Education Research Brief

More Compelling Evidence That Increased Funding Improves School Outcomes

Trevor Cobbold

February 2018

Save Our Schools

http://www.saveourschools.com.au
https://twitter.com/SOSAust
saveourschools690@gmail.com

Introduction

There is an abundance of evidence that money matters in education, especially for disadvantaged students. In the last four months alone, seven new studies were published on school funding and student outcomes. Six showed that increasing funding improves school outcomes and another one showed that school funding cuts reduce student achievement.

These studies complement six others in the preceding 18 months showing that increases in school funding improve student results. Numerous other studies in earlier years produced similar results. The studies provide compelling evidence of the worth of targeting funding increases to meet the learning needs of disadvantaged students.

All these studies present a strong refutation of claims that school funding increases fail to improve results. The studies variously show that increased funding improves test score results, reduces achievement gaps between rich and poor, and increase high school completion rates, post-school earnings and employment.

The claims that school funding increases in Australia have failed to improve results are highly misleading. The increase in funding per student for all schools over the last six years for which figures are available was only 2.8% after adjusting for rising costs. This funding increase was not directed to those most in need. Private schools had their funding increased by 13% while funding for public schools was cut by 1%, even though they enrol 80-85% of all disadvantaged students. As one of the new studies show, cutting funding for public schools reduces student achievement while another shows that students are harmed more by spending cuts than they benefit from equivalent increases in spending.

Six of the seven new studies are from the United States and the fifth is from England. The English study analysed the effect of increased funding on test results in urban primary schools. Four of the new US studies examined the relationship between school expenditure and student outcomes in different regions: the impact of changes in the California school funding scheme on high school graduation rates and student achievement; the impact of increased school expenditure on drop-out rates in New York state; the relationship between school expenditure and student achievement in New York state; and the effect of revenue changes on high school graduation rates and student achievement across 24 US states. The fifth study analysed the effect of increased funding for schools on post-secondary school attainment. The sixth study examined the effect of funding cuts on student achievement and high school graduation rates following the 2008 recession.

Several of the studies report the effects of increased expenditure in terms of a statistical measure called a standard deviation. Effect sizes should be interpreted with respect to empirical benchmarks that relate to the policy or program area. An appropriate benchmark to assess the impact of education interventions on school outcomes is the growth in student learning from year-to-year. The average annual gain in effect size from nationally-normed tests varies considerably according to both year-level and subject. For example, a research study published by the Institute of Education Statistics in the US Department of Education found that the annual gain in effect size for reading varies from 1.14 in K-1 to 0.06 in Year 11-12 so that an effect size of 0.10 standard deviation would constitute a relatively smaller change for students in early grades than for students in later grades. Thus, it is important to interpret a study's effect size estimates in the context of the outcome being measured.

English study

The English study was published in the *Journal of the European Economic Association* in November. It found large effects of increased spending in urban primary schools on the results of national tests at

the end of Year 6. The increase in expenditure was over the preceding year levels (up to four) before the tests. It found that a 30% increase in mean expenditure of £1,000 per year (a 30% increase) raised achievement by around 0.3–0.35 of a standard deviation, which is roughly equivalent to about a year of learning.

The effects were even bigger in schools that have higher proportions of disadvantaged students. Expenditure increases had much stronger effects in schools with high proportions of students eligible for free meals, higher proportions of non-white students, lower than average mean prior achievement, and where a high proportion come from neighbourhoods with a high index of deprivation. In these demographically disadvantaged schools, £1,000 more expenditure was associated with an increase of 0.43–0.5 of a standard deviation in test scores. This is a very large effect and equates to well over a year of learning at the end of primary school.

The estimates are larger than those typically found in the literature for general resource increases in education, although comparable to the effects of class size reductions in the Tennessee STAR experiment. The authors suggest that their higher estimates arise because they focus on persistent cross-sectional differences in income and expenditure, whereas many previous studies have identified effects from short run variation within schools. They suggest that schools are likely to adapt to short run changes in funding and so appear relatively unresponsive to resources in studies that exploit this type of variation.

The study took advantage of education funding policy anomalies in England whereby schools with similar characteristics in one geographical area but in different education districts (LEAs) can get very different levels of core funding from the central government. This discrepancy occurs because core funding is allocated to urban LEAs by the central government according to the proportion of students with additional education needs and an area cost adjustment. However, the funding is not redistributed from LEAs to schools according to these rules. Therefore, two neighbouring schools in adjacent LEAs with students with similar educational needs, staff wages, input prices, and other constraints can get very different levels of funding simply because of the difference in the average educational needs of the LEA and the average market wages in the labour market area in which they are located.

The study matched schools according to school level proxies for key characteristics that determine the grant their LEA receives: the proportion of children entitled to free meals, and geographical location. It then used the discontinuity in funding and student test scores between closely neighbouring primary schools in adjacent LEAs to estimate the causal effect of funding differentials on student outcomes. These funding differentials caused significant differentials in student performance:

> We find that these funding disparities give rise to sizeable differences in pupil attainment in national tests at the end of primary school, showing that school resources have an important role to play in improving educational attainment, especially for lower socio-economic groups. [p. 1]

The authors concluded that the results of their study are crucially important for higher level policy making.

> ….they help address the question as to whether school budgets should be ring-fenced from cuts to public expenditure and whether resources should be explicitly directed to pupils from lower socioeconomic groups (or more accurately, to the schools which they attend). [p. 39]

California school finance reform

In 2013, the state of California implemented a major change in how schools are funded. It attempted to address funding inequities by allocating funding according to student disadvantage (rather than district property wealth) and by removing many of the restrictions on how funds could be used. School district revenues were based almost entirely on the proportion of disadvantaged students in each district—those who qualify for free or reduced-price lunch, have limited English proficiency, or are in foster care.

The three core components of the new funding arrangements are a base grant, a supplemental grant, and a concentration grant. There was also a guaranteed minimum equal to the amount received in 2012–13. The supplemental grant is 20% of the base grant multiplied by the high-need share of enrolment. The concentration grant is 50% of the base grant multiplied by the high-need share of enrolment above 55%. State regulations require the concentration grants be used to increase or improve services for high-need students as compared to services provided to all students.

The new funding arrangements were supported by an $18 billion commitment in increased state support over 8 years.

A study published by the Learning Policy Institute in Washington DC in February is the first one to assess the effects of the new funding scheme on student outcomes. The study, *Money and Freedom: The Impact of California's School Finance Reform*, examines high school graduation rates, and student achievement by grade and subject (mathematics and reading) in the years before and after the implementation of new funding scheme for all public schools in California. It found strong effects on high school graduation rates and reading and mathematics results for all students, low income students, and students from all racial ethnic groups.

> In sum, the evidence suggests that money targeted to students' needs can make a significant difference in student outcomes and can narrow achievement gaps. [p. 1]

It found that a $1,000 increase (about 10%) in district per-student funding by the state in grades 10–12 led to a 5.3 percentage-point increase in high school graduation rates among all students. The same increase resulted in a 6.1 percentage-point increase for low income students, a 5.3 percentage-point increase for Black students, 4.2 percentage-point increase for non-Hispanic White students, and a 4.5 percentage-point increase for Hispanic students.

The results show average gains in mathematics and, to a smaller extent, in reading for all students. These effects are larger for children from low-income families and are particularly strong for high school mathematics achievement for these students. On average, a $1,000 increase in district per-student funding by the state in grades 9–11 leads to an increase of a 0.19 standard deviation in mathematics test scores and a .07 standard-deviation increase in reading test scores among low income students in 11th grade. These are large effects at this level of schooling and represent about a year of learning at the different grade levels.

The study employed three different empirical strategies to isolate the effects of funding on student outcomes and found a similar pattern of results across all three research designs. They all provide strong evidence that increases in school spending led to significant increases in high school graduation rates and academic achievement, particularly among low income students.

The study also found that school districts used their increased funding to reduce student-to-teacher ratios, increase per-student expenditures, increase teacher salaries, and increased instructional

expenditures. A significant proportion of districts' expenditures were focused on the classroom. The authors suggested that higher teacher salaries may help schools and districts attract and retain better-prepared, high-quality teachers.

School expenditure and drop-out rates in New York State

A study published in the academic journal *Education Economics* in February found that increases in school expenditures reduced dropout rates from high school in New York State. It found that a percentage increase in expenditure per student will result in a decrease of around 0.23% in the 12th grade dropout rate. Given that the average dropout rate for the 12th grade is 4%, this result suggests that an 8% increase in school expenditures could reduce the dropout rate by half.

The study analysed how changes in school expenditures affect dropout rates based on data from 466 school districts in New York State during the 2003/04 to the 2007/08 school years. It used a special feature of the way in which New York State determines the level of school funding to isolate the effect of expenditure differences on student drop-out rates. New York sets the level of school funding by school district budget referenda. Each year, school boards propose a budget to be approved by residents voting in a school district referendum. Under the school budget referendum system, a vote defeating a budget usually causes a more austere school budget and hence diminished expenditures per student in comparison to the previous school year. The study exploited the discontinuity in the likelihood of school budget referenda around the 50% voting share by comparing expenditures per student for school districts which barely approve or barely fail budget referenda. It found clear evidence that the school districts at the margin of passing a budget vote are spending more than those failing at the margin.

The study states that the evidence that school expenditures can reduce the number of dropouts is important from a policy perspective. By dropping out, students significantly diminish their chance of finding a decent job, and thus suffer from reduced earnings. Moreover, there are significant social and economic costs to the rest of the community in which they live. Over one's lifetime, a new graduate confers a net benefit to taxpayers of about $127,000 so that reducing the current number of dropouts by half could yield a $90 billion public gain.

School expenditure and outcomes in New York State

A paper presented to the annual conference of the Association for Public Policy Analysis and Management last November by academics from University at Albany and the State University of New York also found that higher spending targeted at disadvantaged students improves school results. It concluded that its findings refute the claims of critics of more spending on schools and disadvantaged students.

> This study strengthens the case that school resources matter, and that targeted financial investments can help close educational achievement gaps….
> The findings in our study show clear and compelling evidence that PPE have a positive and significant impact on student outcomes, providing new evidence which contributes to a long-standing debate over the relationship between educational resources and student performance.

The study investigated the relationship between educational expenditures and student performance in New York State school districts between the 2007-08 through 2014-15 academic years. It found that higher per student expenditure has a statistically significant impact on student achievement. An increase of $1,000 per student in elementary schools (grades 3-8) increased achievement by disadvantaged students in mathematics by 0.05 a standard deviation and by 0.7 in English, which is about one-fifth of a grade level.

The $1,000 increase amounted to about a 5% increase in average per student expenditure. Thus, even a small increase in expenditure can have a significant effect on the achievement of disadvantaged students. The authors state:

> The magnitudes of these student achievement effects are large enough to justify increasing expenditures as a viable policy instrument for improving mean educational performance or for equalizing outcomes between disadvantaged and advantaged student populations.

The study used an idiosyncratic provision in New York State stipulating that school districts could not lose money if their estimated need declined. The largest impact of this provision was that districts did not lose funding when their enrolments decreased, leading districts with declining enrolment to have systematically higher per-student expenditures than others. This provided a natural quasi-experiment to compare education outcomes in districts with higher expenditure than others. The study demonstrated that the enrolment changes were uncorrelated with demographic characteristics that would indicate a change in district composition.

School spending and student outcomes across 24 US states

A working paper from the Department of Economics at Cornell University published in November investigated the effect of changes in education spending caused by property value fluctuations on district-level student outcomes in 24 states. Despite the increased importance of state government funding, property taxes are still a major component of local education spending for school districts in most US states.

The paper found that a 10% increase in spending improves graduation rates by 3 to 5 percentage points and student test scores by 0.07 to 0.09 standard deviations. The paper found that it is only spending in the last two years of high school affects graduation rates, which suggests that students on the margin of dropping out quickly respond to education investments.

Spending increases improved graduation rates by more in high-income districts. It found that a 10% increase in spending increases graduation rates by 4.4 to 7 percentage points in high income districts and 0.6 to 2.1 percentage points in low income districts.

The results also indicate that a 10% increase in average expenditure 5 to 8 years prior to the tests increases 4th grade mathematics and reading scores by about 0.09 standard deviations, which is equivalent to about one quarter to one fifth of a school year. It increases 8th grade reading scores by 0.07 standard deviations (about one quarter of a school year), but the effect on mathematics scores was statistically insignificant. The estimates suggest that the gains in 4th grade scores and 8th grade reading scores are concentrated in low-income districts. As the author states, these estimates are consistent with those of other studies:

> My estimates are consistent with the most recent, well-identified estimates, which suggest that increasing total school resources does indeed improve test scores. [p. 3]

The results also indicate that increased spending has a lasting impact on test scores as increased funding before students enter school has a significant effect several years later. This indicates that there are durable or delayed effects of investments in school inputs on test scores. As the author states:

> This is another reason that simply comparing the current level of funding with contemporaneous outcomes is not likely to capture the relationship between spending and student achievement. [p. 5]

The paper also found evidence that students are harmed more by spending cuts than they benefit from equivalent increases in spending. It found that cuts to spending have up to a 12% larger effect on graduation rates than equivalent increases in spending.

Increased school funding increases post-secondary attainment

Another academic study has found that increased expenditure on primary schools has positive long-term effects on educational attainment. The study, published in the November issue of the journal *Economic Policy*, found that a 10% increase in spending for grades 4-7 in Michigan resulted in a 7% increase in college enrolment and an 11% increase in college completion. It also found that the additional expenditure led to an increase of 3–5 percentage points in high school graduation rates.

The study analysed the long-term effects of a change in school funding requirements in Michigan in 1995 under which state revenue replaced local property taxes as the source of school revenue. Prior to 1995, schools were funded by local property taxes and education funding across the state was highly unequal.

Under the new arrangements, each district was assigned a per student spending amount known as a foundation allowance. Districts were not allowed to spend less than the allowance on per student expenditures and, with few exceptions, were not allowed to raise funds locally to spend more. The allowance was designed to equalize school funding through the early 2000s by boosting funding in initially low-spending districts without reducing the funding of initially high-spending districts. It substantially increased school spending among previously low-spending districts.

The study found that how school districts allocated expenditure increases affected the distribution of benefits. It found that school districts allocated the increases mainly to schools serving wealthier families within the district. For example, the funding increase for schools with higher-income families was four times that for schools serving low-income families.

As a result, the increase in college entry and completion was concentrated among urban and suburban districts, low poverty districts, and higher achieving districts. It appears that decisions by local school districts subverted the original intention of the school finance reforms. As the study noted, this demonstrates that local government responses to state or federal education policies can result in benefits accruing to students who may not have been the intended beneficiaries of the policy.

The study replicated earlier studies of the effect of increased spending on student achievement in grade 4 and later grades. It found that a 10% increase in expenditure increased the proportion of students passing the 4th grade test increased by 2 percentage points, which was about half the effect found in the earlier studies. It found no effect of the 4th grade increase in expenditure on student achievement in grades 7 and 11.

Spending cuts harm students

Another US study published by the National Bureau of Economic Research in January examined how student performance responded to school spending cuts induced the economic recession in 2008. It found that student test scores declined in states with high dependence on state revenues to fund public schools following the recession, relative to other states that were less reliant on state revenues.

The study found that a 10% ($1,000) cut per student reduced average test scores in 4th and 8th grade by about 0.078 of a standard deviation. The results were different for mathematics and reading with

the funding reduction reducing reading test scores by 0.035 of a standard deviation and mathematics by 0.12 of a standard deviation.

The effects were larger in 8th grade than 4th grade. A 10% funding cut per student reduced mathematics scores by 0.15 of a standard deviation in 8th grade, which is about a half of a year in learning at that Year level and by 0.1 in 4th grade which is less than a month of learning. The smallest effects were for reading, with reductions of 0.03 and 0.05 in 4th and 8th grade respectively.

There were also longer-term effects. A 10% spending reduction during all four high school years was reduced graduation rates by 2.6 percentage points. Cutting spending across all school-age years by 10% reduced high school graduation rates by 4.7 percentage points.

The study concluded that while the estimated effects of the funding cuts were generally small, they indicate that spending cuts do matter.

> Our results present further evidence that there is a causal link between changes in the level of financial resources available to a school district and the academic outcomes of the students….we find students that experienced reduced public school spending had both lower test scores but also less high school completion. These patterns suggest that (a) school spending cuts do matter, and that (b) the ill-effects of the recession on the affected youth (through reduced public school spending) will be felt for years. [p. 22]

One reason for the smaller effect of spending cuts on test scores is that school districts responded to budget cuts by cutting more from construction expenditures and less from core K-12 spending. School districts cut back on non-essential spending first before having to cut core services that may have deleterious effects on student outcomes. They were able to preserve more of their core operational services in the face of funding cuts by delaying construction projects.

Abundant evidence supports increased funding for disadvantaged students

There is now a mountain of evidence showing that increasing funding for schools, especially disadvantaged schools, improves school and post-school outcomes. In addition to the six new studies in the last few months, another six studies over 2016 and 2017 variously showed that more spending improves test score results, reduces achievement gaps, and increases high school completion rates, post-school earnings and employment. Numerous earlier studies also demonstrated that money matters in education, especially for disadvantaged students.

These studies show that targeting funding increases to disadvantaged schools and students is fundamental to improving student achievement and reducing achievement gaps between the advantaged and disadvantaged. The effects of relatively small increases in expenditure on test scores are large, often amounting to six months to a year of learning.

Claims that large funding increases in Australia have not led to increased school results are highly misleading. First, after adjusting for rising costs, the increase in government funding from all sources (Commonwealth & State/Territory) for all schools between 2009-10 and 2015-16 was very small – it was only $329 per student across all schools, that is, just over $50 per student per year. The percentage increase over the six years was only 2.8%. Such a small funding increase is far short of what is needed to improve results for disadvantaged students.

Second, the increase in inflation-adjusted funding was confined to private schools which enrol only 15-20% of disadvantaged students. Government funding for private schools increased by $1,165 per student (13%) and was cut by $88 per student (-1%) in public schools. Yet, 80-85% of disadvantaged

students are enrolled in public schools. In other words, real funding increases over recent years went to the school sectors with the least need while the sector most in need was denied any real funding increase.

The misdirection of school funding increases is a critical factor behind the continuing stagnation in test results and the failure to make any headway in reducing the large achievement gaps between rich and poor. As David Gonski said in response to the criticism of his plan that increased funding has failed to improve outcomes:

> ...the essence of what we contended, and still do, was that the way monies are applied is the important driver. Increasing money where it counts is vital. The monies distributed over the 12-year period to which the commission refers were not applied on a needs based aspirational system…

There is little prospect that past funding trends will be reversed under the Turnbull Government's Gonski 2.0 funding plan. Public schools are likely to remain significantly under-funded unless state/territory governments reverse their past practice of substituting Commonwealth funding for their own and failing to increase funding above the rate of cost increases. In contrast, the majority of private schools will be over-funded under the Turnbull plan and will cost the taxpayer billions of dollars over the next decade.