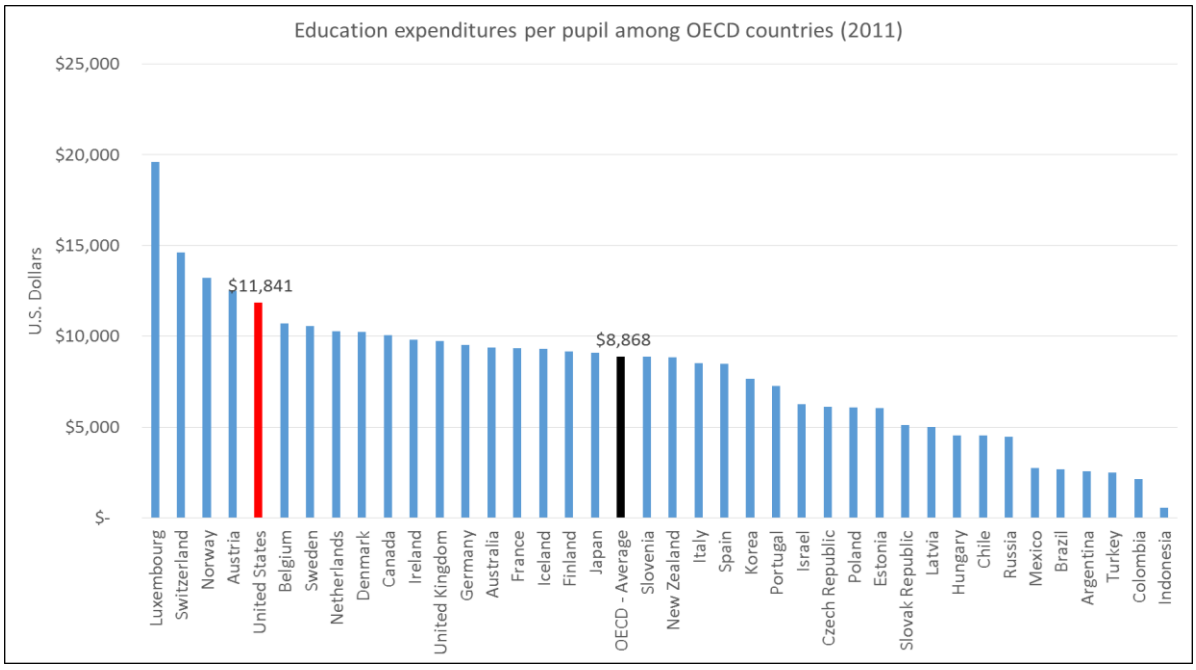
In order to fully understand the Wisconsin education system, we first must explore the system in the United States. Since 1966, per-pupil spending in constant dollars on public education in the U.S. has increased four-fold (Springer, Houck, & Guthrie, 2008). This has resulted in the U.S. spending more on education than nearly every other economically developed country on education. In 2011, the United States spent, on average, $11,841 for every student enrolled in primary and secondary public schools (OECD, 2015). This level is the **5th highest among OECD countries (Figure 1) and $2,973 per pupil (or 34%) higher than the OECD average.**[7]

[5] This estimate excludes the Milwaukee Public Schools and Racine Unified school districts. With these districts, the number exceeds 156,000. The estimate is based on data from the Small Area Income & Poverty Estimates from the U.S. Census Bureau, http://www.census.gov/did/www/saipe/

[6] Figure based on school-level State Report Card data from the Wisconsin Department of Public Instruction (DPI), https://apps2.dpi.wi.gov/reportcards/

[7] When making comparisons across countries, the OECD reflects total employer compensation for teachers and includes job-related health insurance. About 10% of compensation for U.S. teachers involves the cost of providing health and related insurance (U.S. Bureau of Labor Statistics, 2014). While the analogous cost in other OECD countries are likely somewhat lower, the difference could play only a modest role in boosting U.S. spending relative to other countries. Researchers at the OECD were helpful in providing us with this information. Even if all of the United States' per pupil expenditure were for teacher compensation (and it is not) and international numbers included nothing for health insurance (they do), a reduction of 10% would not affect the U.S.'s rankings much, if at all. We tested this. Using expenditure data from the U.S. Department of Education on salaries and benefits in public elementary and secondary schools, a back-of-the-envelope calculation indicates that the full (10%) reduction in total compensation would reduce the per-pupil expenditure figure reported by the OECD by roughly 7%. The new figure is about $11,000, not enough to bump the U.S. ranking down.

Figure 1: Education expenditures per pupil among OECD countries in 2011

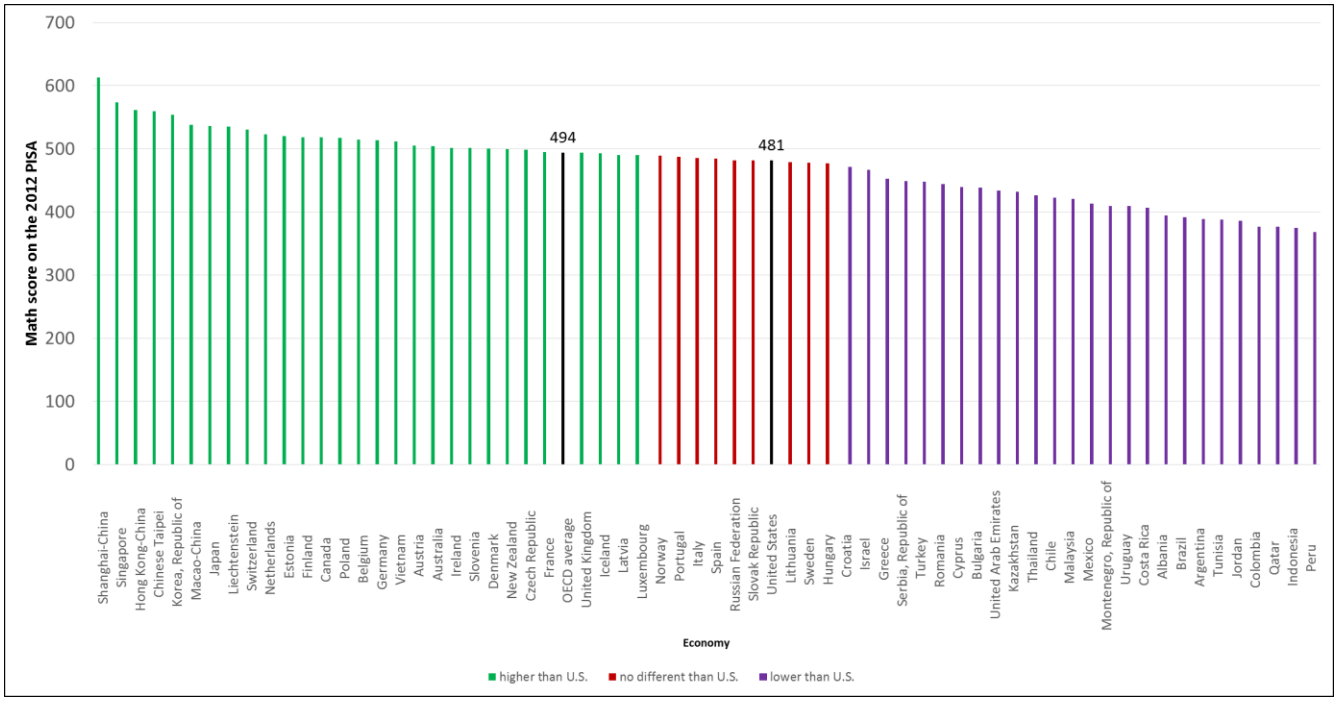


Source: OECD (2013)

However, despite spending lavishly, the United States has not created a world-class educational system. Figure 2 shows average math scores on the 2012 PISA for all participating economies.[8] Overall, 29 countries scored significantly higher than the U.S. The number of OECD members and partners scoring significantly higher than the U.S. was 19 in reading and 22 in science (see Figure A.1 and Figure A.2 in Appendix A). When we look at just the 34 OECD countries and exclude the "partner" countries, **the U.S. ranks 27th in math, 17th in reading, and 20th in science.**[9] Moreover, when one compares Shanghai-China to the top-performing state in the U.S. (Massachusetts), there is a two-year gap in math for formal schooling (OECD, 2012b). The status quo has led the U.S. to falling behind in education. In a world that is as interconnected as ever, that is a major problem.

[8] The Programme for International Student Assessment (PISA) is an international assessment administered every three years to evaluate the skills and knowledge of 15-year old students worldwide. So far, over 70 economies have participated in it (http://www.oecd.org/pisa/aboutpisa/).
In total, 65 countries and economies participated in the 2012 PISA: all 34 member countries in the OECD and 31 partner countries and economies that signed on to participate. http://www.oecd.org/pisa/aboutpisa/pisaparticipants.htm
[8] These rankings are the OECD's best estimates. Actual rankings may be slightly higher or lower than these estimates (OECD, 2012b).
[9] These rankings are the OECD's best estimates. Actual rankings may be slightly higher or lower than these estimates (OECD, 2012b).

Figure 2: 2012 PISA math results for all participating countries



Source: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012. Data were obtained from http://nces.ed.gov/surveys/pisa/pisa2012/xls/table_m4.xls

We need schools that will prepare students for the ever-changing fields of Science Technology Engineering and Math (STEM). Consider these findings by the STEM Education Coalition (2014):

- From 2008 to 2018, STEM jobs will grow 1.7 times faster than non-STEM jobs;
- Unemployment for students that graduate with STEM-based degrees is significantly lower than unemployment for students with non-STEM-based degrees and;
- Average wages in STEM-based occupations are significantly higher than in non-STEM-based occupations.

But, as it stands now, U.S. schools are falling short of ensuring that students are proficient in basic reading and math skills. The percentage of high achievers in the U.S., a group critical for a nation's economic growth, falls below at least 30 of 56 nations who participate in the PISA (Hanushek, Peterson, & Woessmann, 2011). If one treats the top-performing state in the U.S. (Massachusetts) as its own country, the percent of students in Massachusetts performing at an advanced level in math falls behind 14 other nations. In total, when looking at the overall student population, **less than one-third of students in the United States are proficient in math and reading** (Peterson, Woessmann, Hanushek, & Lastra-Anadón, 2011).

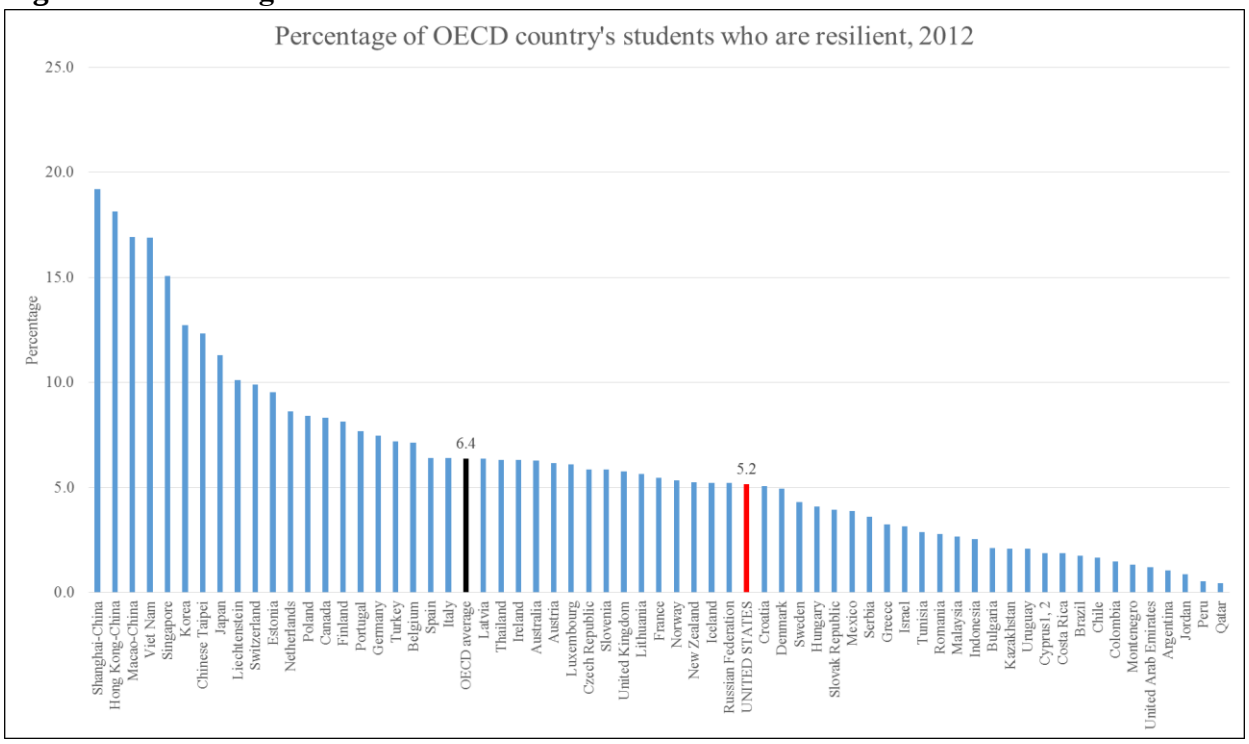
Furthermore, businesses often cite difficulties coping with a "skills gap", i.e. the difference in the skills that employers are looking for and the lack of skills that job applicants have. About 60% of U.S. companies report having a difficult time finding qualified workers to fill job vacancies (Council on Foreign Relations, 2012).[10] Some argue that these gaps are largely due to the inability

[10] A survey of CEOs in Wisconsin concluded that of the 55% of businesses who reported having trouble hiring employees, 76% indicated that it was due to a lack of qualified applicants (WMC, 2013).

of enough people acquiring needed technical skills (Bessen, 2014). [11] In Wisconsin, researchers projected a skills gap for computer science and information technology (Loritz, Nerad, Sletten, & Cunha, 2013).

In addition to equipping a global workforce, a high-quality education can be a poor child's one-way ticket out poverty. But, our schools are not serving low-income children. When it comes to advancing socio-economically disadvantaged students to the top, the U.S. is doing worse than many countries. About 6% of students in all OECD countries were identified as "resilient," i.e. a student who both comes from a socio-economically disadvantaged background[12] and "beats the odds" by performing among the top 25% of all students in participating OECD countries (OECD, 2013). As Figure 3 shows below, notwithstanding the much higher spending, only 5.2% of the students in the U.S. "beat the odds." Moreover, **36 countries – over half of participating countries and economies – had higher proportions of resilient students than the U.S.** To add another perspective, 21% of disadvantaged students in the U.S. were resilient, whereas over 75% of all disadvantaged students in Shanghai-China performed in the top 25% in the OECD world.[13]

Figure 3: Percentage of OECD countries' students who are resilient



[11] Others have argued that a skills gap does not exist (Levine, 2013), believing that employers are unaware of their own markets or are "making it up." A full response is beyond the scope of this paper, but we are comfortable with the proposition that we ought to seek to beat – rather than simply match – international averages and achieve higher levels of proficiency. This is particularly so if we are going to remain committed to spending more money than the rest of the developed world.

[12] Socio-economically disadvantaged students are defined by the OECD as those who are "in the bottom quarter of the socio-economic distribution in their country, or one standard deviation below the average on the PISA index of economic, social and cultural status" (OECD, 2013).

[13] These proportions are estimated by multiplying the percentage values for each participant from Figure 3 by 4 and follows Table 2.2 in OECD (2011). While this is a rough estimate, it allows us to get a sense of how many socio-economically disadvantaged children are moving ahead.

Source: OECD (2013)

In short, we spend more in the United States, but do not see better results. Low-income students, in particular, are not performing well.

b. Wisconsin: A High Price for Mediocrity

i. A microcosm of the United States

In terms of its structure, expenditures, and student outcomes, Wisconsin's K-12 public education system is a microcosm of the United States. Among a country that spends more than nearly every other OECD country, Wisconsin spends over $1,000 more on public education than the average state in the U.S. and **ranks 16th out of 50 states in highest expenditures for public elementary and secondary education.**[14]

Like the United States, Wisconsin is getting a poor return on this investment into education. According to the DPI, **two-thirds of all students in Wisconsin are below proficient in reading, and half are below proficient in math**.[15] Like the United States, when Wisconsin's K-12 education system is compared to those of economically developed countries, it appears that we are paying a lot for, at best, mediocrity. These outcomes are not satisfactory in the 21st century global economy. Students increasingly find themselves competing for jobs with students outside of the United States, especially as jobs evolve and become more streamlined. Moreover, changing demographics in the composition of the workforce will strain our social safety nets, thereby increasing the burden placed on the next generations (see box to right). We can no longer afford to continue down the same path of spending more for mediocre results.

Why the one-size-fits-all model of public education is unsustainable in Wisconsin

Changing demographics in the population of the U.S., including Wisconsin, will pose a monumental challenge that will have profound implications for K-12 education (Ladner, 2015). A growing elderly population and, to a lesser extent, a growing youth population will increase the demand for government spending on social services and income maintenance, such as Medicare and Medicaid, Social Security, public employee retirement benefits, and education.

But there will simply not be enough taxpayers to pay for the desired increases in spending. In Wisconsin, the population of people age 65 and older is projected to increase by 70% by 2030. By then, the "age dependency ratio" (the ratio of the number of non-working people to the number of working people in Wisconsin) will be 0.77. In other words, for almost every 8 non-working people in Wisconsin, 10 working-age people will be supporting them. This ratio in 2010 was 0.59, i.e., six non-working persons for every ten who were working.

In short, Wisconsin will need to figure out how to provide a higher quality of education at a lower cost.

[14] Based on data from the U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD).

[15] Matthew DeFour, "Less than half of state's students measure proficient under new national standards," *Wisconsin State Journal*, July 17, 2012. http://host.madison.com/news/local/education/local_schools/less-than-half-of-state-s-students-measure-proficient-under/article_5c9a2860-cf9b-11e1-9250-0019bb2963f4.html

ii. Global Report Card results

The Global Report Card, created by researchers Jay P. Greene and Josh McGee from the University of Arkansas, allows for comparisons of individual school districts in the United States with other districts in the U.S. and other countries.[16] The comparisons consist of average student achievement scores in math and reading across the world.[17] The Global Report Card is an invaluable tool that conveys information about how competitive a state in the U.S. is with other countries.

When compared to the international average, Wisconsin scores at the 52nd percentile for reading and 47th percentile for math. In other words, **the average public school student in Wisconsin scores better than only 52% of students in the international group on reading and 47% of students in the international group on math.** Even though Wisconsin spends $3,078 more per pupil than other countries, the average Wisconsinite is, well, very average at reading and math.[18]

The findings of mediocrity and higher than average spending are similar when we compared the 20 largest school districts in Wisconsin to the international group of countries. These districts represent over one-third of all public school enrollment.[19] Table A.1 in Appendix A summarizes demographics for students and student-aged children in the 20 largest districts in Wisconsin. Some of the findings (summarized in Table 1):

- The average student in 10 of the 20 largest Wisconsin school districts scores lower than 50% of all students in the international group for math – even though those Wisconsin school districts spend about $2,414 (27%) above the OECD average (see Figure 4). While, by the state's standards, almost all of these districts "Meet Expectations" (Table A.1), the Global Report Card shows that many perform at or below average relative to their international peers in similarly developed countries. Our expectations are apparently not very high.

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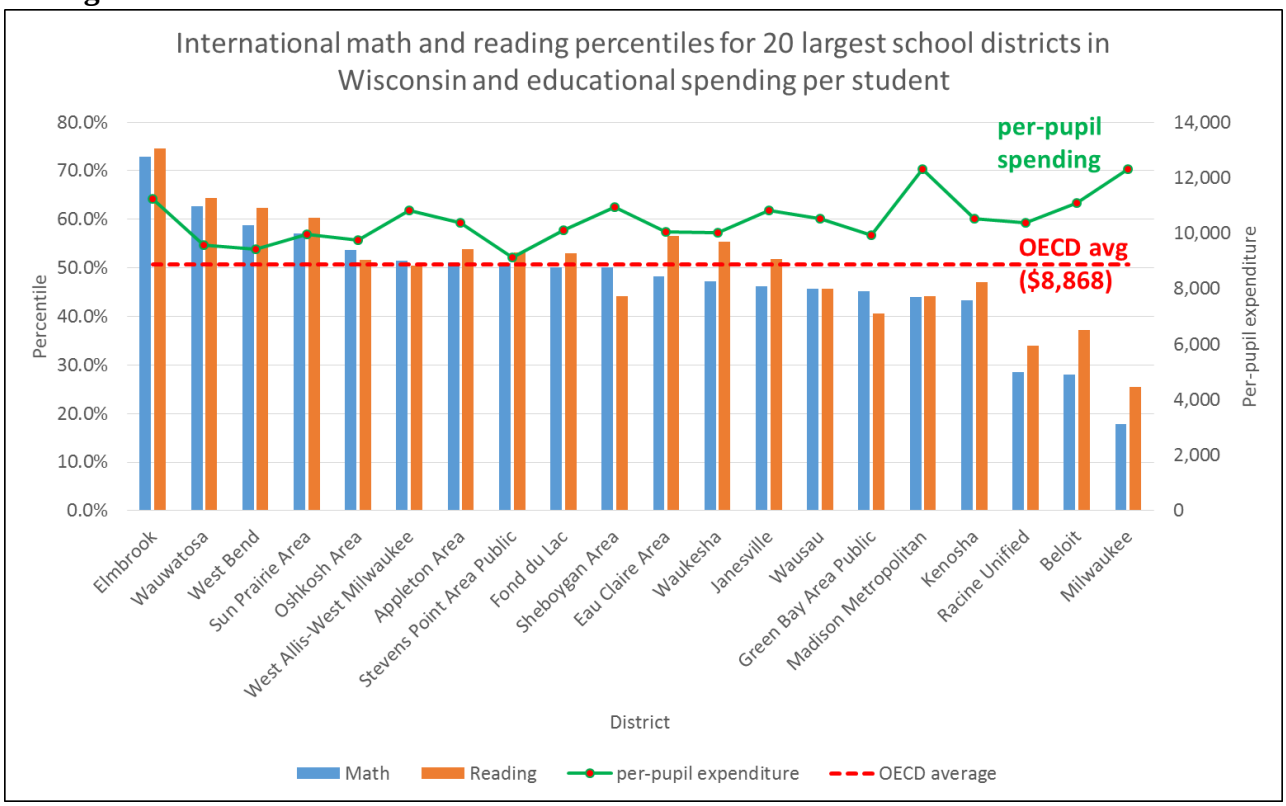
[16] Information about the Global Report Card, including data and a technical appendix, are found at http://globalreportcard.org/.

[17] The comparison group of countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan, and United Kingdom.

[18] Total current expenditures for Wisconsin public elementary and secondary schools per pupil was $11,946 for the same year (http://nces.ed.gov/ccd/elsi/). The OECD average per-pupil expenditures for all services based on PISA 2012 data (the most recent year available) was $8,868 (OECD, 2015). Notably, the figure for Wisconsin excludes expenditures for equipment, non-public education, school construction, debt financing and community services. The OECD figure includes spending on education core services and ancillary services. Educational core services include expenditures on teachers, school buildings, and administration of schools. Ancillary services include meals, school health services, and transportation. It is important to note that when we report and analyze Wisconsin state and district spending, we use data on current expenditures. Because these figures exclude transportation, facility costs, and food services (which are included in the OECD figures), the gaps we observe likely represent lower-bounds, meaning actual spending gaps are actually wider.

[19] Enrolment is one-fourth of the State's if we exclude Milwaukee and Racine. On average, the overall percentage of students receiving free and reduced lunches (FRL) from the government in these districts increased by 17% in the last 10 years.

Figure 4: Current education expenditures and international math and reading percentiles for 20 largest school districts in Wisconsin



Source: Wisconsin Department of Public Instruction and Global Report Card

- The five largest school districts, which educate more than 170,000 children, are those that are struggling to keep pace with their international peers. **The average student in Milwaukee Public Schools (MPS), for example, scores better than only 26% of all international students in reading and 18% in math while spending about $3,400 (39%) more than the OECD average.**[20] Of course, Milwaukee has a large percentage of poor students in challenging circumstances, but the OECD countries also have poor students and the spending advantage enjoyed by MPS is enormous. To offer an excuse for a problem does not make the problem go away. The fact remains that the average student in Wisconsin's largest school district (MPS) scores better than only 9% of students in Singapore and 7% of students in Finland in math.
- The average student in Madison Metropolitan School District, for another example, scores better than only 44% of all international students, even though the district spends about $3,400 (39%) more than the OECD average. Like in Milwaukee, the average student in Madison schools looks worse when compared to Singapore, Finland, and Switzerland.

[20] This gap is based on conservative cost estimates for the Wisconsin districts that exclude costs for transportation, facilities, food and community service. The spending gaps are wider after adding these in.

Table 1: How Wisconsin's 20 largest districts compare internationally

Public School District	Education cost per student	% difference from OECD average spending	Int'l math percentile	Int'l reading percentile	math percentile in Canada	reading percentile in Canada	math percentile in Finland	reading percentile in Finland	math percentile in Singapore	reading percentile in Singapore	math percentile in Switzerland	reading percentile in Switzerland
Appleton Area	10,387	17%	51.1%	53.8%	43.5%	44.7%	37%	39%	32%	44%	41%	55%
Beloit	11,092	25%	28.1%	37.2%	20.0%	28.0%	15%	23%	15%	29%	21%	38%
Eau Claire Area	10,060	13%	48.2%	56.6%	40.4%	47.7%	34%	42%	29%	47%	39%	58%
Elmbrook	11,241	27%	73.0%	74.5%	68.8%	67.9%	64%	64%	53%	66%	64%	76%
Fond du Lac	10,116	14%	50.2%	53.0%	42.5%	43.8%	36%	38%	31%	44%	41%	54%
Green Bay Area Public	9,920	12%	45.2%	40.5%	37.2%	31.2%	30%	26%	27%	32%	36%	41%
Janesville	10,811	22%	46.2%	51.8%	38.2%	42.6%	31%	37%	28%	42%	37%	53%
Kenosha	10,534	19%	43.3%	47.0%	35.1%	37.6%	28%	32%	26%	38%	34%	48%
Madison Metropolitan	12,322	39%	44.0%	44.1%	35.8%	34.8%	29%	29%	26%	35%	35%	45%
Milwaukee	12,298	39%	17.9%	25.5%	11.1%	17.5%	7%	13%	9%	19%	13%	26%
Oshkosh Area	9,764	10%	53.7%	51.7%	46.5%	42.4%	40%	37%	34%	42%	44%	53%
Racine Unified	10,383	17%	28.4%	34.0%	20.4%	25.1%	15%	20%	15%	26%	21%	35%
Sheboygan Area	10,939	23%	50.0%	44.1%	42.4%	34.7%	36%	29%	31%	35%	40%	45%
Stevens Point Area Public	9,124	3%	51.0%	53.1%	43.4%	44.0%	37%	38%	32%	44%	41%	54%
Sun Prairie Area	9,962	12%	57.0%	60.2%	50.2%	51.6%	44%	46%	37%	51%	47%	62%
Waukesha	10,016	13%	47.3%	55.3%	39.4%	46.3%	33%	41%	29%	46%	38%	56%
Wausau	10,532	19%	45.8%	45.8%	37.8%	36.4%	31%	31%	27%	37%	36%	47%
Wauwatosa	9,580	8%	62.7%	64.4%	56.7%	56.2%	51%	51%	42%	55%	53%	66%
West Allis-West Milwaukee	10,826	22%	51.4%	50.4%	43.9%	41.1%	37%	36%	32%	41%	42%	51%
West Bend	9,417	6%	58.8%	62.3%	52.2%	53.8%	46%	49%	39%	53%	49%	64%

Source: Expenditure figures are computed using comparative cost data (2012-13 total current education cost divided by membership), obtained from DPI, http://sfs.dpi.wi.gov/sfs_cmprvcst; enrollment data obtained from the U.S. Department of Education's National Center for Education Statistics; Math and reading performance data are from Global Report Card, http://globalreportcard.org/

NOTE: Total current education cost excludes transportation, capital costs, food and community service; it is given for each full-time-equivalent student

These results worsen when Wisconsin is compared to Canada, the country that most resembles the U.S., as well as being the U.S.'s largest trading partner.

- **Overall, the average student in Wisconsin scores higher than only 39% of all Canadian students in math and 41% in reading.**

- The average student in 16 of the 20 largest school districts scores lower than at least 50% of all Canadian students in both math and reading.

- For example, in Kenosha Unified School District, despite spending over $1,000 per pupil more than Canada, the average student scores better than only 38% of all Canadian students in math and reading.

But what about Wisconsin's highest performing districts? They perform better against international benchmarks, but not as well as one may like and perhaps not nearly as well as families in those districts believe. Similarly, we look at the top 20 school districts in Wisconsin (see Table A.2 in Appendix A).[21] Each of these districts received "Significantly Exceeds Expectations" or "Exceeds Expectations" on the state Report Card. The student enrollment in these districts is quite small; they educate less than 5% of the State's student population.

The average student in only 4 of the top 20 school districts reaches the 75th percentile in the international group of students. In other words, the vast majority of top Wisconsin school districts fall short – some just barely – from reaching the top 25% in math. One could be satisfied with this; it's well above average. But these school districts are Wisconsin's top performers. It may not be the case, for example, that parents in the Elmbrook School District would be happy to know that the average student in their district is outperformed by 25% of international students, particularly given that Elmbrook spends 27% more than the OECD average.

Moreover, the average students from Wisconsin's top school districts are less impressive when compared to particular countries. Country-level data is available for Singapore, Finland, and Switzerland. The average Elmbrook student, for instance, scores higher in math than only 53% of all students in Singapore, 64% in Finland, and 64% in Switzerland. Likewise, Mequon-Thiensville School District, where the average student scores near the top 25% in the international group, does not appear to be elite when compared to some of the top countries for math. The average student in Mequon-Thiensville scores higher than 66% of all students in Finland, 55% in Singapore, and 66% in Switzerland.

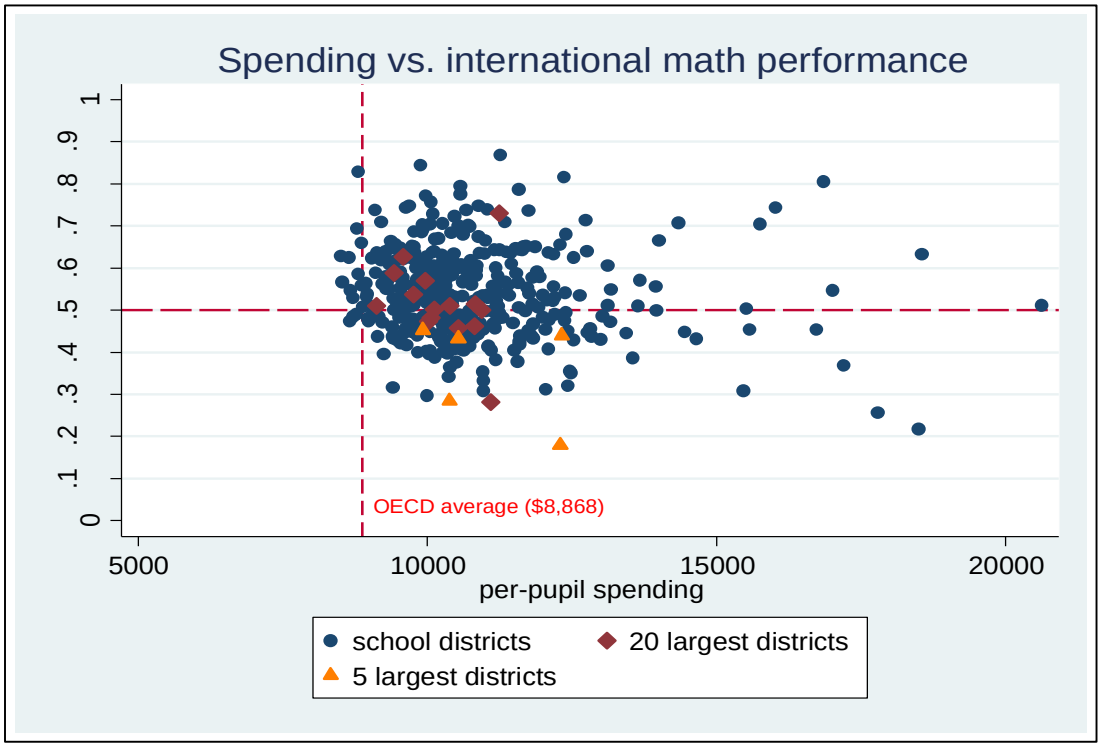
[21] We identify the Top 20 districts using scores from DPI Report Cards.

In short, when stacked up against our international competitors, there appears to be trends – **despite outspending the OECD nations. Wisconsin's lowest-performing schools are struggling to compete, the average Wisconsin student is very mediocre, and Wisconsin's best schools are not the best in the world.**

These trends can be seen throughout other districts. For example, the parents of children in Whitefish Bay Schools may be surprised to know that their average student would only be average in Singapore (scores higher than only 52% of all Singapore students). The average student in Chippewa Falls is below average in math and reading when compared to all students in Canada, Singapore, and Finland. In Northern Wisconsin, the average student in Wausau scores better than only 38% of children in Canada for math and 36% for reading; 31% of children in Finland for both math and reading; and 27% of children in Singapore in math and 37% in reading.

Lastly, there appears to be little relationship, in Wisconsin, between those school districts that spend the most and the ranking of their international student (see Figure 5 below). We explore the relationship of spending and student outcomes in the next section.

Figure 5: Scatterplot of spending and international math performance for all Wisconsin districts



Source: Based on data from the Global Report Card and Wisconsin DPI

III. Wisconsin can no longer spend its way to a better education

a. Per-Pupil Spending and ACT Scores

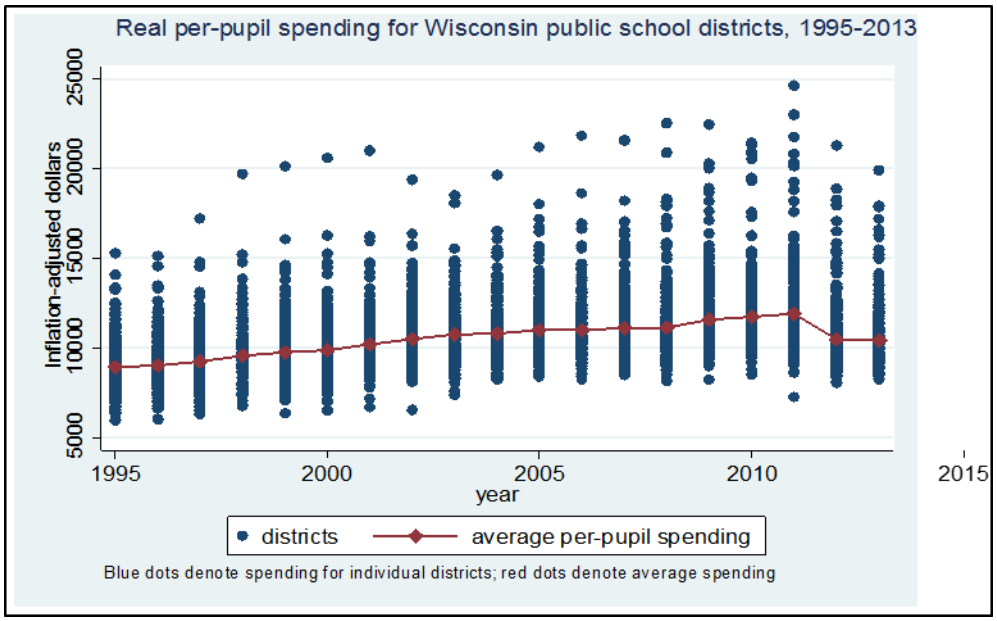
Given all that we spend on public education, one would expect us to perform better. In fiscal year 2012-13, the largest slice of the Wisconsin state budget - $4.9 billion, or 35% of the general fund budget - was appropriated to school aid (LFB, 2013). This commitment to funding education has increased steadily over the last several decades. **Looking back to 1970, inflation-adjusted spending in both the U.S. and Wisconsin has increased in real terms by an average of almost 4% every year.**[22] We can examine district spending using NCES data from 1995. Figure 6 plots per-pupil spending in constant dollars for each school district in Wisconsin from 1995 to 2013 (blue dots).[23,24] It is clear that some districts are relatively low-spending (e.g. roughly $9,000 per student) while a handful are big spenders (e.g. over $15,000).[25]

The overall trend, however, remains clear: *real* spending has trended up. In the figure below, the red dots represent the average per-pupil real expenditures across districts for each year. In constant, dollars, the average district spent $9,253 in 1995. This amount rose to $12,334 by 2011 – an increase of 33% in real spending – before dipping to $10,777 since Act 10 was enacted.[26] A significant part of the decrease is due to districts saving on health care costs (Costrell & Dean, 2013) rather than a reduction in resources deployed to schools.[27]

[22] U.S. Department of Education, National Center for Education Statistics, Statistics of State School Systems, 1969-70; Revenues and Expenditures for Public Elementary and Secondary Schools, 1979-80; and Common Core of Data (CCD).
[23] Data on expenditures are obtained from the U.S. Department of Education's National Center for Education Statistics, with 2011 the last year data are reported. We also extended the analyses to include Total Cost per Member for 2012 and 2013, obtained from the DPI (http://sfs.dpi.wi.gov/sfs_cmpcst). While the state average experienced a slight downtick for these two years due to Act 10, adding them to the analyses have no material effect on any of the results or inferences we make here and later in this paper. Limiting collective bargaining and preventing districts from "picking up" employees' retirement contributions have allowed districts to regain a measure of control over a significant portion of their budgets.
[24] Figures are in 2013 dollars, based on the CPI from the Bureau of Labor Statistics. Total Current Expenditures per Pupil (reported here for 1995-2013) are the current expenditures for public pre-kindergarten and kindergarten through grade 12 programs divided by the fall membership; they reflect the day-to-day operations of schools and school districts and exclude expenditures for capital outlays, equipment, school construction, and debt service.
[25] Variation in per-pupil spending across districts can occur from differences in the use of their authority to levy property taxes up to the revenue limit. Some may "tax to the max" while others levy property taxes below their revenue limits. This can lead to significant variation, especially if these differences persist over time.
[26] We also examine comparative cost data from the DPI, which is provided for the period 2000-2014. Since 2011, average education costs per member declined by about 9%.
[27] Costrell and Dean (2013) estimate that districts saved, on average, $2,614 for family coverage and $1,304 for single coverage from 2011 to 2012. The authors note that district costs remain well above the national average for teachers.

These increases in funding, however, have not yielded proportional improvements in student achievement. Figure 7 depicts a scatterplot of the changes in per-pupil real spending by school districts and change in ACT composite scores for each public school district from 2001 and 2013.[28] The scatterplot indicates a very weak relationship, if that, between spending and ACT test scores.

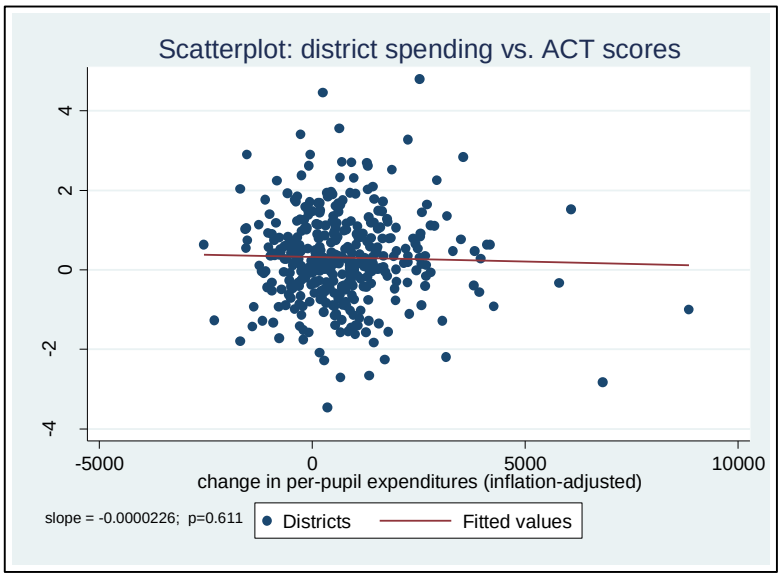
Figure 6: Annual per-pupil expenditures (adjusted for inflation) for Wisconsin public school districts



Sources: U.S. Department of Education National Center for Education Statistics Common Core of Data; WI DPI[29]

[28] According to a recent media report (http://www.jsonline.com/news/education/wisconsins-act-test-scores-keep-high-us-ranking-b99334099z1-271944231.html), Wisconsin's average ACT score in 2013 is second-highest among the 29 states with at least half of all graduates taking the exam. Results are less positive for African-American and Hispanic students. The State's #2 ranking would plummet to #26 (out of 29) if based on the average score for Black students (and #12 for Hispanic students). In addition, 96% of Black students and 84% of Hispanic students in Wisconsin are not college ready (the State would rank #20 and #10 on these measures, respectively). Source: based on data from www.act.org
If one examines the group of states where at least half of high school graduates took the ACT (30 states), then Wisconsin ranks second among them. But the ACT is one of two exams widely used to measure college readiness (the other being the SAT). This makes comparisons across states difficult (and probably unreliable). In 2014, the percent of high school graduates taking the SAT for any state ranged from 9% to 100%. In Wisconsin, 73 percent of graduates took the ACT (http://www.act.org/newsroom/data/2014/states.html). It's not known with certainty whether the state's average score of 22.1 would hold if the remaining 27% of high school graduates took the ACT, but it's unlikely if the group of ACT non-takers likely includes mostly students who did not apply to 4-year universities. Of course some ACT non-takers take the SAT only, but these students are likely to be among high-performers –they are likely to enroll in 4-year universities out-of-state. But they make up only a small portion of the group. Only about 3.9 percent of all Wisconsin students graduating in 2014 took the SAT – probably not enough to offset a likely drop in the average ACT score had all non-takers taken it (https://www.collegeboard.org/program-results/2014/wisconsin). Moreover, according to an ACT spokeswoman, Midwestern states "tend to have strong scores because the ACT was founded in the region and grew organically from the Midwest." (http://www.washingtonpost.com/blogs/fact-checker/wp/2015/03/03/scott-walkers-exaggerated-education-claims/) Therefore, while the ACT and SAT provide reliable measures of college preparedness, they probably do not offer a reliable way to obtain accurate comparisons across states because of state differences in their groups taking each exam. In Wisconsin's case, comparisons using the ACT likely understates Wisconsin's performance, and comparisons that use the SAT likely overstate her performance.
[29] Figures are in 2013 dollars, based on the CPI from the Bureau of Labor Statistics. Total Current Expenditures per Pupil (reported here for 1995-2013) are the current expenditures for public pre-kindergarten and kindergarten through

Figure 7: Scatterplot, changes in ACT scores and per-pupil spending, 2001-2013



The overwhelming majority of school districts increased spending (x-axis) over the sample period. There is considerable variation in how much students in these districts improved on the ACT exam. **But, there is no visible pattern in the relationship between ACT test scores and changes in spending**. A fitted line has a slight positive slope which might indicate a positive relationship (i.e. increases in spending associated with improvements in average scores), but it is practically flat, indicating, at most, a very weak relationship.[30]

How to read the scatterplots: Each blue dot represents a Wisconsin school district. The horizontal axis shows how much district spending has changed from 2001 to 2013. The vertical axis shows the change in ACT scores for the same period. Notice that the dots are scattered both above and below zero, indicating little relationship between spending and ACT scores. If a relationship exists, then we expect to see the line travel up and to the right. It doesn't.

But we cannot conclude that this graph establishes even such a weak relationship because there may be other variables at work. For example, it is possible that more disadvantaged students take the ACT exam each year, and not accounting for this could bias the estimates. A district that has spent more might also have seen the socioeconomic status of its students increase, and this may have contributed to improving test scores. The econometric model in the next section controls for such variables.

b. <u>Econometric Model: The Relationship Between Spending and Student Outcomes</u>

Analytic Model: To further understand the effect of public spending in Wisconsin on education, we search for evidence of a relationship between school districts' educational spending and student academic achievement. We estimate a set of econometric models using a rich longitudinal data set that allows us to employ statistical methods that control for any unobserved or unmeasured factors that do not change over time (i.e. so-called fixed effects) in addition to the relevant factors that we can observe. We control for the makeup of each district's student body, such as family income, race, and gender.[31] We also include the prior year's outcomes as an explanatory variable. Year

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grade 12 programs divided by the fall membership; they reflect the day-to-day operations of schools and school districts and exclude expenditures for capital outlays, equipment, school construction, and debt service.

[30] At most, an additional $1,000 dollars in per-pupil educational expenditures is associated with a 0.02 point increase on the ACT composite score. This correlation, however, is not statistically significant (p=0.657).

[31] To account for the nonlinear relationship between spending and outcomes, the model includes the natural log transformation of per-pupil expenditures. We lag the spending variable as the effect of resources on outcomes will likely not be immediate.

indicators are included to capture trend effects on student expenditures (e.g. changes due to changing economic conditions).

We estimate the following model:

$$(1)\ Y_{jt} = \alpha + \psi Y_{j(t-1)} + \beta ln(PPE)_{j(t-1)} + \delta X_{j(t-1)} + \eta_j + \theta_t + \varepsilon_{jt}$$

where subscripts j and t denote the j^{th} district and year t, respectively; Y_{jt} represents the outcome variable in year t; $Y_{j(t-1)}$ denotes the outcome variable in the prior year (t-1); $ln(PPE)_{j(t-1)}$ gives the natural logarithmic form of a district's annual per-pupil expenditures during the prior year; X is a vector of student demographics such as ELL (English Language Learner), race, IEP (Individualized Education Program), and students in poverty; η_j are district fixed effects; θ_t is a vector of year variables; and ε_{jt} is a stochastic error term. Robust standard errors are used for inference.

The outcomes we examine include districts' overall ACT composite scores and the proportion of students taking the ACT exam who are college ready in terms of reading, math, English, and science (the tested ACT subjects). ACT has set the College Readiness Benchmarks to determine readiness for college courses taken by first year students. These college courses include English composition, college algebra, introductory social science courses, and biology. The benchmarks represent the minimum scores on the ACT subject-area tests which students must achieve to have an approximately 75% chance of obtaining a C or higher.[32] These data are available from 2008 until 2013. We also examine the impact of spending on graduation rates and proficiency on the WKCE math and reading exam from 2006 to 2013.

The analysis relies on district-level demographic data from the NCES at the U.S. Department of Education. District fixed effects control for unobserved factors related to student performance that do not vary over time and may include factors such as geography, culture, hiring procedures or administrative quality. They allow us to estimate the impact of marginal changes in spending on outcomes within school districts. Year indicators are included to capture trend effects on student expenditures (e.g. changes due to changing economic conditions).

If a relationship between school spending and academic outcomes exists, we expect to observe a positive and statistically significant number on the spending variable's estimate. Estimates close to zero would suggest no effect. A negative and statistically significant estimate would suggest an inverse relationship.

Limitations: As with any analysis, there are limitations. While models with fixed effects account for unobserved factors that do not vary over time, they do not account for any unobserved time-*variant* factors (e.g. staffing and curriculum changes). In addition, our analysis relies on data at the district level, which may mask important variation that occurs at the micro level (such as student motivation). Student-level data were not available.[33]

[32] http://www.act.org/solutions/college-career-readiness/college-readiness-benchmarks/

[33] School-level expenditure data over time are not collected by DPI, though other data such as outcomes and demographics are available. We estimated our models with these data, clustering standard errors at the district level, and found similar results.

In addition, private schools and independent charter schools cannot be included in the analysis because of data limitations. Financial data are not reported for independent charter schools, and demographic data are not available for private schools.

Despite these limitations, we believe the analysis offers valuable insights for policy decisions. We are better off having this knowledge than not having it.

Results: Results are presented in Table 2 below. We are interested in the estimates for real per-pupil spending. To interpret the coefficients in the first row, first consider -0.02 in column (1). This indicates that a 10% increase in per-pupil spending is associated with a 0.002 point decrease in the composite ACT score, holding constant district-level demographic variables such as students with IEP status, ELL status, poverty, and minority status, in addition to any time-invariant factors we cannot observe or measure. While the sign is negative and not in the hypothesized direction, the coefficient is not statistically significant at any conventional level. The first row of coefficients in columns 2-5 are interpreted as follows: the coefficient 0.059 in column (2) indicates that a 10% increase in per-pupil spending is associated with a 0.0059 percentage point decrease in the number of students that are college ready in reading, holding demographic and all time-invariant factors constant. The sign is not in the expected direction, and the coefficient is not statistically significant at any conventional level of confidence. The other estimates are also not statistically significant.

Thus, after controlling for demographic and fixed factors, **we do not observe any systematic relationship between real per-pupil spending by districts and student performance perform on the ACT** (column 1).[34]

We also examine the effect of spending on the proportion of students who are college ready in reading, math, English, and science (columns 2-5).[35] We do not observe any systematic relationship here, either. **Changes in educational spending had no significant effect on the proportion of students in a district who finish high school and are likely to succeed in first year college coursework**.[36]

Because not all students took the ACT during the sample period (the participation rate in 2013 was 62%),[37] we also examine the relationship between spending and students' performance on the WKCE state accountability exams. We regress the percent of students proficient in math and reading on district per-pupil spending from 2006-2013. If a relationship exists, then we expect to observe a positive and statistically significant estimate on the spending variable's coefficient. We do not observe this, however. Table B.1 in Appendix B presents the results. Most estimates are not statistically significant. In fact, all but one of the estimates for the impact of spending on WKCE outcomes is negative, contrary to conventional thinking that more spending yields significantly better outcomes. **We do not observe a reliable and consistent relationship between district spending and students' performance on the WKCE exams.**

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[34] ACT composite scores are available from 2001 while college readiness data are available starting in 2008. We also estimated the model in column (1) by and extending the period back to 2001. The estimate on the per-pupil expenditures variable is 0.007, but still statistically insignificant. This does not change the conclusion.

[35] Data on college readiness are not provided prior to 2007-08.

[36] We estimated several variations of the model, including without various controls. The results are robust to these alternative specifications.

[37] Figure obtained from the Wisconsin DPI, http://wisedash.dpi.wi.gov/Dashboard/portalHome.jsp.

Table 2: Results for fixed effects models (dependent variables = ACT composite score and proportion of students who are college ready), 2008-2013

VARIABLES	(1) ACT composite	(2) College readiness reading	(3) College readiness math	(4) College readiness English	(5) College readiness science
ln(per-pupil expenditures)	-0.020	0.059	0.020	-0.051	0.007
	(0.436)	(0.062)	(0.066)	(0.055)	(0.055)
outcome lagged one year	-0.097***	-0.193***	-0.159***	-0.224***	-0.197***
	(0.029)	(0.029)	(0.032)	(0.031)	(0.032)
percent IEP	-0.047	0.114	0.527**	0.496**	-0.024
	(1.495)	(0.230)	(0.256)	(0.210)	(0.196)
percent ELL	-1.114	-0.557**	0.077	-0.063	-0.411
	(1.728)	(0.261)	(0.318)	(0.219)	(0.281)
percent poverty	-1.431	-0.127	-0.109	-0.019	-0.177
	(1.026)	(0.139)	(0.136)	(0.139)	(0.118)
percent minority	-3.171**	-0.260	-0.235	-0.219	-0.226
	(1.411)	(0.182)	(0.153)	(0.172)	(0.137)
Constant	24.886***	0.548***	0.548***	1.025***	0.590***
	(1.184)	(0.151)	(0.168)	(0.139)	(0.130)
Observations	2,147	1,782	1,782	1,782	1,771
R-squared	0.022	0.165	0.077	0.061	0.296
Number of id	373	372	372	372	372

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Sources: expenditure and district demographic data are from the National Center for Education Statistics (U.S. Department of Education); ACT data come from the Wisconsin Department of Public Instruction; poverty data obtained from the U.S. Census Bureau
Notes: ACT composite scores range from 1 to 36; college readiness variables are in proportions (i.e. 0.01 corresponds to 1% and 1.0 corresponds to 100%).

We examine the impact of spending on graduation rates for all students and graduation rates for economically disadvantaged students using data available from the DPI (Table B.2 in Appendix B).[38] The estimated impact of district spending on graduation rates for all students is positive, though they are not statistically significant. When we examine graduation rates among economically disadvantaged students only, the estimates turn negative and significant. This does not mean that increased spending has a negative impact on students. Rather, it means that *a reliable or systematic statistical relationship between spending and outcomes doesn't exist*. **Changes in educational spending had no statistically significant effect on students' graduation rates.**

[38] 4-year graduation rates are available from the DPI and available beginning in 2009-10.

Robustness checks: Lastly, to check if the estimates from our main analysis behave differently when we modify our models, we conduct a series of robustness checks in our analysis. We estimate models with alternate specifications, disaggregate the spending variable by function, and examine an alternate data set that includes one year of school-level expenditures. Details about these approaches and their results are described and reported in Appendix B. As with our main analysis, **we did not find conclusive evidence to indicate that marginal changes in spending had a significant impact on student outcomes**.

Conclusion: We do not find reliable evidence in the data that a systematic relationship exists between additional spending and student outcomes. These results are similar to a larger body of research on the effectiveness of spending. Economist Eric Hanushek (2003), for example, systematically reviewed research on the effectiveness of key educational resources in U.S. schools. In examining the impact of per-pupil educational expenditures, he tallied the statistical significance and impact of 163 estimates on the impact of spending on student outcomes and found that 27% of these estimates were positive and statistically significant, while 66% were not statistically significant, meaning no impacts were detected.[39]

Advocates for keeping the status quo argue for increasing education spending to solve problems with our education system. But, it is not the case that resources alone will bring about improvement – even substantial infusions of resources, as was the case with Kansas City's experience.[40] One plausible explanation may be that **districts have reached what economists call diminishing returns.** This occurs when an organization reaches a point where additional dollars spent do not produce proportional benefits, holding everything else constant. For example, a dollar spent on education in developing counties, such as India, is more likely to have a greater impact than in Wisconsin - or elsewhere in the United States - which spends more than most of the developed world. [41]

This raises a question for policymakers: **Has Wisconsin hit a wall where an additional dollar in education spending will not bring improvements in student outcomes? The results of our research indicate that this may be the case.**

[39] One of the inclusion criteria mandated that models must control for some measure of family background, which we do in our analysis.

[40] In 1985, a Federal judge ordered the Kansas City Public School District and the state of Kansas to spend almost $2 billion over 12 years to update dilapidated facilities, build new ones, integrate classrooms, and improve student academic achievement up to national norms (Ciotti, 1998). But while the ruling brought about state-of-the-art facilities for the high-poverty high-minority inner-city school district, it didn't bring about improvements in student learning. The black-white achievement gap didn't change, and the dropout rate actually went up.

[41] Research illustrates why directing more resources to schools in countries such as India will likely have a larger impact on student outcomes than if the same was done in the U.S. Habitual truancy among teachers is a problem in India. A team of researchers conducted unannounced visits to primary schools in India and found that 25% of the teachers were absent while only half were actually engaged in any teaching (Kremer et al., 2005). When an incentive program was implemented and studied in Indian state Andhra Pradesh, economists found substantially marked improvements in student outcomes (Muralidharan & Sundararaman, 2011). The researchers attributed this at least partly to teachers showing up more frequently.

IV. Can More School Choice Revitalize the Wisconsin Education System?

Hafer (2014) presents evidence that a positive relationship exists between educational attainment and economic growth at the state level. As a result, it is absolutely essential for Wisconsin's economic growth to have education policies that will improve student outcomes. Unfortunately, as demonstrated above, spending more on the "one-size-fits-all" government schools will not lead to better student outcomes. While school choice may not be a silver bullet to what ails Wisconsin's K-12 education system, it should be part of the solution. Consider:

a. School Choice in Milwaukee: Better Results for Less Money

While charter schools and private schools in the choice program have experienced growing demand over the course of their existence, large inequities exist in school funding. Independent public charter schools and private schools in the choice program receive significantly less funding than public schools. However, even on shoe-string budgets, they produce impressive results.

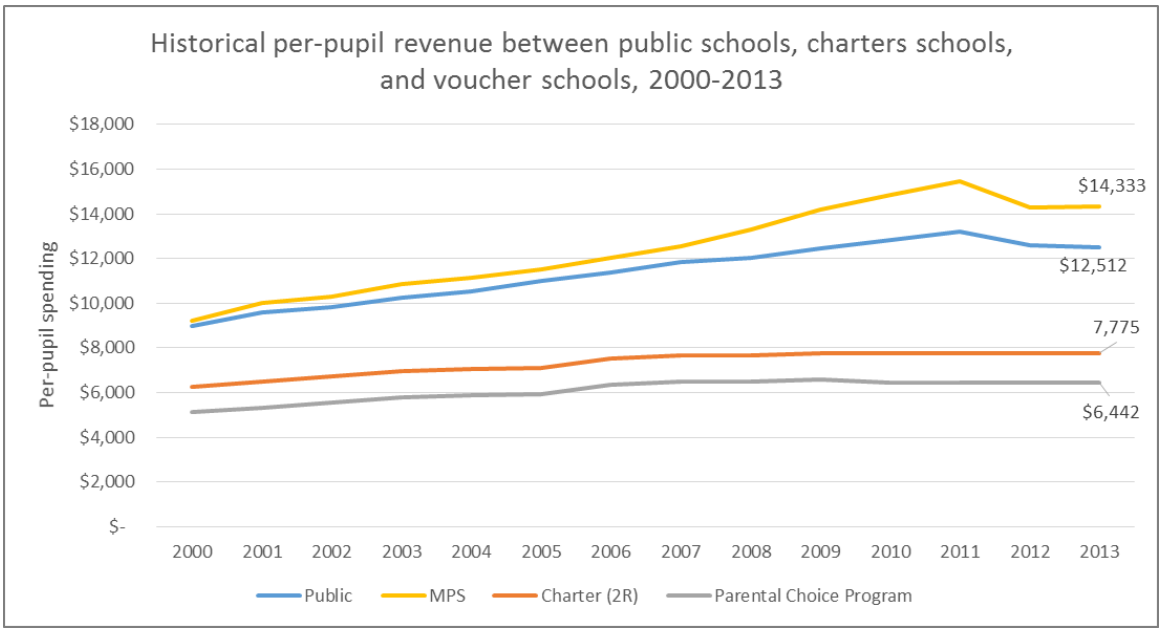
i. Funding disparities between schools

As Figure 8 shows, significant disparities in public funding exist among traditional public schools and both private schools in the choice program and independent public charter schools. The amount that independent charters and choice schools receive is set by state law. Currently, the amount of a **voucher for the choice programs is $7,210 for K-8 and $7,856 for grades 9-12**.[42] Independent charters in Milwaukee receive the same amount (state law reflects that). **Public school districts, on average, receive $12,512 per pupil. Milwaukee Public Schools (MPS) receives $14,333 per pupil** (Figure 8).

This disparity is not new. Since 2000, expenditures increased for public schools statewide by 3% while it *decreased* for independent charter and private schools in the parental choice program by 7% to 8% (adjusted for inflation, i.e. "real").[43] Notably, revenues for MPS increased by 15% in real terms.[44]

[42] Between 2009 and 2013, the amount was $7,775 per student.
[43] The trends were more dramatic for the period before Act 10 was enacted, where real per-pupil revenues increased 12% for public non-charter schools and decreased 3% to 5% for charter schools and schools in the parental choice programs.
[44] This is likely attributed to increases in Federal funding, which tends to target high-poverty areas like Milwaukee. The increase during the pre-Act 10 period was nearly twice as high (27%).

Figure 8: Historical per-pupil revenue between public schools, charter schools, and voucher schools, 2000-2013



Notes: Public school comparative revenue data obtained from DPI historical data, http://sfs.dpi.wi.gov/node/30372/sfs_cmprvcst; charter and private school per-pupil revenue obtained from the Legislative Fiscal Bureau (2013a and 2013b).

Because Wisconsin law allows for the creation of three different types of charter schools, we also observe funding differences between instrumentality charter schools (which can closely resemble traditional public schools) and independent charter schools (including non-instrumentality charters). Funding for schools chartered by a school district is set in the contract, where in "some cases, the district's per-pupil expenditure follows the student as he or she moves from a regular public school to a charter school [and] in other cases, the charter school functions with less money" (DPI, 2013, p. 6). In Milwaukee, according to MPS Admin Policy 9.21(1), instrumentality charter schools receive the same per pupil funding as a MPS school while non-instrumentality charter schools are funded at the same level as independent charter schools.[45] A recent report ranked Wisconsin near the bottom based on the strength of state charter school laws (National Alliance for Public Charter Schools, 2015), partly due to these funding discrepancies.

[45] Nearly all charter schools outside of Milwaukee are instrumentality charter schools.

How school choice helped the Torres' family

Life was difficult for the Torres' family. They moved 9 times because they could not afford their apartments. The many moves meant late nights with missed homework and, often, a new school. In the four elementary and middle schools that David passed through, teachers didn't understand why he was often tired, uninterested, and often combative.

"In elementary and middle school, I never felt welcomed and was bullied. They said, oh, he's different," David recalls.

Not surprisingly, he was the student who sat in the back of the class and never raised his hand. His grades suffered; his dream – to enroll in college and become an engineer – seemed impossible.

All that changed, when the Wisconsin Parental Choice Program expanded statewide for the first time. David used a voucher to attend Notre Dame de la Baie Academy, a Catholic high school, in Green Bay. His family settled into a new home built by Habitat for Humanity and blessed by their priest.

"I wasn't very liked for my cultural background in other schools," David says, shyly but emphatically, as his parents sit beside him in a conference room at Notre Dame.

"Now, I will be a success, and no one can tell me otherwise." (School Choice Wisconsin, 2014).

when compared to MPS schools.

ii. Research on vouchers in Milwaukee

Opponents of school choice have argued that schools in parental choice programs "do not deliver on the promise of significantly improved academic performance."[46] This is simply untrue. There is a vast body of well-respected research based on student-level longitudinal data that have evaluated charter schools and voucher programs in Wisconsin that have established that school choice works.

The School Choice Demonstration Project (SCDP) concluded a 5-year evaluation of the Milwaukee Parental Choice Program (MPCP) and charter schools in Milwaukee. **The SCDP's reports, the best source of information based in research to date on the impact of school vouchers on Milwaukee students, found that students in the MPCP were more likely to graduate from high school in four years, enroll in a 4-year college, and persist in college through the first year (Cowen et al., 2012).** They also gained at least as much as MPS students in terms of academic achievement. The net fiscal benefit from the MPCP in FY2011 was $46.7 million (Costrell, 2010),[47] while the cumulative savings from the MPCP since the program began is $238.5 million (Spalding, 2014).[48]

In addition, WILL (2015b) observed greater portions of students proficient in math and reading in Catholic and Lutheran schools in the MPCP – the schools that educate the majority of students in the parental choice program –

[46] Letter to the U.S. GAO by Reps. Mark Pocan, Gwen Moore, and David Loebsack, http://pocan.house.gov/sites/pocan.house.gov/files/Final_GAO_Request_12_11.pdf.

[47] This fiscal impact, according to Costrell, is distributed unevenly among different taxpayers. State and local taxpayers outside of Milwaukee save from the program while Milwaukee taxpayers incur a negative fiscal impact. This negative fiscal impact on local taxpayers, is currently being phased down so that state taxpayers will eventually pick up the entire tab.

[48] The report also estimated that the savings from all of the voucher programs throughout the United States since 1990 (ten voucher programs) had a fiscal benefit worth $1.7 billion. Remarkably, $1.3 billion of these savings occurred since 2007 (in part due to the introduction of four new programs).

These findings are similar to studies conducted outside of Wisconsin. **According to the Friedman Foundation, there have been at least thirteen studies based on random assignment (i.e. the "gold standard" of research), and all but one of those studies showed that vouchers had beneficial outcomes.**[49] The other study found that vouchers had no impact, which meant that vouchers are at worst a less expensive alternative to public schools.

iii. Research on Wisconsin charter schools

A study released recently by the Center for Research on Education Outcomes at Stanford University found that students in Milwaukee charter schools experienced greater academic growth than similar students in traditional public schools (CREDO, 2015).

The SCDP also analyzed the impact of independent charters. In many cases, their students outperformed similar students in MPS schools. Witte et al. (2011) found that students who stayed in charter schools for more than five years made large gains in math and reading relative to similar students in MPS non-charter schools.[50]

In addition, students in "conversion" charter schools (charters that were previously private schools) "consistently outperformed similar MPS students in the matched sample

How school choice helped the Coleman family

For 15-year old Donnica Coleman and her younger sister, Timia, the Racine Parental Choice Program allowed them an opportunity to get back on track.

Donnica was always fighting and skipping class in her public middle school. *"I wasn't even an OK student," she says unabashedly. "I was skipping class and had something like 100 truancies. I was an 'F' and 'D' student. I was always fighting."*

Her mother agrees. *"I never got called," the 34-year-old mother says. "At the time, I was working a night shift and I was home during the day. No one ever called. I was furious by the end of the year. I was trying to teach one thing at home and another was happening at school."*

Donnica's younger sister, Timia, was also getting into fights frequently at her elementary school.

Her mom agrees that fighting was a frequent occurrence at the schools. *"As a parent, we would be waiting to pick up our children and learn that whole classrooms were held late because of the number of fights happening in the school."*

Timia heard about school choice on the news and begged her mother to send her to a private school. Now, the two sisters are in their second year of the RPCP.

"At Concordia [Lutheran School], everything changed," says Timia. "I understand things more clearly. The teachers deal with someone's behavior. I got accepted. And, I met my best friend, Amy. I love this school."

Timia has more friends and better grades. She is on the honor role.

"They teach a foundation I talk about at home and help them to resist peer pressure," she adds.

Peer pressure is a real game-changer, nods Donnica.

"Before, I was with kids that didn't want to learn," says Donnica of her old cluster of friends at McKinley. "But, when I got to private school, all of the students wanted to learn. They encouraged me to do my work. The teachers are on you – 'You're going to do this!'." (School Choice Wisconsin, 2014).

[49] http://www.edchoice.org/Research/Gold-Standard-Studies

[50] Nisar (2013a) provides additional evidence that autonomous charter schools are effective at boosting academic outcomes of their students. He estimated that on average students who attend a non-instrumentality charter school would read at a grade level higher than similar students who attend an instrumentality charter school in two years, and students who attend a traditional public school in three years. Moreover, over a two-year period students enrolled in instrumentality charters on average would gain one grade level more than students in traditional public schools.

in every year" (Witte et al., 2012, p. iii). Along similar lines, WILL (2015b) found that the percentage of students proficient in math and reading was significantly higher in independent charter schools than non-charter MPS schools.

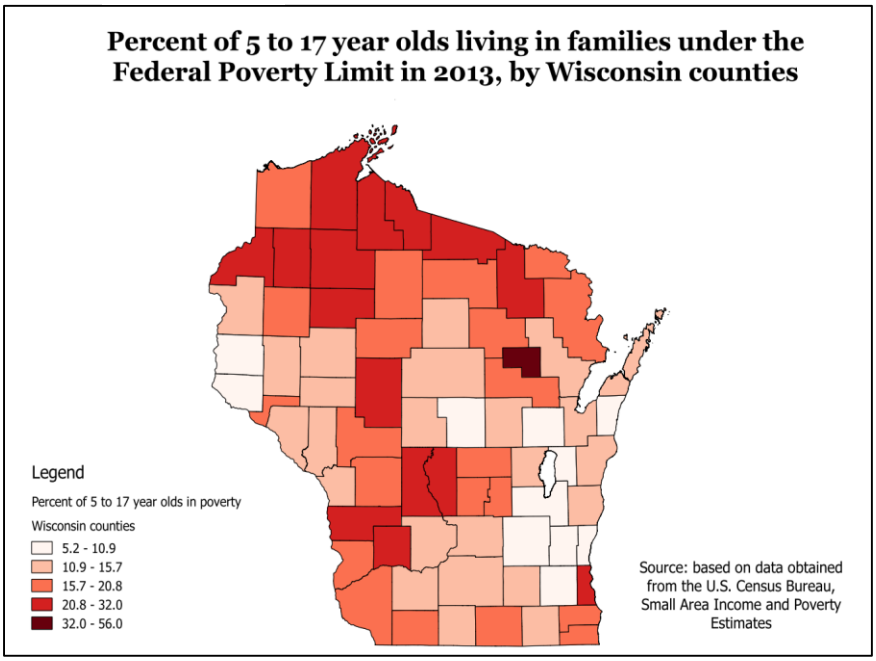
Finally, Nisar (2013b) offers evidence that competition from independent charter schools can actually improve public schools. Competitive pressure from independent charter schools induced nearby traditional public schools to improve the math and reading performance of their students. The groups that benefited most included African American students and previously low-achieving students.

b. Can School Choice Work Outside of Milwaukee and Racine?

If school choice can succeed in Milwaukee – which the vast majority of highly respected studies indicate as much – can it have an impact in rural and small town areas in Wisconsin? **There is likely to be a marketplace for it, with a demand for vouchers from families and a supply line of private schools**.[51]

A major misconception surrounding Wisconsin education policy is that school choice can only work in the inner city. Finding schools that match individual children's needs is an important goal for all school districts to achieve. However, this is no easy task. Some private schools have demonstrated that they are particularly effective at educating disadvantaged students, as suggested by the previous section on school choice research.

Figure 9



The number of children throughout Wisconsin who come from families that cannot afford to send their children to schools other than public schools is not trivial. There are 77 school districts in Wisconsin where at least one in five children (ages 5-17) live in poverty. This accounts for nearly half of the state's 5-17 year olds in poverty.[52] As Figure 9 shows below, this is far from a Milwaukee or Racine problem.

To make matters worse, the number of children living in poverty has been rising rapidly in many districts. Table 3 indicates

[51] According to the Milwaukee State Journal, "Ninety-eight private and religious schools have registered to participate in Wisconsin's statewide voucher program for the 2015-'16 school year — more than three times the current number — but a third of them are in Milwaukee or Racine and unlikely to get seats." http://www.jsonline.com/news/education/as-questions-swirl-around-voucher-programs-schools-rush-to-apply-b99454338z1-294724801.html

[52] Calculations are based on data from U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, released December 2013.

that over a 10 year period (2003-2013), 83% of all school districts in Wisconsin experienced an increase in the number of 5 to 17 year olds in poverty by at least 25%. More than two-thirds (67%) of all districts experienced at least a 50% increase. While climbing out of poverty poses a seemingly Herculean task, many people perceive education as one of the key ingredients for affording people an opportunity to climb up.

Table 3: Change in poverty rates for 5-17 year olds during 10 year period (2003 to 2013)

	number of districts	percent of districts
Experienced at least 25% increase in number of 5-17 y.o. in poverty	345	82.5%
Experienced at least 50% increase in number of 5-17 y.o. in poverty	282	67.5%

Source: Calculations based on data from U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, released December 2013

Note: Map created using data from the U.S. Census Bureau, Small Area Income and Poverty Estimates

There **are over 42,000 students outside of Milwaukee and Racine currently enrolled in failing schools, according to state standards**. Yet, more than 107,000 children, living under the Federal Poverty Limit, would likely qualify for a voucher under Governor Walker's budget. As a result, demand is likely to be high for a voucher.

But, will there be a supply of private schools to meet this demand? There are a surprising number of private schools that already exist. Public education in Wisconsin is quite rural, with over 80 % of all public school districts located in towns and rural communities educating over 45% of public school students in the state (Table 4).[53] However, private schooling is not only an urban or suburban phenomenon. **Almost half (47%) of all private schools in Wisconsin are located in towns and rural districts; in those areas, more than 55,000 children – nearly one out of every three children - live in poverty.** In other words, while there are opportunities for parents to choose among different kinds of schooling, many children cannot afford to attend a private school.[54] A voucher for education could fix that.

Table 4: Private schools in Wisconsin by district urbanicity

	Districts		Private schools		Public students enrolled		Children age 5-17 in poverty	
urbanicity category	number	percent	number	percent	number	percent	number	percent
city	15	3.6%	263	32.4%	256,271	29.8%	76,691	48.9%
suburban	63	15.0%	167	20.6%	216,486	25.2%	24,919	15.9%
town	87	20.8%	195	24.0%	185,105	21.5%	24,205	15.4%
rural	254	60.6%	187	23.0%	202,750	23.6%	30,963	19.7%
total	419		812		860,612		156,778	

Notes: private school directory data are from the DPI; urbanicity and enrollment data are from the National Center for

[53] We rely on urban-centric classification data from the National Center for Education Statistics (U.S. Department of Education), http://nces.ed.gov/ccd/rural_locales.asp, which uses the U.S. Census Bureau's urban and rural definitions in its locale codes classification.

[54] According to the Milwaukee State Journal, "Ninety-eight private and religious schools have registered to participate in Wisconsin's statewide voucher program for the 2015-'16 school year — more than three times the current number — but a third of them are in Milwaukee or Racine and unlikely to get seats." http://www.jsonline.com/news/education/as-questions-swirl-around-voucher-programs-schools-rush-to-apply-b99454338z1-294724801.html

Education Statistics (U.S. Department of Education); poverty data are from the U.S. Census Bureau 's Small Area Income and Poverty Estimates (SAIPE) Program

c. Wide Support for School Choice

Should a zip code dictate what school a child attends? The vast majority of Wisconsinites, as well as Americans, do not think so. Results of several polls and surveys are summarized in Table in Appendix C. **In every case but one, the margin of support for school choice policies in Wisconsin is positive and in the double-digits.** Among 600 Wisconsin residents, the margin of support for vouchers for all children was 8 percentage points (Howell, 2015).[55] The margin was 35 points for providing vouchers for children with special needs. Another poll found that margin of support in Wisconsin for the formation of charter schools was 17 points (Howell, 2013).

In addition, 63% of Wisconsinites, in a poll conducted by NMB Research (2014), "favor giving parents the right to use the tax dollars associated with the education of their children to send their children to the public or private school of their choice;" 60% favor expanding the statewide parental choice program to include "any working class Wisconsin parent;" and 56% favor eliminating the current cap.[56] This is even more amazing when one considers that school choice policies are only available to a small percentage of the state.

This overwhelming support for choice is similar to results from national polls. For example, in a 2015 survey of American adults likely to vote in the 2016 November election, nearly 70% of respondents supported school choice, 76% of voters support charter schools, and 83% of voters support vouchers in some form (Beck Research LLC, 2015). Partisan lines dividing school choice supporters are weakening; 60% of Democrats, 67% of Independents and 81% of Republicans indicated support for school choice.

Another survey of a nationally representative sample found that a solid majority of respondents – greater than 6 out of 10 Americans – support both charter schools and voucher programs (DiPerna, 2014). Support for choice tends to be stronger among minorities and people who live in small towns, rural communities, or urban areas. Support is somewhat weaker in suburbs, though still positive and large.[57]

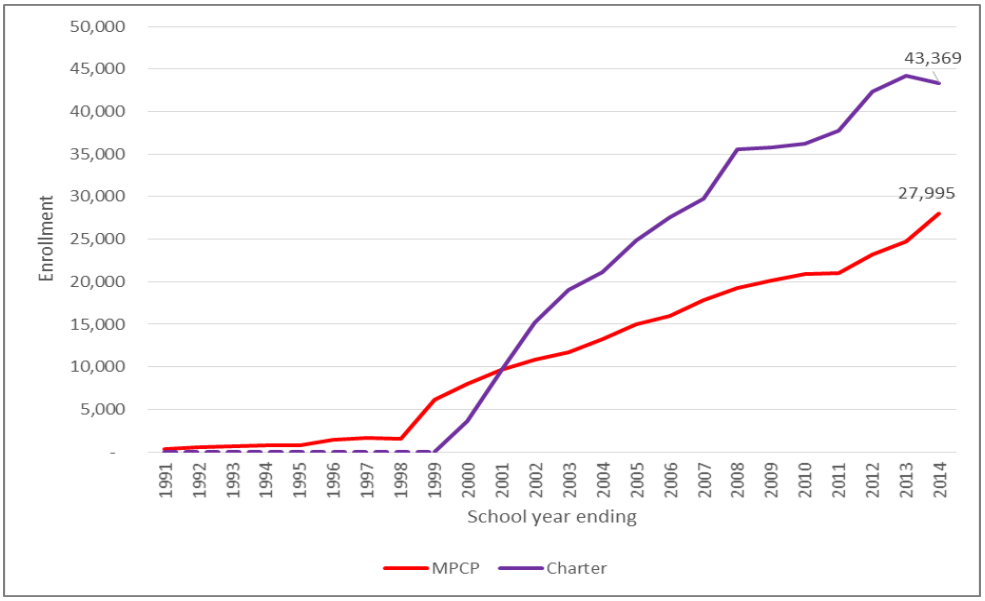
[55] This poll was commissioned by the Wisconsin Policy Research Institute and conducted by William G. Howell from the Harris School of Public Policy, University of Chicago.

[56] This poll was commissioned by the American Federation for Children, http://www.federationforchildren.org/wp-content/uploads/2014/09/Wisconsin-Education-Memo-9-3-14.pdf?e40fe9

[57] Among residents in urban areas and small towns, the margin of support for charter schools was 40 points. The margin of support was the same for low-income earners and 46 points among Latinos. This sentiment did not change over the same survey the previous year (2013). The margin of support for school vouchers was 30 percentage points (63% support, 33% oppose). There is strong support among low-income earners, African Americans, and Latinos, where the margin of support is plus 47 to 50 points for each group.

Most significantly, though, in Milwaukee and Racine, when parents have been given the ability to choose their own school, they have exercised their right to choose. Enrollment trends in school choice programs (below) are indicative of growing popularity.

Figure 7: Historical enrollment in the Milwaukee Parental Choice Program and charter schools, 1990-91 to 2013-14



Sources: MPCP enrollment data are from the Wisconsin Department of Public Instruction; charter school enrollment data are from the National Alliance for Public Charter Schools Dashboard.

V. Conclusion

While Wisconsin has demonstrated a policy commitment to funding public education to improve its K-12 education system, our econometric analysis did not find evidence of a relationship between spending and student outcomes. This is not an insignificant finding. Given how Wisconsin's public schools – at all levels of performance – underachieve when compared to their international peers, one could make the case that we are spending too much for too little in student outcomes. This "one-size-fits-all" education model should be replaced with a more robust and responsive education system that allows for more school choice.

The long-held paradigm of more public spending for the purpose of greater student achievement is clearly not working. Wisconsin is, to be succinct, experiencing *diminishing returns on its K-12 education.*

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Appendix A

Figure A.1: 2012 PISA reading results for all participating countries

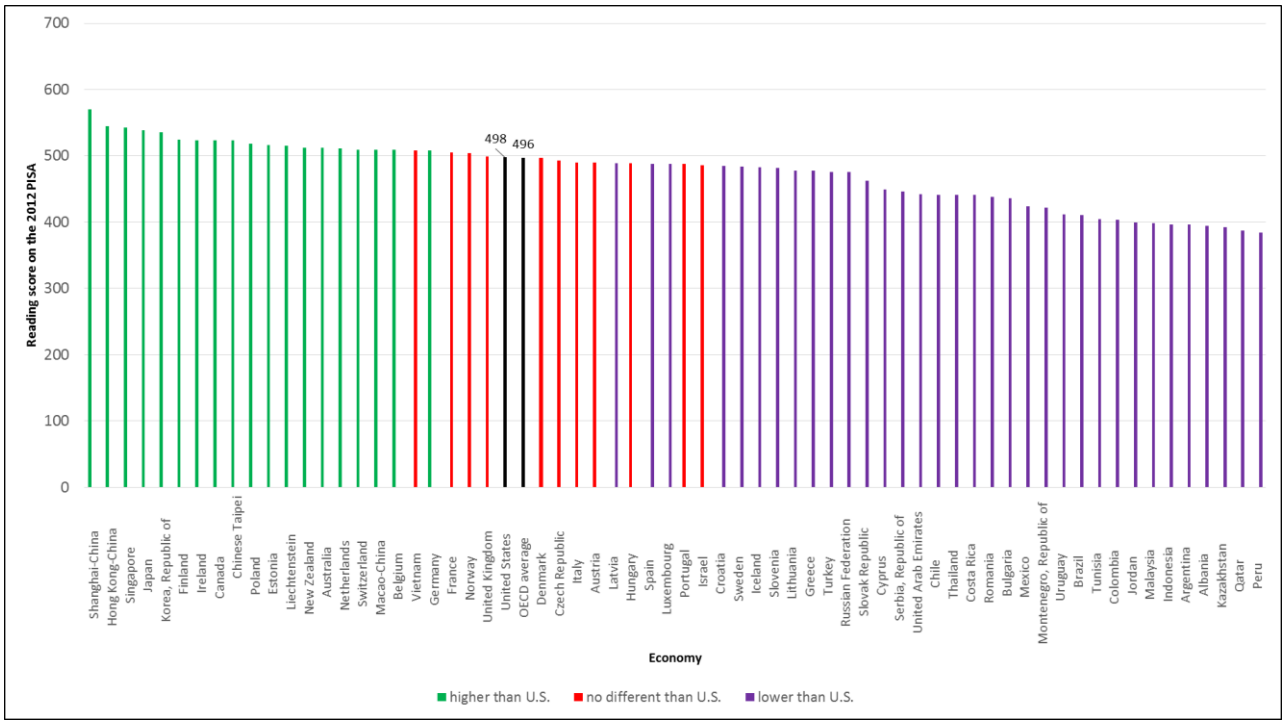
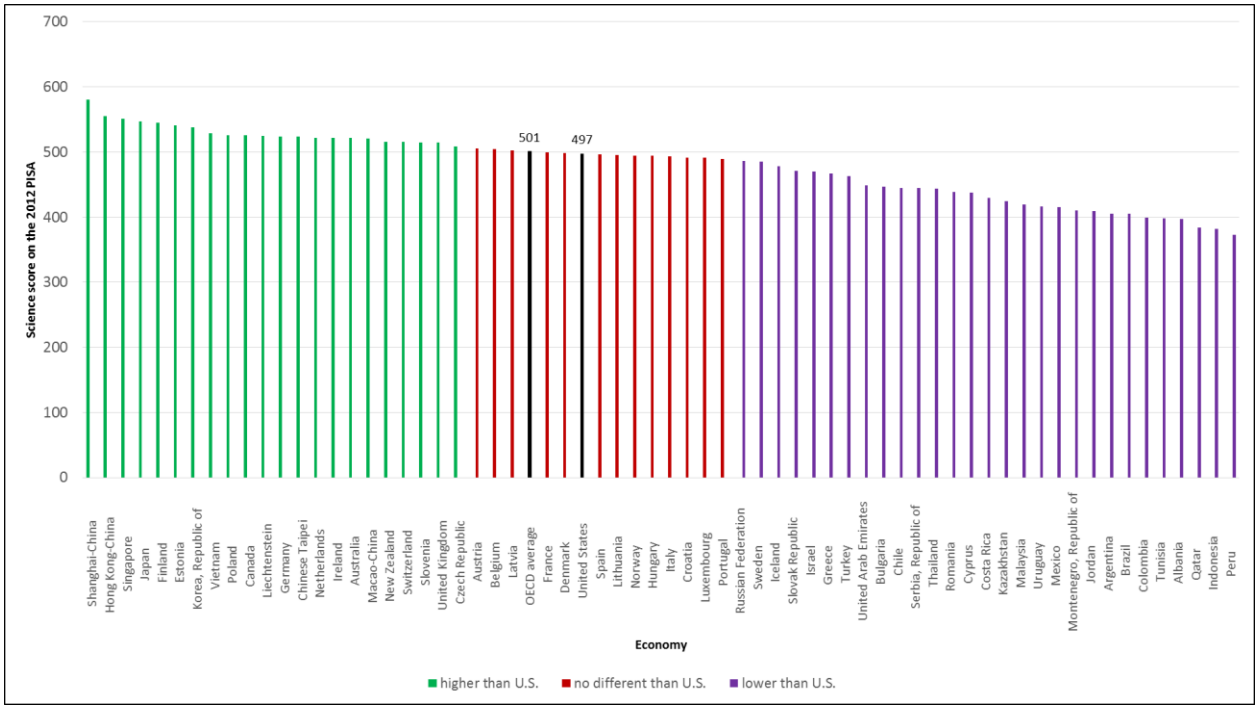


Figure A.2: 2012 PISA science results for all participating countries



Source: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012.

Figure A.3: Scatterplot of change in WKCE math proficiency rates and change in district spending

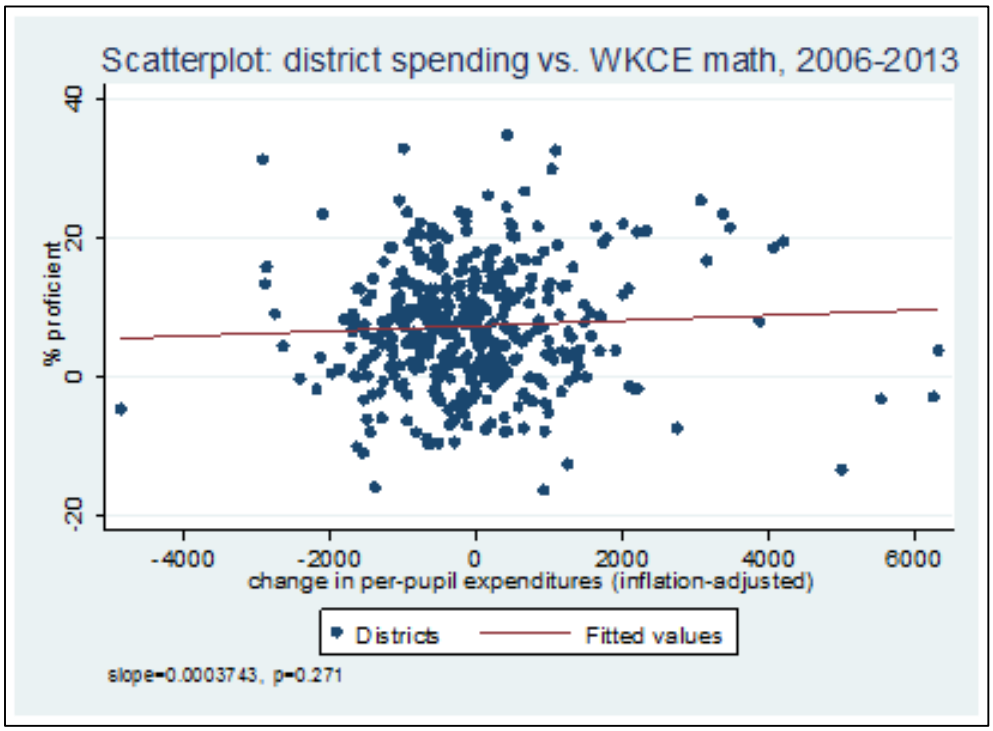


Figure A.4: Scatterplot of change in WKCE reading proficiency rates and change in district spending

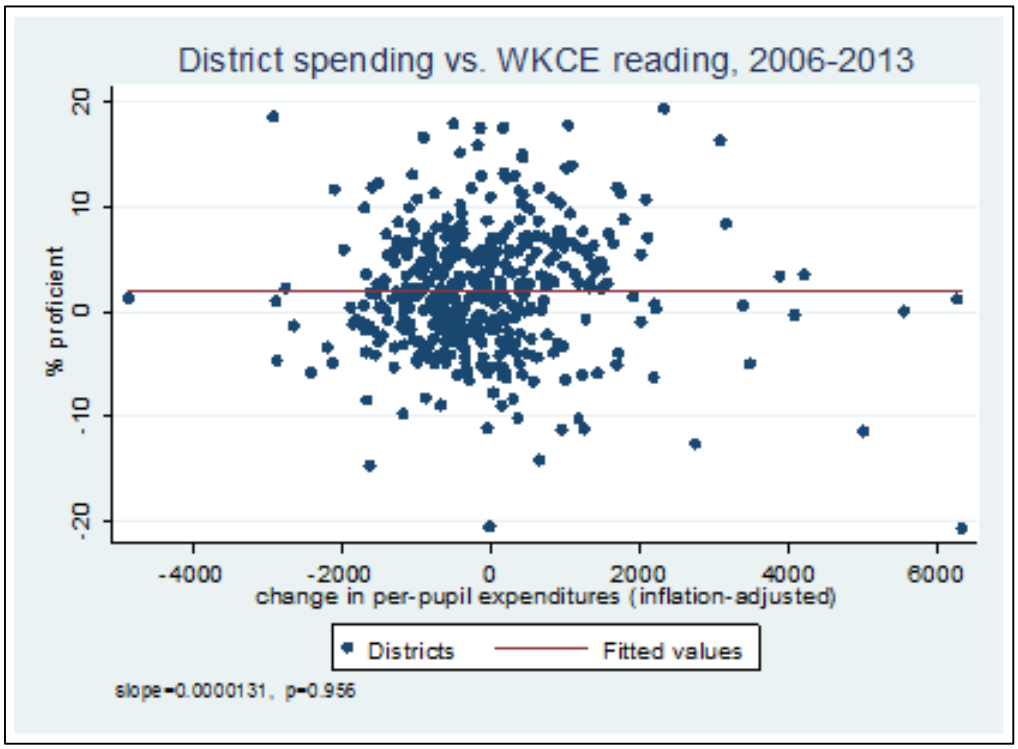


Figure A.5: Scatterplot of change in graduation rates for all students and change in district spending

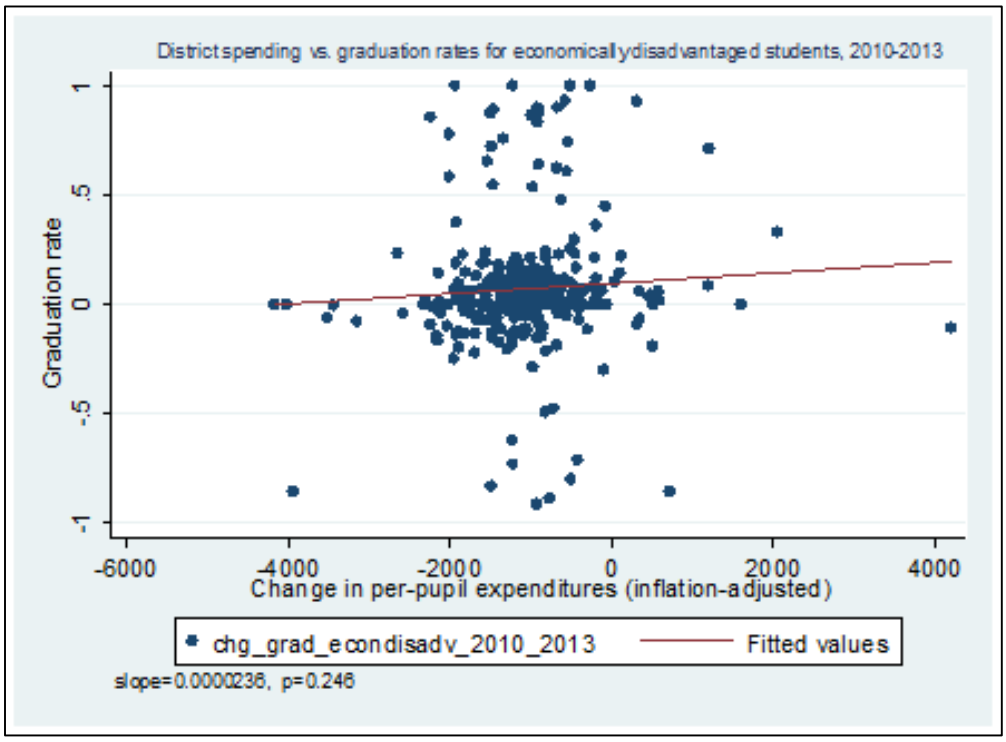
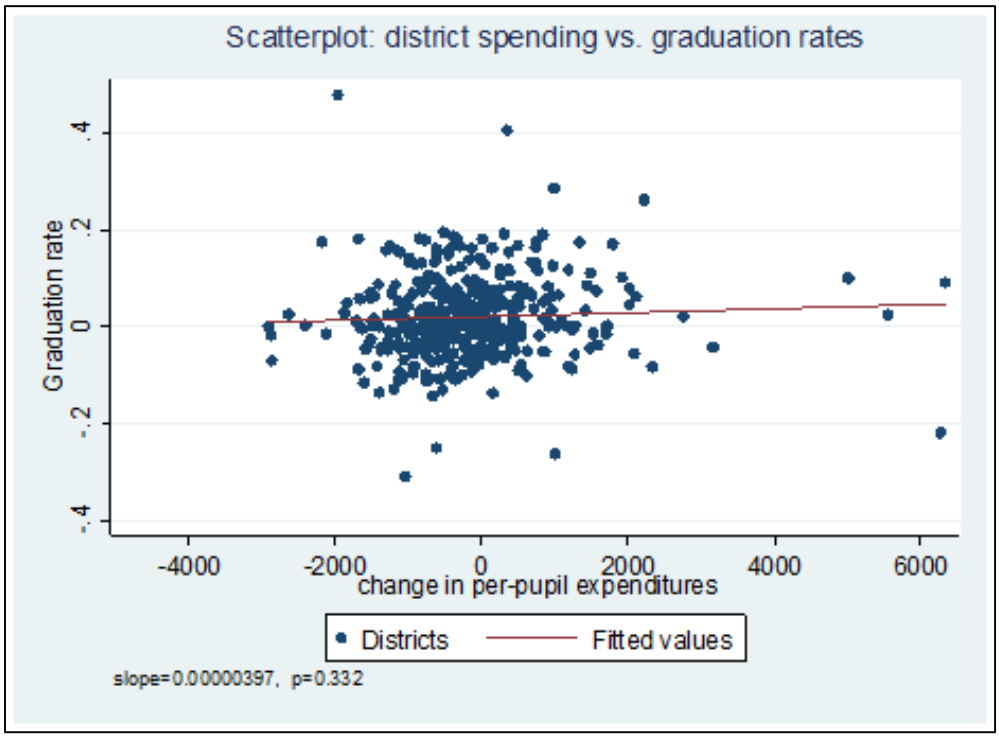


Figure A.6: Scatterplot of change in graduation rates for economically disadvantaged students and change in district spending



Source for Figures A.3 through A.6: WI Department of Public Instruction

Table A.1: How Wisconsin's 20 largest districts fare on the State Report Card

Public School District	Enrollment	percent of students with FRL	change in % FRL students last ten years	State Report Card, 2014	Equivalent accountability letter grade
Milwaukee	79,130	83.3%	8.0%	Fails to Meet Expectations	F
Madison Metropolitan	26,817	49.3%	18.2%	Meets Expectations	C
Kenosha	22,905	49.0%	15.3%	Meets Expectations	C
Racine Unified	20,809	62.0%	27.1%	Meets Few Expectations	D
Green Bay Area Public	20,636	52.1%	15.0%	Meets Expectations	C
Appleton Area	15,119	38.9%	16.9%	Meets Expectations	C
Waukesha	13,770	29.2%	14.4%	Meets Expectations	C
Eau Claire Area	11,030	41.0%	14.0%	Meets Expectations	C
Janesville	10,325	49.5%	25.8%	Meets Expectations	C
Sheboygan Area	10,129	48.7%	18.8%	Meets Expectations	C
Oshkosh Area	10,064	40.5%	17.0%	Meets Expectations	C
West Allis-West Milwaukee	9,281	49.5%	22.1%	Meets Expectations	C
Wausau	8,574	46.2%	12.3%	Meets Expectations	C
Stevens Point Area Public	7,453	37.3%	n/a	Meets Expectations	C
Fond du Lac	7,448	43.1%	18.8%	Meets Expectations	C
Wauwatosa	7,275	24.7%	n/a	Exceeds Expectations	B
Elmbrook	7,154	12.0%	6.6%	Significantly Exceeds Expectations	A
Sun Prairie Area	7,095	27.9%	13.1%	Exceeds Expectations	B
West Bend	7,008	33.1%	18.1%	Meets Expectations	C
Beloit	6,967	74.2%	24.8%	Meets Few Expectations	D

Source: WI Department of Public Instruction

Table A.2: How Wisconsin's Top 20 districts compare internationally

Public School District	Total current education cost per student	% difference from OECD average spending	Int'l math percentile	Int'l reading percentile	math percentile if in Canada	reading percentile if in Canada	math percentile if in Finland	reading percentile if in Finland	math percentile if in Singapore	reading percentile if in Singapore	math percentile if in Switzerland	reading percentile if in Switzerland
Arrowhead UHS	10,270	16%	70.5%	69.5%	65.9%	62.0%	61%	57%	50%	60%	61%	71%
Cedarburg	10,101	14%	72.9%	81.0%	68.7%	75.6%	64%	72%	53%	73%	64%	82%
Elmbrook	11,241	27%	73.0%	74.5%	68.8%	67.9%	64%	64%	53%	66%	64%	76%
Fox Point J2	14,009	58%	66.5%	67.5%	61.1%	59.7%	55%	55%	46%	58%	57%	69%
Geneva J4	12,531	41%	43.0%	52.0%	34.8%	42.8%	28%	37%	25%	43%	34%	53%
Hamilton	9,196	4%	70.9%	72.7%	66.4%	65.7%	61%	61%	51%	64%	62%	74%
Kettle Moraine	9,920	12%	70.3%	70.7%	65.6%	63.4%	60%	59%	50%	62%	61%	72%
Maple Dale-Indian Hill	15,750	78%	70.5%	69.7%	65.9%	62.2%	61%	58%	50%	61%	61%	71%
Mequon-Thiensville	10,886	23%	74.7%	76.7%	70.8%	70.5%	66%	67%	55%	68%	66%	78%
Merton Community	8,810	-1%	82.8%	75.2%	80.6%	68.7%	77%	65%	65%	67%	75%	77%
New Glarus	10,849	22%	51.4%	62.9%	43.9%	54.5%	37%	49%	32%	53%	42%	64%
North Lake	9,888	12%	84.4%	79.1%	82.6%	73.3%	80%	70%	67%	71%	78%	80%
Norway J7	12,184	37%	55.6%	54.1%	48.6%	45.0%	42%	40%	36%	45%	46%	55%
Sevastopol	12,734	44%	71.3%	62.7%	66.9%	54.4%	62%	49%	51%	53%	62%	64%
Shorewood	11,521	30%	64.7%	73.8%	59.0%	67.0%	53%	63%	44%	65%	55%	75%
Stone Bank	11,583	31%	78.8%	71.3%	75.7%	64.1%	72%	60%	60%	62%	71%	73%
Swallow	11,260	27%	86.8%	80.9%	85.5%	75.5%	83%	72%	71%	73%	81%	82%
Waterford UHS	10,285	16%	52.1%	65.9%	44.7%	57.9%	38%	53%	33%	57%	42%	67%
Waunakee Community	9,683	9%	74.8%	70.2%	70.9%	62.8%	66%	58%	55%	61%	66%	72%
Whitefish Bay	10,471	18%	72.3%	74.2%	68.0%	67.5%	63%	63%	52%	66%	63%	76%

Source: Expenditure figures are computed using comparative cost data (2012-13 total current education cost divided by membership), obtained from DPI, http://sfs.dpi.wi.gov/sfs_cmprvcst; enrollment data obtained from the U.S. Department of Education's National Center for Education Statistics; Math and reading performance data are from Global Report Card, http://globalreportcard.org/

NOTE: Total current education cost excludes transportation, capital costs, food and community service; it is given for each full-time-equivalent student

Appendix B

Robustness checks: The makeup of a district's student body is likely endogenous with spending – for instance, districts receive additional revenue for educating economically disadvantaged students or special education students and, therefore, will likely have higher levels of expenditures. Therefore, we also estimated alternative specifications of equation (1) above, such as models that exclude district fixed effects and demographic variables. Results do not change our conclusion. When we run an OLS model without fixed effects but with demographic controls, we find estimates that are positive and statistically significant. This model, however, is essentially asking a different question. Rather than looking at how changes in spending within each district affect student outcomes, it looks at districts pooled together. Thus, it conveys how districts that spend more perform relative to districts that spend less. But even if one somehow believes this is evident of positive effects, this does not lend itself to conclusive evidence of a systematic impact by spending. Grouped with other evidence we present in this paper, these findings do not constitute reliable and consistent statistical evidence that points to systematic relationship.

We also subset districts by urbanicity (districts located in cities, suburbs, towns, and rural communities). Again, the results from these analyses do not reveal conclusive evidence that indicate marginal changes in spending have a significant impact on student outcomes.

We also estimated models that account for variation in district expenditures by including per-pupil expenditures dedicated to different functions. These categorical expenditures include:[58]

- *Current expenditures for instruction*, including teacher salaries and benefits and instructional supplies and purchased services and excluding tuition payments to other school districts;
- *General Administration expenditures* for board of education and executive administration services, and other LEA administrative functions;
- *Instructional staff support expenditures* including supervision of instruction service improvements, curriculum development, instructional staff training, and media, library, audiovisual, television, and computer-assisted instruction services;
- *School Administration expenditures* for the office of the principal services; and
- *Pupil support expenditures* for guidance, health, and logistical support that enhance instruction; these expenditures include attendance, social work, student accounting, counseling, student appraisal, information, record maintenance, and placement services;

Results are reported in Table B.1 in the appendix. While we observe a few positive estimates for each categorical spending variable, most estimates are negative, and none are statistically significant at the 95% confidence level. Thus, we cannot conclude that additional spending had any significant impact on student outcomes.

[58] These data were obtained from the NCES and were available up to 2011.

We also estimated models with outcome and demographic data reported at the school level. These models account for intra-district variation in outcomes and clustered standard errors at the district level. Again, we cannot conclude that additional spending had a significant impact on student outcomes.

Because federal and state funds are allocated to districts, and districts disburse dollars to individual schools, we cannot rule out the possibility that school-level expenditure data might produce different results. Unfortunately, longitudinal data for school-level spending are not available. However, under the American Recovery and Reinvestment Act of 2009 (ARRA), states were required to report school-level expenditures for the 2008-09 school year for all districts that received Title I Part A funds. As a final robust check, we obtained these data and estimated the following model for Wisconsin:

$$(2)\ Y_{j2010} = \alpha + \psi Y_{j2009} + \beta_1 ln(PPE_school)_{j2009} + \beta_1 ln(PPE_teacher_sal)_{j2009} + \beta_1 ln(PPE_staff_sal)_{j2009} + \delta X_{j2009} + \varepsilon_{jt}$$

where notation is the same as above, except that 2009 refers to the 2008-09 school year, *PPE_school* gives per-pupil school expenditures minus all personnel salaries, *PPE_teacher_sal* denotes teacher salaries, and *PPE_staff_sal* represents teacher support staff salaries. Once again, the results are similar (Table B.2). Most estimates on each expenditure variable are not statistically significant. This time, we observe a positive impact by non-personnel expenditures on WKCE reading and college readiness in science, but a negative impact on WKCE math. Estimates imply that a 10% increase in non-personnel spending by schools was associated with 0.3 percent fewer students proficient on the WKCE math exam and 0.25 percent more students proficient on the WKCE reading exam, holding other variables constant. Keep in mind that these school-level data provide only a snapshot. Nevertheless, these observations add support to our previous findings. We are unable to find any conclusive evidence of a systematic relationship.

Table B.1: Results for fixed effects models (dependent variables = % students proficient on WKCE reading and writing), 2006-2012

VARIABLES	(1) math	(2) math	(3) math	(4) reading	(5) reading	(6) reading
ln(per-pupil expenditures)	-2.096***	-0.458	-1.586	-0.809	-0.825	0.254
	(0.590)	(1.635)	(1.835)	(0.506)	(1.561)	(1.846)
outcome lagged one year	0.913***	0.402***	0.356***	0.897***	0.230***	0.167***
	(0.007)	(0.023)	(0.027)	(0.008)	(0.030)	(0.033)
percent IEP			-16.011**			-9.431
			(6.792)			(5.828)
percent ELL			9.894			0.722
			(6.139)			(5.852)
percent poverty			-1.529			-4.524
			(3.759)			(2.987)
percent minority			2.988			-7.445
			(5.340)			(5.115)
Constant	24.929***	35.475**	49.120***	12.033**	37.908***	32.610*
	(5.552)	(15.277)	(17.106)	(4.744)	(14.608)	(17.254)
Observations	3,348	3,348	2,839	3,348	3,348	2,839
R-squared		0.323	0.288		0.092	0.062
Number of id	419	419	419	419	419	419
District FE included	NO	YES	YES	NO	YES	YES

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

NOTES: dependent variable is the proportion of students in each district that scores Proficient or Advanced on WKCE math and reading exams for 2005-06 to 2013-14; estimates for fixed and year effects are not shown;

Sources: district WKCE data obtained from the Wisconsin DPI; student expenditures and demographic data are from the National Center for Education Statistics; poverty data from the Small Area Income & Poverty Estimates, U.S. Census Bureau

How to interpret coefficients in first row: -2.096 in column (1) indicates that a 10% increase in per-pupil spending is associated with a 0.21 percentage point decrease in the number of students proficient on the WKCE math exam, holding constant other district-level demographic variables such as students with IEP, ELL, poverty, and minority status. This estimate is statistically significant at the p<0.01 level (99% confidence level).

Table B.2: Results for fixed effects models (dependent variables = district graduation rates), 2010-2012

VARIABLES	all students			economically disadvantaged students		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(per-pupil expenditures)	0.001	0.014	0.008	-0.177**	-0.372**	-0.284*
	(0.013)	(0.041)	(0.045)	(0.086)	(0.184)	(0.171)
outcome lagged one year	0.436***	-0.228***	-0.222***	0.171***	-0.287***	-0.339***
	(0.023)	(0.063)	(0.046)	(0.031)	(0.054)	(0.052)
percent IEP			0.112			0.666
			(0.107)			(0.843)
percent ELL			0.270**			-0.976
			(0.125)			(1.316)
percent poverty			0.154*			0.120
			(0.085)			(0.800)
percent minority			-0.070			0.426
			(0.086)			(0.487)
Constant	0.517***	1.010**	1.027**	2.302***	4.471***	3.577**
	(0.121)	(0.397)	(0.427)	(0.802)	(1.702)	(1.549)
Observations	1,122	1,122	1,057	956	956	912
R-squared		0.106	0.094		0.108	0.137
Number of id	374	374	374	347	347	344
District FE included	NO	YES	YES	NO	YES	YES

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

NOTES: dependent variable is the 4-year graduation rates for all students and for economically disadvantaged students for the period 2009-10 to 2012-13; estimates for year effects are not shown

Sources: graduation data obtained from the Wisconsin DPI; student expenditures and demographic data are from the National Center for Education Statistics; poverty data from the Small Area Income & Poverty Estimates, U.S. Census Bureau

Table B.3: regression results (dependent variable = per-pupil expenditures by function)

VARIABLES	(1) percent proficient WKCE math	(2) percent proficient WKCE math	(3) graduation rate, all students	(4) graduation rate, econ disadv students	(5) ACT composite	(6) College readiness reading	(7) College readiness math	(8) College readiness English	(9) College readiness science
ln(ppe, instructional)	2.523	0.681	-0.021	-0.204	-0.107	0.041	-0.015	-0.039	0.057
	(2.374)	(2.511)	(0.067)	(0.363)	(0.343)	(0.097)	(0.096)	(0.097)	(0.089)
ln(ppe, general administration)	0.575	-0.656	0.019	0.156	-0.056	-0.009	-0.048*	0.038	-0.039*
	(0.912)	(0.737)	(0.025)	(0.123)	(0.127)	(0.028)	(0.028)	(0.027)	(0.024)
ln(ppe, instructional staff support)	-0.505	-0.183	-0.013	-0.151	0.045	0.002	-0.001	-0.007	0.030*
	(0.773)	(0.566)	(0.017)	(0.122)	(0.096)	(0.018)	(0.023)	(0.020)	(0.018)
ln(ppe, school administration)	-0.508	-0.216	-0.009	-0.028	0.120	-0.006	0.040	-0.008	0.034
	(0.430)	(0.475)	(0.007)	(0.244)	(0.086)	(0.042)	(0.035)	(0.049)	(0.042)
ln(ppe, student support services)	-0.681	-0.592	0.011	0.056	-0.102	0.011	0.011	0.015	-0.004
	(0.887)	(0.506)	(0.011)	(0.097)	(0.102)	(0.024)	(0.023)	(0.022)	(0.020)
outcome lagged one year	0.313***	0.114***	-0.286***	-0.481***	0.027	-0.231***	-0.221***	-0.269***	-0.259***
	(0.030)	(0.038)	(0.085)	(0.078)	(0.023)	(0.032)	(0.037)	(0.038)	(0.034)
Constant	17.208	36.675*	1.335**	2.785	22.425***	0.390	0.768	1.099	-0.184
	(21.791)	(22.156)	(0.651)	(2.866)	(3.058)	(0.812)	(0.873)	(0.851)	(0.733)
Observations	2,409	2,409	739	632	3,990	1,458	1,458	1,458	1,447
R-squared	0.258	0.032	0.189	0.259	0.041	0.062	0.098	0.071	0.096
Number of id	404	404	370	330	370	368	368	368	367

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Sources: expenditure data are from the National Center for Education Statistics (U.S. Department of Education); district WKCE data, graduation data, and ACT data obtained from the Wisconsin Department of Public Instruction

How to interpret coefficients in first row: 2.5 in column (1) indicates that a 10% increase in per-pupil spending is associated with a 0.25 percentage point decrease in the in the number of students proficient on the WKCE math exam.

Table B.4: OLS model results, impact of 2008-09 school-level expenditures on outcomes

VARIABLES	(1) percent proficient WKCE math	(2) percent proficient WKCE reading	(3) graduation rate, all students	(4) graduation rate, econ disadv	(5) ACT composite	(6) College readiness reading	(7) College readiness math	(8) College readiness English	(9) College readiness science
ln(non-personnel expenditures)	-2.973**	2.454**	0.023	-0.067	0.714*	0.005	0.019	0.020	0.029**
	(1.388)	(1.244)	(0.050)	(0.144)	(0.405)	(0.014)	(0.014)	(0.013)	(0.014)
ln(ppe, teacher salaries)	1.542	1.382	0.023	0.065	-0.166	-0.000	-0.023**	-0.006	-0.017*
	(1.078)	(0.962)	(0.036)	(0.097)	(0.300)	(0.010)	(0.010)	(0.009)	(0.009)
ln(ppe, instructional staff salaries)	-1.131*	-1.138**	0.012	-0.007	-0.197**	-0.004	-0.003	-0.009*	-0.003
	(0.643)	(0.574)	(0.011)	(0.029)	(0.087)	(0.006)	(0.006)	(0.005)	(0.005)
outcome lagged one year	0.809***	0.695***	--	--	0.675***	0.821***	0.874***	0.879***	0.749***
	(0.016)	(0.021)			(0.045)	(0.023)	(0.019)	(0.022)	(0.024)
Student enrollment	-0.000	0.003***	0.000**	0.000**	0.000***	-0.000	0.000*	0.000	0.000*
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ell_pct_2009	10.504***	-2.905	-0.308*	-0.478	-0.703	0.114***	0.138***	0.158***	0.161***
	(2.330)	(2.073)	(0.179)	(0.476)	(1.299)	(0.029)	(0.029)	(0.027)	(0.028)
frl_pct_2009	-7.474***	-8.596***	-0.165**	0.366**	-1.346**	-0.052***	-0.029*	-0.058***	-0.070***
	(1.478)	(1.358)	(0.065)	(0.184)	(0.530)	(0.016)	(0.016)	(0.015)	(0.016)
iep_pct_2009	0.075	-12.102***	-0.390**	-0.668	0.154	-0.003	0.083*	0.073*	0.047
	(4.335)	(3.914)	(0.198)	(0.553)	(1.575)	(0.048)	(0.048)	(0.044)	(0.046)
minority_pct_2009	-4.755***	-4.489***	-0.204***	-0.285**	-2.912***	-0.119***	-0.121***	-0.155***	-0.103***
	(1.266)	(1.129)	(0.048)	(0.129)	(0.399)	(0.016)	(0.016)	(0.015)	(0.015)
Constant	34.597***	-7.146	0.516*	0.779	4.464*	0.118	0.134	0.060	0.044
	(8.252)	(7.354)	(0.279)	(0.813)	(2.299)	(0.088)	(0.088)	(0.081)	(0.084)
Observations	1,198	1,197	269	248	261	1,232	1,232	1,232	1,231
R-squared	0.828	0.801	0.393	0.039	0.871	0.751	0.808	0.827	0.684

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Source: Outcome data are from the NCES; school-level expenditures come from the U.S. Department of Education; they were reported by states in response to a requirement under the American Recovery and Reinvestment Act of 2009 (ARRA), and all states that received Title I Part A funds under ARRA were required to report school-level expenditures for the 2008–09 school year for all districts.

Appendix C

Table C.1: Statewide and national polls on school choice

Poll	sample	% support	% oppose	margin of support
Wisconsin polls				
Howell (2015)*				
providing government subsidies for private tuition for all children	600 WI residents	47%	40%	**8%**
providing government subsidies for private tuition for children with special needs		62%	27%	**35%**
NMB Research (2014)**				
give parents the right to use tax dollars to send their children to public or private school of their choice	500 likely voters from swing legislative districts	63%	n/a	**n/a**
expanding statewide PCP to allow any working class WI parent to access to public dollars for choosing public or private schools		60%	n/a	**n/a**
eliminating the cap on vouchers in statewide PCP		56%	n/a	**n/a**
WPRI (2012)	605 Milwaukee City residents			
formation of charter schools		48%	30%	**17%**
National polls				
Beck Research, LLC (2015)				
support the concept of school choice	1,800 likely November 2016 voters	69%	27%	**42%**
specific school choice proposals				
vouchers		63%	34%	**29%**
tax credits		70%	26%	**44%**
ESA		66%	29%	**37%**
special needs scholarships		83%	14%	**68%**
charter schools		76%	20%	**56%**
DiPerna (2014)***				
school vouchers				
all respondents	1,007 American adults	63%	33%	**30%**
urban		63%	35%	**28%**
suburban		61%	34%	**27%**
small town		66%	31%	**35%**
rural		64%	32%	**32%**
vouchers should be available regardless of incomes or special needs		65%	31%	**34%**
charter schools				
all respondents		61%	26%	**35%**
urban		66%	26%	**40%**
suburban		55%	30%	**25%**
small town		66%	24%	**42%**
rural		62%	26%	**36%**

* poll was commissioned by the Wisconsin Policy Research Institute and conducted by William G. Howell, Harris School of Public Policy, University of Chicago

** poll was commissioned by the American Federation for Children

*** poll was commissioned by the Friedman Foundation for Educational Choice and conducted by Braun Research, Inc.