

Education Revenue and Student Achievement — Key Research Findings

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1. The current context is one of deep cuts in education spending.

“Elementary and secondary education spending as a share of personal income is lower than any time in the past decade and lower than 1993” (Baker & Weber, 2016, p. 24).

“Kentucky is among the states that have cut public education funding most deeply over the last decade. ... The state sets aside 15.8 percent less per public school student than it did in 2008 — the third largest drop in the nation” (Barton, 2017).

“Spending cuts over the recovery were not the result of weak state economies. Rather, many state legislatures and governors cut spending in order to finance tax cuts for the wealthy and corporations” (Economic Policy Institute, 2019, p. 1).

“There is a direct correlation between dwindling resources for public schools and the ongoing political proclivity for transferring public dollars to the nation’s wealthiest individuals and corporations” (Alliance to Reclaim Our Schools, 2018, p. 1).

“Reduced spending for K–12 schools and the corresponding cutbacks in teacher salaries were conscious policy choices and were frequently done to accommodate tax cuts for corporations and the rich as well as an ideological commitment to smaller government” (Economic Policy Institute, 2019, p. 13).

“Cuts to K-12 spending have ‘serious consequences,’ [the Center on Budget and Policy Priorities contends], including crippling efforts to hire and retain the best teachers, reduce class sizes, expand learning time, and provide high-quality early childhood education” (Bryant, 2017).

“In the absence of adequate funding, or in the aftermath of deep cuts to existing funding, schools are unable to do many of the things necessary to develop or maintain the key elements of quality education, and achievement ultimately declines” (Learning Policy Institute, 2017, p. 14).

As of 2016, Kentucky was the 16th worst in the nation at funding adequacy, defined as, “current spending as a percentage of predicted spending required to achieve national average test scores in highest poverty districts” (Albert Shanker Institute, 2019, p. 12).

“The situation [in Kentucky] may be so dire that without tax reform to generate additional state tax revenues, we will likely face substantial cuts to base SEEK funding and all other educational programs” (Kentucky School Boards Association, 2017).

2. Equity is a persistent challenge in education funding.

“Schools in the United States are among the most inequitably funded of any in the industrialized world, with those serving the most affluent students often much better resourced than those serving the poorest” (Learning Policy Institute, 2017, p. vi).

“For a state school finance system to provide equal educational opportunity, that system must provide sufficiently higher resources to ensure adequacy and equity in higher need (e.g., higher poverty) settings than in lower need settings” (Learning Policy Institute, 2017, p. 3).

“As concentrated poverty increases, the costs of achieving any given level of outcomes increase significantly. ... It takes more money to get a more ambitious job done, and it takes more when students have greater needs” (Learning Policy Institute, 2017, p. 10).

“Prior research has shown that children from low-income families may be more sensitive to changes in school quality and school-related interventions than children from more advantaged backgrounds” (National Bureau of Economic Research, 2015, p. 24), which makes recent cuts to education especially harmful for the most vulnerable students.

“There is considerable research in psychology and education to support the hypothesis that home environment has very strong effects on student achievement, stronger in fact than social class effects The most important home environment variables involve a parent (or parents) expending time participating in or facilitating activities with children which enhance learning (reading with the child, playing games with educational content, helping with homework, etc.). These home environment variables have been characterized as social capital. ... These indicators have shown marked declines in the last quarter century. ... We conclude that ... increases in school expenditures substitute for the informal educational resources we characterized as social capital investments” (Greenwald, Hedges, & Laine, 1996, pp. 383-384).

“Virtually all of the options for improving America’s schools require investment — particularly for disadvantaged students ... however, resources in most states tend to be allocated non-progressively or even regressively. That is, higher-poverty districts do not receive more funds — and in some cases receive substantially less — than do lower-poverty districts. ... The vast majority of states spend well under the levels that would be necessary for their higher-poverty districts to achieve national average test scores” (Albert Shanker Institute, 2019, p. 1).

“There is now broad agreement among scholars and organizations across political and disciplinary spectra that school districts serving higher-needs student populations — those with

higher poverty rates in particular — require not the same, but more resources per pupil than districts serving lower-needs student populations” (Albert Shanker Institute, 2019, p. 5).

“It is clear that state school finance systems should strive to be progressive: They should channel more funds toward districts with higher levels of student poverty, because that is where those funds are needed the most” (Albert Shanker Institute, 2019, p. 5).

“On average, the highest-poverty U.S. districts spend only about two-thirds of how much they would have to spend in order for their students to achieve national average test scores” (Albert Shanker Institute, 2019, p. 11).

“The goal of getting students in high-poverty districts in most states to score at current national averages would require many years of sustained investment and improvement” (Albert Shanker Institute, 2019, p. 11).

“Most states provide sufficient resources to their lowest-poverty districts and achieve above-average outcomes. The opposite is true, however, of the highest-poverty districts: they are underfunded vis-à-vis predicted requirements, and their students perform accordingly” (Albert Shanker Institute, 2019, p. 15).

“Between 2005 and 2017, public schools serving majorities of low-income students in the U.S. were under-funded by \$580 billion in federal dollars alone” (Alliance to Reclaim Our Schools, 2018, p. 2).

“Though the federal government contributes only about 8 percent of all spending on K12 public schools, it is critical funding because the majority of that funding is directly targeted at students with the greatest needs — low income children and students with disabilities. Five decades of Congressional failure to fully invest in the two largest K-12 funding streams [Title I and IDEA] has denied these children and, we argue, all children, the additional supports they need” (Alliance to Reclaim Our Schools, 2018, p. 4).

“Over the past dozen years, Congressional appropriations for Title I have averaged less than half the promised funding” (Alliance to Reclaim Our Schools, 2018, pp. 4-5).

“The financial assumption underlying IDEA is that on average, the cost of educating a child with disabilities is twice the cost of educating a non-disabled student” (Alliance to Reclaim Our Schools, 2018, p. 5).

“If Title I was fully funded by Congress, the nation’s high-poverty schools could provide:

- health and mental health services for every student, including dental and vision services; and
- a full-time nurse in every Title I school; and
- a full-time librarian for every Title I school; and
- a full-time additional counselor for every Title I school, or
- a full-time teaching assistant in every Title I classroom across the country” (Alliance to Reclaim Our Schools, 2018, p. 5).

“IDEA made providing these additional services mandatory and Congress pledged that the federal government would pay up to 40 percent of the cost. ... Federal funding of IDEA has never approached the promised 40 percent mark [and since 2011 it has been only 15 or 16 percent]. And because IDEA guarantees the necessary services for all students with disabilities, state and local governments must not only contribute their share, but also cover the unfunded federal contribution. ... Even the best resourced school districts are finding it difficult to meet the needs. But in districts already struggling for resources, the mandate of IDEA has shattered school budgets, affecting educational quality for all students — those with, and without disabilities” (Alliance to Reclaim Our Schools, 2018, pp. 5-6).

“Since 2005, the aggregated federal underpayment to states to help provide services to students with disabilities has reached \$233 billion. This amounts to an average of \$2,637 in additional funding each year for every special needs student in the country, 53 percent of whom are students of color” (Alliance to Reclaim Our Schools, 2018, p. 6).

“Fully funded, this federal contribution [for IDEA] would have been more than enough to assign an additional teacher’s assistant for every twelve students with disabilities in a school” (Alliance to Reclaim Our Schools, 2018, p. 6).

“Federal short-changing of public schools, just through [Title I and IDEA] approached \$55 billion in 2017 alone” (Alliance to Reclaim Our Schools, 2018, p. 6).

Between 2005 and 2017, the federal government has shortchanged Kentucky \$9.3 billion of funding in Title I and IDEA funds (Alliance to Reclaim Our Schools, 2018, pp. 19-20).

“[There is] a positive relationship between funding gaps and outcome gaps” (Albert Shanker Institute, 2019, p. 14).

Kentucky spends only 57.7 percent of what is required for high-poverty districts to achieve national average test scores (Albert Shanker Institute, 2019, p. 12).

Kentucky students in high-poverty districts are greatly exceeding expectations relative to the funding they receive (Albert Shanker Institute, 2019, p. 14), a testament to the ability of Kentucky schools to yield significant returns on investment in education.

3. There is a clear causal link between overall education spending and student achievement.

“Our results indicate a causal relationship between per-pupil spending and student outcomes” (National Bureau of Economic Research, 2014, p. 44).

“A broad range of school inputs are positively related to student achievement, and ... the magnitude of the effects are sufficiently large to suggest that moderate increases in spending may be associated with significant increases in achievement” (Greenwald, Hedges, & Laine, 1996, p. 362).

“Often, moderate increases in spending are associated with significant increases in achievement and graduation rates” (Learning Policy Institute, 2017, p. 5).

“Global resource variables such as [per-pupil expenditures] show strong and consistent relations with achievement” (Greenwald, Hedges, & Laine, 1996, pp. 384-385).

“A political and empirical consensus has emerged about the importance of equitable and adequate school funding for high-quality K-12 education. ... This consensus — that money does, indeed, matter — is supported by a growing body of high-quality empirical research” (Albert Shanker Institute, 2019, pp. 1-2).

“More equitable and adequate allocation of financial inputs to schooling provides a necessary underlying condition for improving the equity and adequacy of outcomes” (Learning Policy Institute, 2017, p. vii).

“On average, aggregate per-pupil spending is positively associated with improved student outcomes. ... Schooling resources that cost money are positively associated with student outcomes” (Learning Policy Institute, 2017, p. 1).

“Studies have invariably found a positive, statistically significant relationship between student achievement gains and financial inputs” (Learning Policy Institute, 2017, p. 5).

“The association of higher spending with better student outcomes holds true, on average, even in large-scale studies across multiple contexts” (Learning Policy Institute, 2017, p. 14).

“Since 2003, researchers in 25 states and the District of Columbia have conducted 41 ‘adequacy’ studies that quantify the resources and conditions that students need to succeed in

school. All but one of those studies recommended increased funding for public schools” (Alliance to Reclaim Our Schools, 2018, p. 3).

“The centrality of funding to improving outcomes is slowly gaining political consensus in all but the most extreme ideological camps. The idea that ‘money doesn’t matter’ is no longer defensible” (Albert Shanker Institute, 2019, p. 25).

4. Increasing overall education spending is especially beneficial for low-income children.

“There is strong evidence of a causal effect of school spending on outcomes for children from poor families” (National Bureau of Economic Research, 2014, p. 38).

“There is now widespread agreement, backed by research, that we cannot improve education outcomes without providing schools — particularly schools serving disadvantaged student populations — with the resources necessary for doing so” (Albert Shanker Institute, 2019, p. 2).

“States with greater overall investment in education ... tend across the board to have higher outcomes for low-income students, and progressiveness of spending and staffing are consistently, positively associated with outcomes for low-income students” (Baker & Weber, 2016, p. 24).

“Additional funding appears to matter more for some students than for others — in particular students from low-income families who have access to fewer resources outside of school” (Learning Policy Institute, 2017, p. 1).

“Collectively, [recent] studies provide compelling new evidence of the large-scale achievement and economic benefits of substantive and sustained additional funding for schools serving higher-poverty student populations” (Learning Policy Institute, 2017, p. 7).

“States that have targeted more resources to higher-poverty settings show higher performance among low-income students and smaller gaps between low-income and non-low-income students” (Baker & Weber, 2016, p. 25).

“Increases in per-pupil spending, induced by court-mandated school finance reforms, led to significant increases in the likelihood of graduating from high school and educational attainment for poor children, and thereby narrowed adult socioeconomic attainment differences between those raised in poor and affluent families. ... These improvements reflect the causal effect of school spending and show that these results persist with controls for other coincident policies” (National Bureau of Economic Research, 2014, pp. 4-5).

“Increased per-pupil spending ... increased the high school graduation rates and educational attainment for low-income children, and thereby narrowed adult socioeconomic attainment differences between those raised in low-and high-income families” (National Bureau of Economic Research, 2015, p. 3).

“For low-income children, a 10 percent increase in per-pupil spending each year for all 12 years of public school is associated with 0.43 additional years of completed education, 9.5 percent higher earnings, and a 6.8 percentage-point reduction in the annual incidence of adult poverty” (National Bureau of Economic Research, 2015, p. 3).

“Increasing per-pupil spending by 10 percent in all 12 school-age years increases the probability of high school graduation by 11.6 percentage points ... for low income children” (National Bureau of Economic Research, 2015, p. 26).

“For children from low-income families, both [future] wages and family income exhibit substantial improvements ... associated with more years of exposure to a predicted spending increase ... consistent with a causal effect of spending increases. ... For children from low-income families, increasing per-pupil spending by 10 percent in all 12 school-age years increases adult wages by 9.5 percent. ... For non-poor children, increasing per-pupil spending by 10 percent in all 12 school-age years increases adult wages by 4.3 percent. While this effect is not statistically significant, the effect is economically important and is suggestive of benefits for all children. ... For children from low-income families, increasing per-pupil spending by 10 percent in all 12 school-age years increases family income by 16.4 percent. ... Among low-income children, a 10 percent spending increase is associated with a 10 percentage-point increased likelihood of currently being married and never previously divorced” (National Bureau of Economic Research, 2015, pp. 28-30).

“A 20 percent increase in per-pupil spending each year for all 12 years of public school for children from poor families leads to about 0.9 more completed years of education, 25 percent higher earnings, and a 20 percentage-point reduction in the annual incidence of adult poverty. ... The magnitudes of these effects are sufficiently large to eliminate between two-thirds and all of the gaps in these adult outcomes between those raised in poor families and those raised in non-poor families” (National Bureau of Economic Research, 2014, p. i).

“For children from poor families, increasing per-pupil spending by 20 percent in all 12 school-age years increases the likelihood of graduating high school by 23 percentage points. ... In fact, the effects are large enough to completely eliminate the high school graduation gap between children from poor and non-poor families” (National Bureau of Economic Research, 2014, p. 36).

“For children from poor families, increasing per-pupil spending by 20 percent in all 12 school-age years increases adult wages by 24.6 percent. ... The results suggest that the effect of increasing school spending by 20 percent in all school age years is large enough to eliminate the

wage gap between children from low-and high-income families” (National Bureau of Economic Research, 2014, p. 38).

“For children from poor families, increasing per-pupil spending by 20 percent in all 12 school-age years increases family income by 52.2 percent. ... The results suggest that the effect of increasing school spending by 20 percent in all school age years is large enough to completely eliminate the family income gap between children from low-income families and those from non-poor families” (National Bureau of Economic Research, 2014, p. 38).

“Our results indicate that for children from poor families, increasing per-pupil spending by 20 percent for a child’s entire K-12 schooling career increases high school completion by 22.9 percentage points, increases the overall number of years of education by 0.928, increases adult earnings by about 24.6 percent, increases annual family income by 52.2 percent, and reduces the incidence of adult poverty by 19.7 percentage points. All of these effects are statistically significant and are robust to a rich set of controls for confounding policies and trends. The magnitudes of these effects are sufficiently large to eliminate between two-thirds and all of the gaps in these adult outcomes between those raised in poor families and those raised in non-poor families” (National Bureau of Economic Research, 2014, p. 44).

“The estimated effect of a 22 percent increase throughout all 12 school-age years for low-income children is large enough to eliminate the education gap between children from low-income and non-poor families” (Baker & Weber, 2016, p. 5).

“The estimated effect of a 22.7 percent increase in per-pupil spending throughout all 12 school-age years for low-income children is large enough to eliminate the education gap between children from low-income and non-poor families” (National Bureau of Economic Research, 2015, p. 26).

“For children from low-income families, increasing per-pupil spending yields large improvements in educational attainment, wages, family income, and reductions in the annual incidence of adult poverty. All of these effects are statistically significant and are robust to a rich set of controls for confounding policies and trends. ... The results make important contributions to the human capital literature and highlight how improved access to school resources can profoundly shape the life outcomes of economically disadvantaged children, and thereby significantly reduce the intergenerational transmission of poverty” (National Bureau of Economic Research, 2015, p. 39).

5. Teachers, teacher wages, and other staff are central to improving student achievement.

“Effective teachers are the most important school-based determinant of student educational performance” (Economic Policy Institute, 2019, p. 1).

“Investments in teacher quality (teacher ability, teacher education, and teacher experience) are particularly effective in raising achievement” (Learning Policy Institute, 2017, p. 5).

“A lack of sufficient, qualified teachers threatens students’ ability to learn. Instability in a school’s teacher workforce (i.e., high turnover and/or high attrition) negatively affects student achievement and diminishes teacher effectiveness and quality. And high teacher turnover consumes economic resources (i.e., through costs of recruiting and training new teachers) that could be better deployed elsewhere. Filling a vacancy costs \$21,000 on average and Carroll estimated that the total annual cost of turnover was \$7.3 billion per year” (Economic Policy Institute, 2018, pp. 2-3).

“Increases in teacher wages have been found in several studies to be associated with increased student achievement” (Learning Policy Institute, 2017, p. 12).

“Prior research has emphasized that an important determinant of how much students learn is teacher quality; and, teachers' salaries represent the largest single cost in K-12 education and may exert a direct effect on the ability to attract and retain a high-quality teaching workforce” (National Bureau of Economic Research, 2015, p. 38).

“The increases for instruction and support services (which includes expenditures to hire more teachers and/or increase teacher salary along with funds to hire more guidance counselors and social workers) are consistent with the large, positive effects for those from low-income families” (National Bureau of Economic Research, 2014, p. 42; 2015, pp. 37-38).

“We produce statistically significant, robust estimates of the effects of teacher wages on high-school dropout rates and college attendance rates, which suggest that raising the wages of teachers by 50% will reduce high-school dropout rates by more than 15% and increase college enrollment rates by approximately 8%” (Loeb & Page, 2000, p. 394).

“Our estimates suggest that, holding all else equal, raising teachers’ wages by 10% ... would reduce dropout rates by between 3% and 6%” (Loeb & Page, 2000, p. 406).

“A number of recent studies ... to identify the effect of wages on student outcomes ... produce estimates that are positive and statistically significant” (Loeb & Page, 2000, p. 395).

“Our findings have important policy implications. First of all, they suggest that the quality of education can be improved by raising teacher salaries. In addition, they indicate that non-wage attributes are important and should be taken into account.” (Loeb & Page, 2000, p. 407).

“A sizable body of research has illustrated the connection between staffing qualities and quantities and student outcomes” (Educational Testing Service, 2016, p. 3).

“The primary resources involved in the production of schooling outcomes are human resources — or quantities and qualities of teachers, administrators, support, and other staff in schools” (Educational Testing Service, 2016, p. 4).

“States in which teacher wages are more competitive have smaller achievement gaps and higher scores for children from lower income families (Educational Testing Service, 2016, p. 28).

“Higher levels of staffing are also associated with reductions in achievement gaps and improvements to disparities in achievement across schools” (Baker & Weber, 2016, p. 1).

“Staffing levels and distributions explain over 40 percent of the variation in outcome levels for low-income students. ... Targeting of staffing was consistently associated with higher performance in high-poverty schools” (Baker & Weber, 2016, pp. 17-18).

“Relationships between staffing measures and outcome measures tend to be more consistent than direct spending-to-outcome relationships [but] spending measures are a substantial driver of staffing measures” (Baker & Weber, 2016, p. 24).

“It is suggested here that administrative spending devoted solely to the governance of the school district increases resources available in other areas because a well-supported central administration makes better decisions about the allocation of resources that lead to improved teacher-student ratios” (Wenglinsky, 1997, p. 225, see also p. 229).

“Increased targeted staffing to higher poverty schools within states is associated both with higher measured outcomes of children from low-income families and with smaller achievement gaps between children from low-income and children from non-low-income families” (Educational Testing Service, 2016, p. 27).

“The key resource that affects the social environment of the school is the number of teachers available per student. Teachers who are responsible for a large number of students tend to be demoralized because they have trouble developing relationships with all their students; if there are more teachers per student, teachers' morale should improve because this situation is rectified and the workload of each teacher is less. Students' morale increases because students receive more individual attention and are more easily able to participate in group discussions. Relations between principals and teachers improve because the teachers' morale is higher and the principals do not have to devote the attention to individual students that overworked teachers cannot give them. Thus, the overall social environment of the school improves when there are more teachers for students” (Wenglinsky, 1997, p. 225, see also p. 229).

“Resource variables that attempt to describe the quality of teachers (teacher ability, teacher education, and teacher experience) show very strong relations with student achievement. ... We did not expect that the synthesis of data from a wide variety of studies over a three decade period would yield conclusions so uniform in direction and comparable in magnitude” (Greenwald, Hedges, & Laine, 1996, pp. 384-385).

6. Unfortunately, a large teacher wage penalty works against quality and quantity of staffing.

The teacher wage penalty is, “the percent by which public school teachers are paid less in wages and compensation than other college-educated workers” (Economic Policy Institute, 2019, p. 1).

“The teacher weekly wage penalty was 5.3 percent in 1993, grew to 12.0 percent in 2004, and reached a record 21.4 percent in 2018” (Economic Policy Institute, 2019, p. 3).

“The wage penalty for men teachers is much larger. ... In 2018, men teaching public school were making 31.5 percent less in wages than comparable men in other professions” (Economic Policy Institute, 2019, p. 3).

“The large wage penalty that men face in the teaching profession goes a long way toward explaining why the gender makeup of the profession has not changed much over the past few decades (roughly three-fourths of teachers are women). Those arguing that teachers are overpaid have a hard time explaining why, if this is so, men have not swarmed to teaching.” (Economic Policy Institute, 2019, pp. 10-11).

“The total teacher compensation penalty was 13.1 percent in 2018 The teacher compensation penalty grew by 10.2 percentage points from 1993 to 2018 [and] from 8.7 percent in 2010 to 13.1 percent in 2018” (Economic Policy Institute, 2019, p. 4).

“Between 2004 ... and 2018, weekly wages of other college graduates grew \$119 (7.2 percent), while teacher weekly wages dropped \$44 (3.6 percent). ... The teacher weekly wage difference of 32.7 percent in 2018, ... was roughly double that of the 16.4 percent disadvantage in 1996” (Economic Policy Institute, 2019, p. 9).

“The estimated 21.4 percent teacher weekly wage penalty in 2018 means that, on average, teachers earned just 78.6 cents on the dollar compared with what other college graduates earned — and much less than the relative 93.7 cents on the dollar that teachers earned in 1996” (Economic Policy Institute, 2019, p. 10).

Kentucky has the 13th highest teacher wage penalty in the nation (Economic Policy Institute, 2019, p. 14).

“The erosion of teacher weekly wages ... reflects state policy decisions rather than the result of revenue challenges brought on by the Great Recession” (Economic Policy Institute, 2019, p. 4).
“It is the result of revenue declines states brought on themselves by cutting tax rates” (p. 12).

A survey by the Gates Foundation found that “prior to taking on any extracurricular activities, teachers work an average of 10 hours and 40 minutes a day, three hours and 20 minutes beyond the average required work day in public schools nationwide” (as cited in Economic Policy Institute, 2019, p. 7).

7. The teacher wage penalty contributes to a severe and damaging teacher shortage.

“Every state headed into the 2017-2018 school year facing a teacher shortage” (Economic Policy Institute, 2019, p. 1).

“The teacher shortage is real, large and growing, and worse than we thought ... with high-poverty schools suffering the most from the shortage of credentialed teachers” (Economic Policy Institute, 2018, p. 1).

“A shortage of teachers harms students, teachers, and the public education system as a whole. ... High teacher turnover consumes economic resources that could be better deployed elsewhere” (Economic Policy Institute, 2018, p. 1).

“Only 5 percent of the students in a recent survey of college-bound students were interested in pursuing a career in education, a decrease of 16 percent between 2010 and 2014” (Learning Policy Institute, 2016, iii).

“Relative teacher wages, as well as total compensation ... [have] been eroding for over a half a century. These trends influence the career choices of college students, biasing them against the teaching profession, and also make it difficult to keep current teachers in the classroom” (Economic Policy Institute, 2019, p. 2).

“The share of teachers without each of the quality credentials has grown since the 2011-2012 school year. ... Nearly one in four teachers (22.4 percent) has five or fewer years of experience. ... Almost one in ten (9.4 percent) has fewer than two years of experience, i.e., are novices. Moreover, nearly a third of teachers (31.5 percent) do not have an education background in their subject of main assignment” (Economic Policy Institute, 2018, p. 4).

“The shortage of qualified teachers is not spread evenly among all schools but is more acute in high-poverty schools” (Economic Policy Institute, 2018, p. 5).

8. Attracting and retaining teachers via compensation is vital for improving achievement.

“Providing appropriate compensation is a necessary, major tool in addressing constant shortages” (Economic Policy Institute, 2019, p. 2).

“Teacher wages affect teacher quality. ... Teacher wages must be sufficiently competitive with other career opportunities for similarly educated individuals. The overall competitiveness of teacher wages affects the overall academic quality of those who choose to enter teaching” (Learning Policy Institute, 2017, p. 3).

“Some share of the additional resources is needed in higher poverty settings simply to provide for “real resource” equity — or to pay the wage premium for doing the more complicated job, under less desirable working conditions” (Learning Policy Institute, 2017, p. 4).

“Qualities of school staff depend in part on the compensation available to recruit and retain the staff — specifically salaries and benefits, in addition to working conditions. Notably, working conditions may be reflected in part through measures of workload, such as average class sizes, as well as the composition of the student population” (Learning Policy Institute, 2017, p. 11).

“A substantial body of literature validates the conclusion that teachers’ overall wages and relative wages affect the quality of those who choose to enter the teaching profession — and whether they stay once they get in” (Learning Policy Institute, 2017, p. 11).

“Several studies have shown that higher salaries relative to labor market norms can draw higher quality candidates into teaching” (Learning Policy Institute, 2017, p. 12).

“Teachers are more likely to quit when they work in districts with lower wages and when their salaries are low relative to alternative wage opportunities, especially in high-demand fields like math and science” (Learning Policy Institute, 2016, 18).

“Our results help to explain why previous studies have failed to produce systematic evidence that teacher wages affect student outcomes. ... Only a regression analysis that controls for other factors that affect the supply of teachers will produce policy-relevant elasticity estimates of the effect of teacher wages on student outcomes” (Loeb & Page, 2000, p. 406).

“Per-pupil expenditures on instruction positively influence teacher-student ratios and the average level of education of teachers. The ability to pay teachers higher salaries means that teachers with more experience or education can be hired” (Wenglinsky, 1997, p. 224, p. 229).

“A substantial body of literature has accumulated to validate the conclusion that teachers’ overall wages and relative wages affect the quality of those who choose to enter the teaching profession — and whether they stay once they get in. ... A permanent upward shift in the competitiveness of teacher wages may substantively improve the quality of the teacher workforce and, ultimately, student outcomes” (Educational Testing Service, 2016, p. 4).

“We are quite confident that higher teacher salaries lead to increases in the quality of applicants to the teaching profession and increases in student outcomes” (Educational Testing Service, 2016, p. 5).

“One would expect ... substantial increases in achievement if resources were targeted to selecting (or retaining) more educated or more experienced teachers” (Greenwald, Hedges, & Laine, 1996, p. 380).

9. Certain investments demonstrably improve achievement, especially for low-income students.

“More equitable and adequate allocation of financial inputs to schooling provides a necessary underlying condition for improving the equity and adequacy of outcomes. These include smaller class sizes, additional instructional supports, early childhood programs, and more competitive teacher compensation (permitting schools and districts to recruit and retain a higher quality teacher workforce) ... There is scarce evidence that one can gain stronger outcomes without these resources” (Learning Policy Institute, 2017, p. 1).

“Resource-intensive strategies such as reduced class sizes in the early grades, high-quality early childhood programs, intensive tutoring, and extended learning time programs may significantly improve outcomes of students from low-income families. And these strategies all come with significant additional costs” (Learning Policy Institute, 2017, p. 4).

“States with greater overall investment in education resulting in more intensive staffing per pupil tend to have higher outcomes for children from low-income families, higher performance in schools serving children from low-income families, and smaller disparities between schools serving children from low-income families and schools serving more advantaged populations” (Learning Policy Institute, 2017, p. 7).

“The primary resources involved in the production of schooling outcomes are human resources: quantities and qualities of teachers, administrators, support, and other staff in schools. Quantities of school staff are reflected in pupil-to-teacher ratios and average class sizes. Reduction of class sizes or reductions of total teaching or specialist caseloads requires additional staff, thus additional money” (Learning Policy Institute, 2017, p. 11).

“A significant body of research points to the effectiveness of class-size reduction for improving student outcomes and reducing gaps among students, especially for younger students and those who have been previously low-achieving. These reductions for young children have long-term effects on outcomes many years into the future. Often studies find that the effects of class size reduction on achievement are greatest when certain smaller class thresholds (such as 15 or 18) are reached, and are most pronounced for students of color and those in schools serving concentrations of students in poverty” (Learning Policy Institute, 2017, p. 11).

“A recent comprehensive meta-analysis [Dietrichson, Bøg, Filges, & Klint Jørgensen, 2017] of programs and strategies for improving outcomes for children from low-income households finds interventions that intensify human resources to be particularly effective when compared with alternatives. Examining 101 studies from the past 15 years, the researchers found the

largest effects on achievement were from interventions like tutoring, small-group instruction, and coaching or mentoring of children's teachers" (Learning Policy Institute, 2017, p. 11).

"Districts that increased spending due to reforms see reductions in student-to-teacher ratios. This have been found to benefit students in general, with larger effects for children from disadvantaged backgrounds" (National Bureau of Economic Research, 2015, p. 38).

"Fewer students per counselor and fewer students per administrator ... have also been found to improve student outcomes. ... A 10 percent increase in school spending is associated with a 5.3 percent reduction in the student-to-teacher ratio ..., 1.14 more school days ..., and a 2 percent increase in base teacher salaries. ... While there may be other mechanisms through which increased school spending improves student outcomes, the results suggest that the positive effects are driven, at least in part, by some combination of reductions in class size, having more adults per student in schools, increases in instructional time, and increases in teacher salary that may have helped to attract and retain a more highly qualified teaching workforce" (National Bureau of Economic Research, 2015, pp. 38-39).

"Districts that experience a 20 percent increase in spending due to reforms see reductions in student-to-teacher ratios and school size. Both of these have been found to benefit students in general, with larger effects for children from disadvantaged backgrounds. We also find that schools in these districts have fewer students per counselor and fewer students per administrator. These have also been found to improve student outcomes. While there may be other mechanisms through which increased school spending may improve student outcomes, results suggest that the positive effects may be driven, at least in part, by reductions in class size and having more adults per student in schools" (National Bureau of Economic Research, 2014, p. 42).

"Per-pupil expenditures for instruction and the administration of school districts are associated with achievement because both result in reduced class size, which raises achievement" (Wenglinsky, 1997, p. 221).

"Schools can make a difference when their economic resources are allocated in a fashion conducive to positive school social environments. The study tested the notion that through a certain 'path,' economic resources are associated with academic achievement. The path begins with the hypothesis that per-pupil expenditures on instruction and the administration of school districts' central offices are positively related to class size, with more spending leading to smaller classes. Class size is, in turn, positively related to school social environment, with schools having more cohesive social environments when they have smaller classes. Finally,

cohesive school social environments are positively related to students' achievement above and beyond students' social backgrounds" (Wenglinsky, 1997, p. 221).

"A series of studies, known as 'effective-schools research,' ... identified schools in which students of low SES evince high levels of achievement. They found that such schools display a series of relatively uniform characteristics that, they concluded, are associated with high levels of achievement among low SES students. These characteristics include the social environment of the school, the relations between teachers and principals, and teachers' morale" (Wenglinsky, 1997, p. 222).

"Schools with a positive climate and good relations among principals, teachers, and students can expect to produce relatively high levels of achievement in students" (Wenglinsky, 1997, p. 223).

"When a school has a positive social environment, students perform better. As the effective-schools literature suggests, when teachers and principals have more positive attitudes about their schools, they do their jobs better. Furthermore, when teachers have higher expectations of their students and students identify more closely with their teachers and school, students achieve at a higher level" (Wenglinsky, 1997, p. 225, see also p. 229).

"This research suggests that ... reduced class size leads to higher achievement" (Wenglinsky, 1997, p. 233).

"The results of class size presented here are consistent with the extensive experimental literature, which suggests that smaller class sizes produce greater achievement" (Greenwald, Hedges, & Laine, 1996, p. 380).

"Spending increases ... found to be associated with long-term benefits 'were associated with sizable improvements in measured school quality, including reductions in student-to-teacher ratios, increases in teacher salaries, and longer school years'" (Educational Testing Service, 2016, p. 4).

"Ample research has indicated that children in smaller classes achieve better outcomes, both academic and otherwise, and that class size reduction can be an effective strategy for closing racially or socioeconomically based achievement gaps" (Educational Testing Service, 2016, p. 5).

"States with lower pupil- to-teacher ratios and fairer distribution of staffing tend to have both higher outcomes among children from low-income families and smaller achievement gaps

between children from low-income and children from non-low-income families” (Educational Testing Service, 2016, p. 27).

“School spending increases were associated with a reduction in the student-to-teacher ratio, longer school years, and increased teacher salaries — suggesting that reductions in class size, increases in instructional time and improvements in teacher quality improve student outcomes” (National Bureau of Economic Research, 2015, p. 4).

10. Investing in education yields significant returns.

“Increasing spending by 10 percent for all school-age years ... implies a benefit-cost ratio of 2.01 and an internal rate of return of 8.9 percent. This internal rate of return is ... larger than long-term returns to stocks” (National Bureau of Economic Research, 2015, p. 40).

“[Spending] reforms that entail high tax prices ... reduce long-run spending for all districts, and those that entail low tax prices lead to increased spending growth, particularly for low-income districts” (National Bureau of Economic Research, 2014, p. i).

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