



STRATEGY PAPER  
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# Improving Student Outcomes: Restoring America's Education Potential

Michael Greenstone, Adam Looney, and Paige Shevlin



## MISSION STATEMENT

The Hamilton Project seeks to advance America's promise of opportunity, prosperity, and growth.

We believe that today's increasingly competitive global economy demands public policy ideas commensurate with the challenges of the 21st Century. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by fostering economic growth and broad participation in that growth, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments.

Our strategy calls for combining public investment, a secure social safety net, and fiscal discipline. In that framework, the Project puts forward innovative proposals from leading economic thinkers — based on credible evidence and experience, not ideology or doctrine — to introduce new and effective policy options into the national debate.

The Project is named after Alexander Hamilton, the nation's first Treasury Secretary, who laid the foundation for the modern American economy. Hamilton stood for sound fiscal policy, believed that broad-based opportunity for advancement would drive American economic growth, and recognized that “prudent aids and encouragements on the part of government” are necessary to enhance and guide market forces. The guiding principles of the Project remain consistent with these views.





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BROOKINGS

# Abstract

For decades, investments in public education have boosted U.S. productivity and earnings, forged a path out of poverty for many families, helped disadvantaged students narrow the learning gap with their peers, and developed a workforce that continues to be among the most productive and innovative on Earth. More recently, this engine of growth has lost momentum. While per-pupil spending has continued to rise, educational attainment and performance have stagnated over the last thirty years. Because workforce skills are closely linked to productivity and compensation, the stagnation in education has contributed to static or even declining earnings for many Americans. In this paper, The Hamilton Project provides a dual-track approach to improving future educational outcomes: 1) tackling structural barriers to unlock the largest gains in student achievement and 2) in the near term, implementing relatively simple cost-effective reforms that improve student performance. The first approach examines opportunities for structural changes to America's educational system—a new way of doing business. These include generalizing the best practices of top performing charter schools and changing the current systems for identifying, hiring, and retaining highly-effective teachers. The second approach focuses on smaller, cost-effective reforms that could be implemented without dramatically re-thinking how schools operate, such as student incentive and early childhood education programs, and managerial and organizational changes at the school and district levels. In today's environment of tight school budgets, it is essential not just to know how different approaches impact student performance, but also how much they cost. To this end, The Hamilton Project outlines a metric for comparing educational interventions and calls on policymakers to identify and test more policies and programs in a consistent way. Taken as a whole or piecemeal, we believe these types of reforms hold the potential to reinvigorate our existing system of education.

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# Chapter 1: Introduction

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Great teachers and great schools have the ability to transform and enrich the lives and living standards of Americans. Over the past century, investments in public education—such as the development of and widespread enrollment in high schools, preparation of more students for college, and improvements in the accessibility of all levels of education—have boosted U.S. productivity and earnings, forged a path out of poverty for many families, helped disadvantaged students narrow the learning gap with their peers, and developed a workforce that continues to be productive and innovative.

But the nation’s educational engine has lost momentum. In the past three decades, standard measures of student achievement, such as the national standardized tests administered to high school seniors, have been flat, and the growth in college completion has stagnated. At the same time, per pupil spending has continued to rise. We now spend more than \$10,000 per student in current expenditures, double what was spent in 1970, and \$3,000 more on average than other developed countries (Organisation for Economic Co-operation and Development [OECD] 2010a; Snyder and Dillow 2011, Table 190).

Since workforce skills are closely linked to productivity and compensation, the stagnation in educational attainment and performance has contributed to static or even declining wages for much of the workforce. For example, the earnings of the median working-age man have declined by \$13,000, a total of 28 percent since 1969, returning him to the level of the 1950s (Greenstone and Looney 2011). These trends underscore that America’s position as the most powerful economy in the world may change as a result of educational choices made today and in the future.

A recent explosion of research provides optimism about the prospect of reversing these trends and shows us that amazing gains in education are achievable. At the top of the list of promising approaches are innovative charter schools such as the Knowledge Is Power Program (KIPP) and the Harlem Children’s Zone. These schools boost test scores of disadvantaged students by enough to cut the stubborn black–white achievement gap in half after just three years, and to raise college attendance rates of students who otherwise are unlikely to have had that opportunity (Gleason, Clark, Tuttle, and Dwoyer 2010; KIPP 2011). Researchers have also recently estimated how much effective teachers contribute to the lifetime outcomes of their students. For example, “an above-average kindergarten teacher generates \$320,000 more in total earnings than a below-average kindergarten teacher for a class of 20 students” (Chetty, Friedman, Hilger, Saez, Schanzenbach, and Yagan 2010, 1). Unlocking such benefits with better teachers and schools for all students, according to some estimates, could generate economic benefits into the *trillions* (Hanushek 2010; Hanushek and Woessmann 2010).

Realizing these large-scale gains will be challenging because it requires changes to the status quo of the educational system. Though researchers do not know exactly what makes these charter schools effective, it is likely that applying their methods more generally would mean changing how schools operate. Similarly, there are barriers for policy-makers trying to raise teaching quality. In addition to issues such as teacher certification, the compensation of American teachers is a challenge for recruitment. The systems and institutions currently used to hire and retain teachers are not designed to attract a broad range of talented young people into the profession. According to the OECD, the relative pay of teachers in the United States compared to similarly educated

America’s position as the most powerful economy in the world may change as a result of educational choices made today and in the future.



workers is among the lowest of any developed country, despite the fact that American teachers spend considerably more time in the classroom than do teachers in other countries (OECD 2010b). At the same time, it seems evident that teachers will be asked to do more than ever in the coming years, whether through the increased use of mandated accountability systems or increased numbers of hours on the job. Given that over the next decade America will need to fill millions of new teaching openings, it is imperative to develop new approaches to attract, train, motivate, retain, and organize these essential teachers (Aaronson and Meckel 2008).

Addressing these challenges is essential to reinvigorating our school system, but the precise steps that need to be undertaken are not well understood. It is clear that the current teaching compensation and recruitment system does not benefit student performance; nevertheless, the exact system that should replace it is not well defined. At the same time, alternative practices cannot always be implemented quickly or taken on at the individual school level.

In a previous strategy paper, “An Education Strategy to Promote Opportunity, Prosperity, and Growth,” by Joshua Bendor, Jason Bordoff, and Jason Furman, The Hamilton Project summarized research on effective K–12 reforms and on the challenges schools face, such as teaching disadvantaged children. For example, that paper summarized proposals such as expanded access to preschool, which would make sure all children are ready for kindergarten, and summer programs to address lost learning that occurs outside of the regular school year. This paper builds on that earlier work and emphasizes new evidence that has illuminated specific reforms demonstrated to improve student achievement and that could be implemented immediately.

With tight state and local budgets, many schools must do better with fixed or even declining resources. In such circumstances, improvement requires not just identifying approaches to education reform that perform better than others, but also understanding the budgetary tradeoffs. A metric that compares educational policies on an apples-to-apples basis by weighing their beneficial impacts on student achievement relative to their costs will help school leaders get the biggest bang for their buck.

America’s educational system must do a better job at improving student achievement and preparing children for a more competitive labor market. The biggest gains will likely come from structural changes, but incremental steps are also important. Thus, The Hamilton Project proposes that policy-makers and educators move forward with a dual-track approach—tackling the long-term structural barriers

to improving student performance, while also implementing relatively simple, cost-effective and evidence-based policies to improve student achievement.

- **TRACK ONE: TAKE ON STRUCTURAL BARRIERS TO IMPROVING STUDENT PERFORMANCE**

To fully realize the potential of America’s educational system, fundamental changes are necessary. Evidence suggests that the largest achievement gains come from innovative charter schools, such as KIPP and Harlem Children’s Zone, and from highly effective teachers.

The evidence indicates that charter schools on the whole are not any more effective than traditional public schools, but that some charter school models have extremely large positive impacts on student achievement. Thus, simply expanding charter schools is not the answer. Instead, researchers and policy-makers must identify which practices or set of practices make certain charter school models so effective.

Similarly, new evidence suggests that teacher effectiveness is among the largest determinants of student achievement and among the most promising ways to raise student learning. But realizing these gains likely requires changing the current systems for identifying, hiring, developing, and retaining highly effective teachers.

- **TRACK TWO: IMPLEMENT SIMPLER EVIDENCE-BASED POLICIES THAT IMPROVE STUDENT ACHIEVEMENT**

There is a range of interventions that research demonstrates can increase student achievement, and that are relatively inexpensive and could be implemented without dramatically rethinking how schools operate. Such approaches include providing incentives for students to read more books to improve their reading skills, instituting managerial changes in school organization, and expanding early childhood education, summer school and after-school programs, all of which are demonstrated to improve achievement at relatively low cost.

As policy-makers compare these approaches, it is helpful to know how much each improves achievement per dollar of cost. In today’s environment of tight school budgets, educators and policy-makers can use this metric to look for the most cost-effective means of improving educational achievement.



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## Chapter 2: The Value of Educational Investments

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**H**istorically, education has helped to drive economic growth in the United States by enhancing the productivity of workers and thus their wages and job opportunities. Rising educational attainment has helped raise living standards. It is also an important reason why, over most of the last century, each generation has done better than the last.

However, educational attainment and the measured achievement of students have stalled in recent years, both relative to older generations of Americans and internationally. Partially as a result, broad segments of the American labor force are falling behind, experiencing high rates of unemployment and declining real wages, and reversing years of gains.

Investments in education are estimated to have accounted for 25 percent of productivity gains between 1915 and 1999 (Goldin and Katz 2001), gains that have translated into increases in wages for American workers and real growth in the American economy. At the level of society, these benefits of education translate into a larger tax base, increased property values, and lower crime (Barrow and Rouse 2004; Lochner and Moretti 2004; Moretti 2004). Our highly educated workforce has allowed the United States to become a successful, innovative economy—indeed, it has literally taken us to the moon.

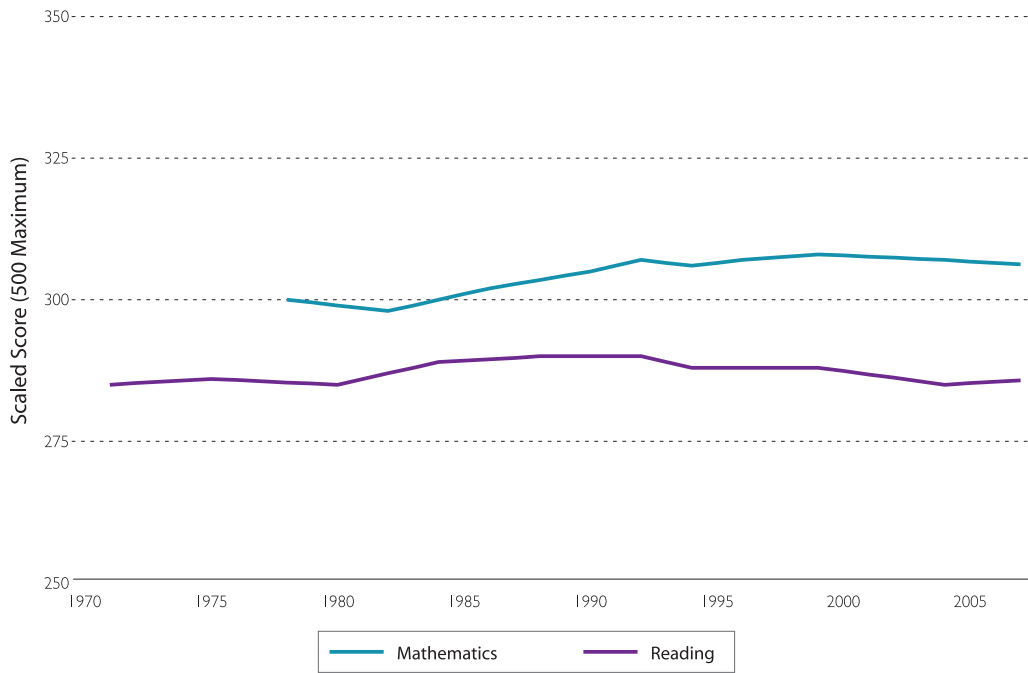
Education also has helped to narrow the pay gaps between women and men, and between whites and minorities. In fact, women’s academic achievement now exceeds men’s—the share of young women that go on to receive a college degree increased from 12 to 34 percent from 1970 to 2008, and now stands approximately 8 percentage points higher than the corresponding share of men. The black–white skill gap declined for much of the twentieth century because of increased education access, but it has stagnated since the 1980s (Neal 2006).

Despite our long history of educational leadership and the historic gains from investing in education, the United States has been falling behind, and the skill sets that many Americans possess today make them much less competitive both within the American labor market and internationally. The United States scores below the OECD average in mathematics, and no better than average in science and reading in international comparisons (OECD, Program for International Student Assessment [PISA], 2009). Test scores, as measured by the National Assessment of Educational Progress (NAEP), have barely budged in thirty years: the average high school senior today scores about the same as his or her parents.

Rising educational attainment has helped raise living standards. It is also an important reason why, over most of the last century, each generation has done better than the last.

FIGURE 1

## Average Mathematics and Reading Test Scores for 17-Year-Olds

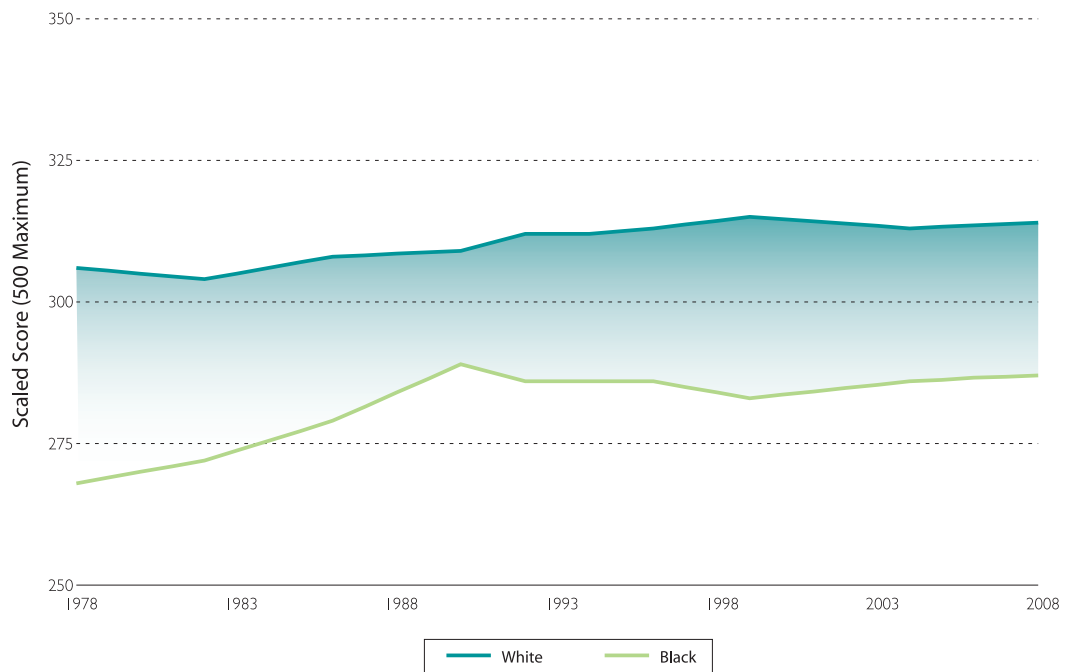


Source: NAEP 1971-2008.

Note: Average scaled scores for reading and mathematics, age seventeen, 1971–2004 original assessment format.

FIGURE 2

## Average Mathematics Test Scores for 17-Year-Old White and Black Students

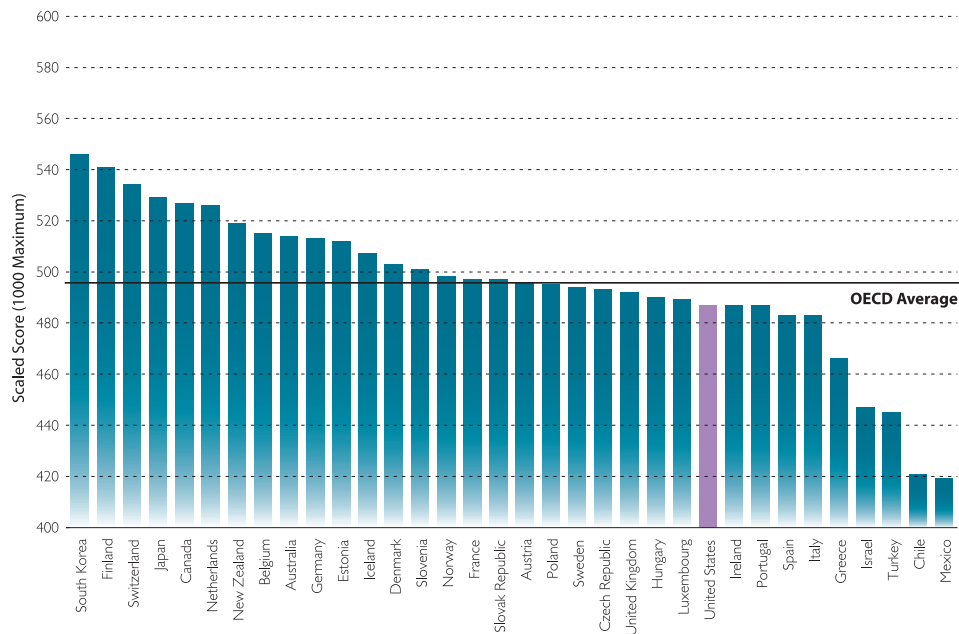


Source: NAEP 1978-2008.

Note: Average scaled score for mathematics, age seventeen, 1978–2004, original assessment format.

FIGURE 3

## Average Mathematics Test Scores for 15-Year-Olds, OECD Countries



Source: OECD, Program for International Student Assessment (PISA), 2009.

Note: Average scaled scores for mathematics, all students ages fifteen, in 2009. Some apparent differences between estimates may not be statistically significant.

These stagnant scores reflect broader problems. If GED qualifications are excluded, the proportion of the population with a high school diploma has actually *fallen* since the 1970s. This fall helps explain, at least in part, the recent slowdown in college attendance (Heckman and LaFontaine 2010).

The stagnation—and even decline—in educational attainment has occurred as changes in the global economy have increased the need for skilled workers. On average, students who successfully go on to complete college earn nearly twice as much as their peers with only a high school diploma, up from one and a half times in the 1960s (Autor 2010). This gap is considerably larger if we include the value of job benefits such as health insurance and benefits that are more generous in high-skilled jobs. In addition to higher earnings, education is linked to longer, happier, and healthier lives, and higher job satisfaction (Grossman 2006; Oreopoulos and Salvanes 2009). While student ability and other factors also play a role in the earnings of college graduates, research suggests that educational investments boost earnings for students (Card 1995, 2001; Kane and Rouse 1995).

Even as educational performance has stagnated, real total spending per pupil has increased by 90 percent over the past thirty years (Snyder and Dillow 2011, Table 190). While per pupil expenditure has grown below the OECD average since 2000, the United States currently spends approximately \$3,000 more per student than the OECD average across primary, secondary, and postsecondary education (OECD 2010a).

The challenge we face is that not all investments are equally worthwhile. Putting money into the educational system without targeting it toward reforms that have proven to be successful has resulted in more spending per pupil without the desired increase in student achievement. While still in its early stages, recent research and experimentation in education have pointed to some paths forward—highlighting initiatives that provide the largest gains at the lowest cost.

The stagnation of educational achievement and attainment over the past few decades, and the fact that the United States is no longer educationally exceptional compared to many other countries, is an important contributor to the challenges we face in our labor market today. For more than a century, each generation has had an opportunity to achieve higher living standards than the previous one—until recently. As mentioned above, a large segment of our population has experienced declining real incomes over the past forty years, and many less-skilled Americans no longer work at all (Greenstone and Looney 2011).

In this paper, The Hamilton Project outlines a dual-track approach to addressing today’s challenges in the American education system. This approach involves breaking down the barriers to achieving large gains in student performance and implementing proven educational policies and reforms.

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# Chapter 3: A Dual-Track Approach to Improving America's Education System

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Despite many challenges, Americans should be optimistic about the prospects for improving the educational system. New research and experimentation in education have signaled clearly that large gains are achievable. A subset of charter schools has succeeded in taking some of the most disadvantaged students and dramatically enhancing their skills as measured by test scores and their future potential as demonstrated by higher rates of college completion. Another result that emerges clearly from the research is the importance of teachers. Students who have highly effective teachers perform better on standardized tests; recent evidence also suggests that more experienced kindergarten teachers that are effective at raising test scores also boost students' earnings as adults (Chetty et al. 2010).

Based on this evidence, it seems that realizing the full potential of our educational system will require fundamental change, but there are significant challenges. Charter schools as a whole are no more successful than traditional schools, and some are even significantly worse. It is necessary to first identify why certain charters outperform traditional schools and then replicate those practices at a wider scale.

Despite evidence of large variation in teacher effectiveness, there are few systems in place that use measures of effectiveness for hiring, training, retaining, or compensating teachers. Individual school leaders may not be able to change the state's system for certifying new teachers or compensation systems agreed to for a larger region. Nor is it easy for individual schools to remove ineffective teachers.

School leaders can make progress on student achievement, however, by going after relatively easier reforms such as implementing student incentives, running effective after-school programs, or starting school later in the morning.

For this reason, we outline a dual-track approach to improve student performance. The first approach is to tackle the major structural challenges that have contributed to declines in the U.S. education system highlighted by stagnant test scores and graduates without the skills to be competitive in the global marketplace. The second is to undertake simpler changes that can achieve positive impacts more quickly. By pursuing both approaches it is possible to bring about gains in student

achievement and, in the long term, create a stronger workforce and a more productive economy.

## TRACK ONE: TAKE ON STRUCTURAL BARRIERS TO IMPROVING STUDENT PERFORMANCE

Educational policies like student incentives and organizational changes create large benefits relative to their cost, but their total power is limited. The biggest gains come from restructuring school systems in innovative ways and from unlocking the potential of the best teachers. Achieving these goals comes with substantial challenges, including determining how to scale up the most successful charter schools and how to change current systems of compensation and recruitment to identify and retain the highest-quality teachers.

### *A. Understanding and scaling charter school impacts*

Charter schools are publicly funded, but they operate independently of local school boards or superintendents. Charter schools generally allow teachers and administrators more leeway than do traditional public schools to engage in innovative learning practices to meet educational standards. The number of charter schools has increased steadily over the past few decades: as of 2009, there were nearly 4,700 charter schools in forty states educating more than 1.4 million children, just under 3 percent of the 49 million students enrolled in public schools (Snyder and Dillow 2011, Table 100 and 102).

Evidence on the impact of charter schools is mixed. On average, charter schools have not been shown to have any effect on achievement. However, this finding masks considerable variability across schools. Some charter school models have tremendous impacts on student achievement, particularly among disadvantaged students in urban areas.

For example, Harlem Children's Zone, a charter school in Harlem, New York City, produces large impacts on achievement, as do the KIPP charters, which encompass 32,000 students in 109 schools in twenty states and the District of Columbia. On average, students admitted to the twenty-two KIPP middle schools studied gained 0.3 standard deviations

in test scores, approximately equivalent to going to school for an additional four months (Tuttle, Teh, Nichols-Barrer, Gill and Gleason 2010).<sup>1</sup> By the end of a student's career at Harlem Children's Zone middle schools, that student has improved by the equivalent of six months of regular school.<sup>2</sup> These impacts continue past school age: 33 percent of students from KIPP had graduated from college by the time they were twenty-four, compared to just 8 percent of eighteen to twenty-four year olds from similar backgrounds, and 31 percent of all eighteen to twenty-four year olds (KIPP 2011).

However, these results are atypical of performance at the average charter school. In fact, some charter schools appear to have negative impacts on student test scores and, on average, students at charters perform the same as at other public schools (Angrist, Pathak and Walters 2011; Gleason et al. 2010). A benign reason for these differences is that certain charters, such as suburban charters, may focus more heavily on subjects like performing arts, which may not contribute directly to math or reading test scores. But these differences also arise between charters serving similar populations or with similar goals, which suggests that simply allowing the development of more charter schools is unlikely to be the solution.

More applicable lessons may come from carefully researching what makes some charter schools effective, scaling those schools up, and applying their practices to a broader range of schools. However, scaling up successful charter school practices is not as easy as it sounds, partly because charter schools do not use just one single pedagogical scheme or design. Charter schools often contain many elements that make them different from regular schools, including stricter discipline, different curricula, performance pay for teachers, greater parent involvement, and more time in school because of longer days, after-school programs, and classes on weekends. Often, charter schools engage in a combination of these activities, making it hard to disentangle cause and effect. Furthermore, it may be hard to replicate some aspects of successful charter school models because high impacts may come from a particularly dynamic principal or a great group of teachers that are difficult to transplant to other schools.

Several researchers have started trying to identify particular aspects of charter schools that are linked to achievement, but no consensus has emerged. A study by Caroline Hoxby, Sonali Murarka, and Jenny Kang (2009) looked at charter schools in New York City and found high impacts were linked to a package of a longer school year and longer school days, disciplinary policy of transparent rewards and punishments, performance pay for teachers, and a mission statement that emphasized academic performance. A study of charter schools in Massachusetts finds that longer school days and higher costs are not important in explaining the effectiveness of urban charter schools, and instead points to a "no excuses" approach that emphasizes good behavior and basic math and reading skills (Angrist, Dynarski, Kane, Pathak and Walters 2010). Certain public schools also appear to outperform their peers, and research focusing on Chicago public schools has attempted to identify essential characteristics of high-performing schools that can be applied elsewhere, such as school leadership, professional capacity, parent-community ties, student-centered learning climate, and instructional guidance (Bryk, Sebring, Allensworth, Luppescu and Easton 2010).

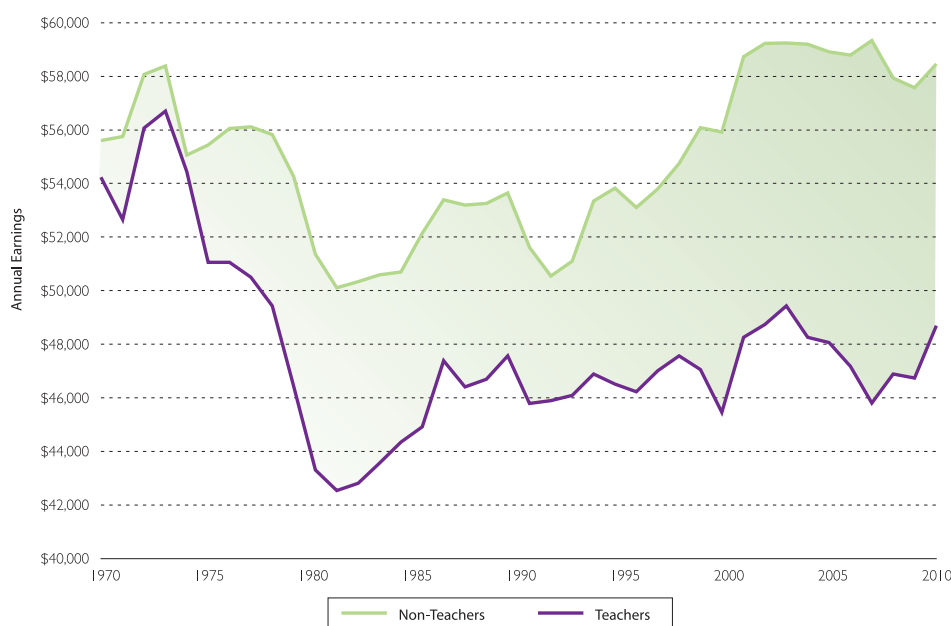
Expenses per student do not seem to be a determining factor in these achievement differences. The average budgetary cost of charters appears to be the same, or even less, than many public schools; in reality, they often operate on tighter budgets with fewer facilities than do public schools (Dynarski et al. 2011).<sup>3</sup> However, the fact that these programs appear inexpensive in comparison to traditional public schools does not necessarily make them easy to replicate. High-performance charters may be able to attract teachers that are more talented, and to encourage them to work more hours in part because they are different and selective. While this model works when innovative charter schools are rare and unusual, it may not work if all schools adopt the same model.

Further research is needed to understand how particular charter models have succeeded in improving achievement for the nation's most disadvantaged children. Experiments are currently taking place in Houston that have implemented some charter school practices in public schools to see if

**It is necessary to first identify why certain charters outperform traditional schools and then replicate those practices at a wider scale.**

FIGURE 4

## Annual Earnings of Teachers and Non-Teachers



Source: IPUMS CPS.

Note: Excludes non-wage benefits. Adjusted for inflation using the CPI. Full-time workers age 25-60, employed for at least 40 weeks. Annual earnings adjusted for age, education and gender.

these changes positively impact students (Dillon 2011). Such experiments should help unlock the effective strategies of charter schools so that best practices can be applied more widely.

### *B. Attracting and retaining effective teachers*

Great teachers have positive effects on children long after they leave the classroom. A recent study found that a student's kindergarten teacher had long-lasting influence on important lifetime outcomes, like future earnings. The effects on future earnings are so important that the difference between having an above-average kindergarten teacher and a below-average kindergarten teacher translates into a difference of more than \$300,000 in future earnings for a classroom of twenty students (Chetty et al. 2010). In terms of test-score performance, research suggests that a one standard deviation increase in teacher effectiveness translates into approximately 0.13 standard deviation in test scores. That means that the difference between having a teacher at the 5th and 95th percentile is roughly the equivalent to about 0.5 standard deviation on test scores or an additional six months of school (Aaronson, Barrow, and Sander 2007; Kane and Staiger 2008; Rivkin, Hanushek, and Kain 2005; Rockoff 2004). Given the importance of teaching quality, it is clear that there is much to be gained by improving the average effectiveness of teachers.

According to one estimate, if average effectiveness could be raised enough to put American students on par with those from the highest-performing countries it could be worth as much as \$100 trillion in national productivity benefits over the next eighty years (Hanushek 2010). The bottom line from this recent body of research is that potential benefits from increasing teacher quality are enormous.

Realizing the gains from effective teachers requires attracting more qualified people into the profession and then identifying and retaining those who are most effective. Steps to move in this direction, such as higher entry-level pay for all teachers and subsequent raises based on performance, contrast with the current system in which new teachers are paid relatively little and salaries increase only with experience or specific educational credentials.

### *The current approach to hiring, promoting, and compensating teachers is not geared toward improving student outcomes*

Teacher compensation and pay structures are not designed to attract, retain, and reward the most effective teachers. To make sure the most effective teachers are in the classroom, policymakers could focus on making teacher pay more competitive with pay in other sectors, removing unnecessary barriers to teaching, and aligning compensation practices with the goal of improving student achievement.



### ***Teacher salaries are relatively low***

Starting salaries are perhaps the most salient form of compensation for new workers starting out in a profession, particularly in comparison to non-wage benefits like retiree health and pension benefits, which tend to reward workers only after many years of continuous service. However, the relative salaries of teachers are much lower in the United States than in other developed countries, according to a recent OECD study. This salary gap between teachers and other workers in the United States is roughly twice as large as the OECD average (OECD 2010b). To illustrate the evolution of this salary gap over time, the graph below compares the salaries of teachers and nonteachers controlling for education, experience, and gender. Teachers in the 1970s earned 93 percent as much as similar nonteachers; the 2000s, they earned just 81 percent as much. This is more than \$10,000 less. In addition to salaries, teachers also receive more favorable health and retirement benefits than many private-sector workers, and those benefits are excluded from this analysis because data on the value of those benefits are hard to come by. However, nonwage benefits have historically been relatively more generous, but it is not clear that these benefits have increased by an amount that would offset the relative decline in wages.

But the relevant question is whether the combination of relatively low salaries and relatively high deferred benefits is the right formula to attract talented young people with many career opportunities to teaching, and to retain the most effective teachers throughout their career.

Of course, very few people choose careers based on salaries or compensation alone and there are many nonmonetary benefits of teaching such as the opportunity to work with children, flexible summer schedules, and the value of public service. The bottom line, however, is that the teaching profession can have difficulty attracting the most talented people when relative salaries are in decline.

### ***Current recruitment methods are costly and may not identify the best teachers***

One striking finding in the research on teaching quality is that it is difficult to identify effective teachers at the time of hiring. The characteristics that administrators have traditionally used in the hiring process, including teaching degrees, exam scores, college GPAs, and college prestige, do not appear to be good predictors of student achievement (Gordon, Kane, and Staiger 2006; Kane, Rockoff and Staiger 2008; Rockoff, Jacob, Kane, and Staiger 2011).

Such evidence suggests that the schools should recruit teachers as widely as possible and not use measures that are costly to potential recruits, such as teaching certificates, or expensive to schools, such as premium pay for advanced degrees.

The primary pathway into teaching is costly in terms of both time and money. In most states, teachers have to enroll in and graduate from teacher certification programs in order to be qualified to teach in that state, and often must take tests in the subjects they will teach. If certain certificates were a good predictor of teacher performance, then requiring these certificates would make sense, but there is little evidence that this is the case.

In addition, teachers from programs like Teach for America (TFA), which bypass the traditional certification process by allowing students to receive full-paying teaching jobs without any prior undergraduate coursework or on-the-job training, perform just as well or better than other teachers (Decker, Mayer, and Glazerman 2004; Kane, Rockoff, and Staiger 2008). The evidence that alternative certification does not negatively impact student achievement and the success of programs like TFA and other alternative certification programs in attracting new teachers demonstrates that the expansion of alternative certification routes could be a meaningful way to bring in new teachers and fill gaps in areas with teacher shortages.

### ***Tenure decisions rarely incorporate evidence of teacher effectiveness***

Tenure is also more closely tied to experience than it is to effectiveness, and tenure decisions usually are made very early in a teacher's career. This short clock limits opportunities to use performance measures to inform tenure decisions.

In most states tenure is not closely linked to teacher effectiveness. Indeed, most teachers will receive tenure. Right now in tenure systems that give either "satisfactory" or "unsatisfactory" ratings, 99 percent of teachers receive a "satisfactory" rating; in only four states—Colorado, Delaware, Oklahoma, and Rhode Island—does evidence on student achievement account for the majority of the tenure decision (Weisberg, Sexton, Mulhern and Keeling 2009; National Council on Teacher Quality [NCTQ] 2010).

Tenure decisions are also made very early in a teacher's career. In most states tenure is awarded after three years. In only eight states is tenure awarded after more than three years (NCTQ 2011). This period is short relative to the length of time before tenure is awarded in other jobs, such as university professorships, where the norm is seven years, or community college professorships, where the norm is three to five years. For the purpose of linking tenure to student achievement, the length of the probationary period—the time before tenure



is awarded—matters if measures of teacher effectiveness are to be used in the process because evaluating effectiveness accurately may take more than three years.

### ***Current compensation systems are seldom designed to explicitly incentivize student achievement***

For teachers already within the system, compensation structures fail to reward effectiveness; these structures are instead set up to pay more for credentials and characteristics that do not raise student achievement. School systems currently pay a premium for teachers who hold master’s degrees, even though evidence shows that teachers with master’s degrees are no more or less effective than teachers who hold a bachelor’s degree. A teacher with a master’s degree earns an average of about \$6,000 more per year than a teacher with the same experience holding a bachelor’s degree (Roza 2007).

The evidence suggests that more experienced teachers are better teachers—but their skills primarily develop early on in their careers. In the first three years of teaching, teachers rapidly become more effective. However, after roughly three years, experience is less important and the benefit of additional experience is smaller (Staiger and Rockoff 2010). Nevertheless, the current system pays a premium to additional experience well beyond the first three years—the average salary increment is 3 percent per year above cost-of-living adjustments, more than \$900 per year for the average teacher. In total, a compensation scheme based on experience amounts to 10 percent of the average school’s expenditures (Roza 2007). It is not evident that this system is the most effective means to attract a broad pool of new teachers and to retain the most effective experienced teachers.

**Realizing the gains from effective teachers requires attracting more qualified people into the profession and then identifying and retaining those who are most effective.**

Finally, in all but two states (Alaska and Washington), teachers have “defined benefit” pensions, which generally provide an employee with some certain percent of their salary from the time they retire until death. These benefits tend to be a function of years of experience and compensation levels at the end of a career. Thus they tend to reward long-tenured workers and older workers over younger workers. In contrast to defined contribution plans, these pension benefits are often not immediately portable; if a teacher leaves the system before vesting her benefits, she forgoes those benefits entirely.

Some evidence suggests that these pension benefits are not the ideal way to attract new applicants. For example, evidence suggests that teachers respond more to changes in their salaries than to changes in the value of their pensions when making decisions about whether to leave the profession, possibly because salary benefits are more salient than long-term gains (Costrell and McGee 2010; Costrell and Podgursky 2009). Costrell and McGee (2010) found that an increment of \$10,000 in the one-year accrual of pension wealth decreases exit probability by 0.6 percentage points, yet a \$1,000 increment in annual earnings decreases the probability of exit by about 5 percentage points. If true, this research suggests that it is possible that school districts could raise take-home pay and decrease pensions for new hires without increasing turnover or losing the ability to attract high-quality teachers.

One concern is that this system is not as effective in attracting a broad pool of applicants because back-loaded pay decreases the opportunity for higher upfront pay that could bring a wider variety of people into the profession. A second concern is that pension benefits that are not transportable across jobs impose harsh financial penalties on teachers who are dismissed or who choose to leave teaching. Pensions may also tie people to the system, keeping lower-quality teachers in.

### ***Assessing and paying for performance***

Since the current systems of compensation and recruitment fail to identify and retain the most effective teachers, an alternative is measuring performance on the job and compensating teachers based on their performance.

As is explained in a previous Hamilton Project discussion paper, “Identifying Effective Teachers Using Performance on the Job,” by Robert Gordon, Thomas Kane, and Douglas Staiger (2006), the test scores of students over the first few years of a teacher’s career can be used to generate measures of a teacher’s “value added.” Value-added measures can be used to determine the individual impact of a teacher on student achievement after controlling for other factors such as class size, student characteristics, and baseline achievement. Research suggests that value added is a good predictor of how

students in subsequent classes with the same teacher will perform on their tests.

Such results support the expansion of teacher value-added measures, but questions remain about how such measures should be constructed and used in practice. Two challenges are using the best assessments to measure teacher value added, and linking test score gains to teacher compensation decisions.

### ***Better assessments***

Standardized tests taken by students, that have been adopted by reforms, are not necessarily designed for measuring teacher effectiveness. As a result, using these tests to determine “high stakes” bonuses and penalties can produce a number of unintended and inefficient outcomes. For example, because the design and basic content of these tests are known well in advance, teachers and schools may teach narrowly to the test or spend time coaching students on test-taking skills, rather than focusing on more productive activities such as teaching critical thinking skills. In fact, research suggests that the incentives of accountability systems like those prescribed in *No Child Left Behind*, which threaten consistently low-performing schools with a loss in funding or school closure, can lead to performance increases on the “high-stakes” tests that mattered, but not on other “low-stakes” tests that covered the same material (Figlio and Rouse 2006; Jacob 2005; Reback 2008). In short, if improperly applied or poorly designed, such incentives could produce achievement gains on a specific assessment without engendering significant real learning.

Similarly, using these assessments as the basis for high-stakes accountability systems may also encourage other actions that are ineffective ways to increase student learning. For example, poorly-designed systems resulted in incentives to shift low performers out of the test-taking pool (Cullen and Reback 2006; Figlio 2006; Figlio and Getzler 2006; Jacob 2005). In another case, teachers may focus their attention on the group of their students that is likely to have the biggest effect on class test scores at the expense of other students (Neal and Schanzenbach 2010; Reback 2008).

Of course these results are not an indictment of accountability systems per se, but rather of poorly constructed systems. Since the time of many of those studies many apparent loopholes have been closed. And other studies have found little evidence of gaming behavior and instead find real schoolwide policy changes such as supplemental instruction and longer school days, and corresponding performance improvements in schools threatened with accountability policies (Chiang 2009; Rouse, Hannaway, Goldhaber and Figlio 2007).

The lesson is not that it is impossible to implement a system of measurement and accountability, but rather that the existing system needs to be improved. One way to do that is to develop tests that measure the skills children should learn—tests that are not easily corrupted when teacher performance pay is based on them.

In new work for The Hamilton Project, Derek Neal of the University of Chicago examines the incentives of teachers on high-stakes tests and discusses the conditions necessary for high-stakes tests to be useful. Accountability measures encourage teachers to work toward increasing their class test scores, but issues arise when teachers can boost test scores by coaching based on the test format instead of teaching the content on the test. Since any test with repeated formats and questions will encourage teaching to the test, high-stakes tests should be unpredictable in format but predictable in content. When that happens, teachers who aim to improve test scores will do so by teaching content instead of format.

Another step is to make sure that measures of teacher effectiveness incorporate non-test outcomes. The Bill and Melinda Gates Foundation has recently shown that classroom observation protocols in which teachers are observed and scored on a predetermined set of teaching skills have the ability to spot effective teachers (Kane and Cantrell 2010). Other evidence shows that experienced teachers (“master teachers”) can also identify teaching quality (Kane, Tyler, Tayler, and Wooten 2010; Rockoff and Speroni 2010). These practice-based measures could be used to complement test-based measures. This approach is being used in places like New York City, where teachers are evaluated with a combined metric, based partially on value-added measures, partially from classroom observations, and partially from parent and principal appraisals.

### ***Pay for performance***

After developing measures of effectiveness using the right assessments and other metrics such as classroom observations, the next step is to change the systems of compensation and recruitment to reflect these measures. As an alternative to the current system where salaries and benefits are generally tied to credentials or experience, some school systems and charter schools have experimented with systems designed to pay for performance and evaluations. According to the National Council on Teacher Quality, twenty-one states in 2010 evaluated teachers annually, a large increase from fifteen the year before.

Much of this experimentation has been incentivized by the Obama administration’s Race to the Top grants. Race to the Top (RTT) is a competitive grant program designed to encourage education policy reforms. Twelve states have received RTT

grant funds totaling \$3.9 billion (Government Accountability Office [GAO] 2011).<sup>4</sup> One third of the grants went to help states develop and implement plans for recruiting, developing, rewarding, and retaining effective teachers. For example, New York passed a law requiring that all classroom teachers and principals be evaluated in part on student data, and is using RTT funds to develop a way to measure this impact.

Although schools are moving toward more-demanding teacher evaluations, the question of how exactly evaluations should affect pay and career development is open for research. Because the movement toward evaluation and accountability systems is relatively new, there is very little evidence about how teaching quality responds to pay or to tenure decisions that are based on performance.

New York City implemented an incentive program that rewarded teachers for improvement in their school report cards. The incentive applied to achievement at the school-level—the entire school had to improve—and the incentive payments were largely distributed equally among teachers. Fryer (2011) finds that this program had no effect on student achievement and even small negative effects in some cases. Another incentive program in Nashville studied by Springer and others rewarded individual middle-school math teachers (Grades 5–7) with bonuses ranging from \$5,000 to \$15,000 if class test scores improved by a certain amount. The authors find no long-term effect. The experiment found positive impacts for fifth graders, but no remaining gains once those fifth graders reached the sixth grade (Springer et al. 2010).

There are many possible explanations for the lackluster results of these two studies, and further research is needed to determine which reasons apply to any given case. First, group-level incentives such as the ones used in New York may not be as effective as individual incentives. The experiment in Nashville, however, gave teachers individual incentives. Second, teachers may not have responded to the incentives in New York City and in Nashville because the scheme was too complex: it was not clear what an individual teacher needed to achieve in order to obtain the bonus. Both of the incentive programs relied on improvements in achievement relative to other schools and students, and so teachers may not have felt that the results were under their control. Finally, teachers may have attempted to respond to the incentives in all cases, but the effects are not observable because other factors may limit teachers' ability to improve test scores over the course of the study.

In addition to rewarding teachers for performance, higher salaries and bonuses could be used to attract teachers to states and school districts with low-performing students and to teach in fields where there are shortages, such as math and science. Evidence shows that schools in urban areas, schools

with a large number of low-performing students, and schools with a high concentration of students who live in poverty find it harder to attract good teachers; as a result, high-quality teachers were underrepresented in low-performing middle schools (National Center for Educational Evaluation and Regional Assistance [NCEE] 2011). The distribution of teaching talent occurs both because of the difficulty of attracting high-quality teachers to low-performing schools in the first place and because more-effective teachers tend to move to higher-achieving schools, while less-effective transfers stay in lower-performing schools (Boyd, Grossman, Lankford, Loeb, and Wyckoff 2008). Evidence from California and North Carolina suggests bonuses are effective ways to encourage teachers to work in low-performing schools (Clotfelter, Glennie, Ladd, and Vignor 2008; Steele, Murnane, and Willett 2010).

## **TRACK TWO: IMPLEMENT SIMPLER EVIDENCE-BASED POLICIES THAT IMPROVE STUDENT ACHIEVEMENT**

The recent approach to education research that uses experimentation and rigorous evaluation of student outcomes has produced a growing menu of cost-effective policies for raising student achievement. The exercise of examining a wide range of approaches and paying close attention to their benefits offers a variety of innovative reforms that could benefit students. Many of these ideas are relatively inexpensive and could be implemented without the need to dramatically rethink how schools operate.

The body of education research uses test scores to measure the benefit of education policies. In this paper, we rely on student test scores as a basis of comparison. Although test scores are obviously only one measure of achievement and do not capture all of the ambitions that parents and society have for today's children, they also have a number of desirable properties. First, evidence shows that educational efforts that improve student test scores also appear to improve other student outcomes that really matter, like raising college attendance rates and increasing future earnings. Second, test scores provide a common measure of achievement that can be used to compare the effect of one educational reform to another.

At the end of this section, we introduce a metric for comparing these reforms on a level playing field based on the available data. Reforms can be compared based on their impact on equivalent months of schooling per dollar. This metric allows school officials to identify efficient methods to raise achievement.

## *Effective ways to improve student achievement*

### *Student incentives*

Student incentive programs are based on the notion that students lack sufficient motivation to invest in key steps in their own educations, perhaps because they do not understand how valuable schooling is in the long run, and that this motivation could be increased through the provision of incentives for achievement.

In a new Hamilton Project discussion paper by Brad Allan of the Education Innovation Laboratory and Roland G. Fryer, Jr., of Harvard University, “The Power and Pitfalls of Education Incentives” (2011), the authors find that paying students for inputs (e.g., reading books), had an effect of 0.18 standard deviations on reading test scores, equivalent to spending an extra two months in school. Other programs, like paying students for outputs (e.g., grades), showed no effect. Their findings prompt “10 Do’s and Don’ts” of a student incentive program. These include providing incentives for behaviors like reading rather than just grades, especially for younger children who may not know how to raise their grades; thinking carefully about what to incentivize; implementing exactly what has been proven effective; staying the course despite opposition to incentive programs; and not worrying that students waste the money they earn.

While critics contend that incentive programs destroy intrinsic motivation (i.e., love of learning), the evidence does not support this claim (see Allan and Fryer 2011 for a review of the literature). Most importantly, Allan and Fryer suggest that the positive effects of certain incentive programs may not go away after the incentives are removed.

The costs of wider implementation of incentive programs may not be high. The costs of pilot programs, such as paying students to read books and paying for grades, have ranged from \$44 to \$1,200 per student, on average. Additional costs may involve hiring and empowering a district-based program

management team. While the effects are generally small, so are the costs, meaning that incentives programs can have large returns on investments if properly designed and implemented.

### *Organizational changes*

A second body of research provides evidence about managerial decisions on how to organize schools and school systems, when to start school, and how to deploy teaching resources.

Class size reductions have long been pointed to as a step toward higher student performance. A study by Krueger (1999) suggests that reducing large class sizes of twenty-three by one third produced test score gains equivalent to an additional 2.8 months of schooling.

A new sampling of education interventions points to further improvements that involve organizational changes. The ways in which schools are organized and managed, such as school start times, the configuration of grades, and class sizes, are important for student achievement.

In a new Hamilton Project discussion paper by Brian Jacob of the University of Michigan and Jonah E. Rockoff of Columbia University, “Managerial Reforms to Improve Student Achievement in U.S. Public Schools” (2011), the authors focus on three particular organization reforms: moving to later school start times, addressing the deleterious effects of middle and junior high grade configurations, and maximizing teachers’ experience by minimizing grade switching early in the teacher’s career, assigning the same teachers to teach English language learners, and encouraging teachers to specialize by subject.

Recent studies provide compelling evidence that later school starting times could substantially improve the academic achievement of students in middle and high school grades. These studies find that students in classes scheduled earlier in the day perform much worse relative to their peers. Tired

**In today’s environment of tight school budgets it becomes essential not just to know how different approaches impact student performance, but also how much they cost.**



students have impaired cognitive functions and increased absences that can lower achievement by what amounts to two months of schooling.

Another organizational feature under scrutiny is the use of stand-alone middle schools and junior high schools. Two large-scale studies conclude that, on average, students who move to middle schools perform significantly worse than those educated in a K–8 or K–12 structure. Students typically enter middle and junior high schools alongside a large group of new peers with widely different experiences in their prior schools during a period of childhood marked by major changes in attitudes and motivation, low self-esteem, poor ability to judge risks and consequences, decreased respect for authority, and other behaviors that may make it more difficult to educate students. By eighth grade, middle school students have lost approximately 0.1 standard deviations relative to their K–8 peers, putting them roughly 1.25 months behind their peers in K–8 by the time they enter high school.

Teacher assignments—how often teachers switch grades and subjects—is another area where managerial changes may benefit students. As in many professions, new teachers learn rapidly from on-the-job experience. New evidence suggests that the speed at which teachers learn may depend on their assignments. For example, Ost (2010) finds that an elementary math teacher who receives the same grade assignment year after year will improve roughly 50 percent faster than a teacher who never repeats a grade assignment. In addition, research shows that teacher experience working with English language learners (ELL) is one of the strongest predictors of effectiveness teaching that cohort. This logic of teacher specialization applies more broadly to other subjects as well, suggesting that teacher specialization as early as elementary school could have a positive effect on student achievement. While the extent of grade and subject switching varies from school to school and reflects factors such as staffing shortages in certain subjects as well as teacher preferences, managing assignments to promote experience can help boost student achievement.

### ***Investing in early childhood education***

Recognizing that a large reason for poor student performance is socioeconomic, early childhood education interventions make sure that students are ready to enter kindergarten and reduce the burden on K–12 teachers to address a major source of disadvantage.

Poverty is on the rise in the aftermath of the Great Recession, creating enormous challenges for an already overburdened school system. As of 2010, the U.S. poverty rate was 14.3 percent, and 15.5 million children were growing up in poverty (Census 2011). Many aspects of growing up in

poverty can have detrimental effects on children's success in school. Children's cognitive development may be affected by poor nutrition, insufficient health care, and a lack of access to early childhood educational opportunities. For these reasons, children from poor families entering kindergarten are often already behind their counterparts in cognitive and socioemotional development, including measures of verbal memory, vocabulary, math and reading achievement, and in behavior problems (Evans and Schamberg 2009; Korenman, Miller, and Sjaastad 1995).

One way to address these challenges is through publicly provided preschool (Heckman 2006; Ludwig and Sawhill 2007). There is strong evidence that early childhood programs have benefits in terms of cognitive achievement and outcomes later in life. For example, the early childhood Head Start program is known to have positive benefits for disadvantaged students, but this program is not widely available. Funding comes through block grants and thus space is limited by the funding available. Only 52 percent of all three- and four-year olds attend any form of school (Snyder and Dillow 2011, Table 6).

In a previous Hamilton Project discussion paper, “Success by Ten: Intervening Early, Often, and Effectively in the Education of Young Children,” Jens Ludwig and Isabel Sawhill (2007) suggest expanding and intensifying Head Start so that every disadvantaged child has the opportunity to enroll in a high-quality program of education and care during the first five years of life. Two experimental programs, Abecedarian and Perry Preschool, showed substantial positive impacts—impacts as large as those gained by successful charter school models like KIPP. The impacts from Head Start are smaller—about one fourth as large—than those of the experimental programs, but Head Start is substantially less expensive than these experimental models, and demonstrates that positive impacts can be attained for a broader group of children.

### ***Summer school and after-school programs***

Some students take longer to learn and others learn best outside of the classroom. New research has shown that out-of-school-time (OST) programs such as summer school and after-school programs can help low-achieving students reach their educational potential.

In a study of mandatory summer school in Chicago for low-performing students, remedial summer school substantially increased the academic achievement of these students, with a larger effect for younger students than for older students

(Jacob and Lefgren 2004). The authors estimate the effect increased student achievement by the equivalent of one month of additional schooling for third graders, and a slightly lower half month of additional schooling for sixth graders.

Children from disadvantaged families experience greater losses in skills during summer vacations than do their more advantaged counterparts. Several studies provide evidence that summer school or summer enrichment programs are effective interventions for stanching this summer learning loss. Based on this evidence, a previous Hamilton Project discussion paper by Alan Krueger and Molly Fifer (2006) proposes and designs a policy of Summer Opportunity Scholarships (SOS), which will provide scholarships so that economically disadvantaged children in kindergarten through fifth grade can participate in a six-week summer school or summer enrichment program of their parents' choosing.

After-school programs accounted for an estimated 4 million student enrollments in public elementary schools (Parsad and Lewis 2009).<sup>5</sup> After-school programs can be particularly important for disadvantaged students because their neighborhoods tend to be less safe and because they are at higher risk of dropping out of school. Certainly, there is considerable variation in the quality, academic merit, and type of after-school programs. An overview of the literature on after-school programs finds that after-school programs can boost student achievement, with an effect equivalent to about an extra month and a half of formal schooling (Lauer, Akiba, Wilkerson, Apthorp, Snow, and Martin-Glenn 2006).

### *Identifying ineffective policies*

Experimentation and research has also helped identify ideas that are not effective in improving student achievement. For example, certain compensation and recruitment policies for teachers discussed above, such as requiring teacher certification and paying teachers for master's degrees, appear to be less effective and more costly than other measures intended to raise achievement. Similarly, certain types of student incentives were not effective. While rigorous research has been limited, preparing students for the twenty-first-century workplace with the "classroom of the future" by beefing up costly technology in the classroom beyond access to Internet and computing resources does not appear to have a direct link to student outcomes (Cuban 2001).

### *Identifying more effective policies*

Although available evidence provides a starting point for thinking about practical and innovative solutions to pave the way for American educational policy, more research is needed. A wider array of programs and policies needs to be

tested. As an example, research has pointed to the importance of the principal's school leadership (Loeb and Grissom 2009), but there is neither concrete evidence on the benefits of high-quality principals nor information about the costs of having such principals in a wider set of schools.

Further research is also needed on what forms of teacher incentives are most effective. As discussed earlier, the few incentive programs tested thus far have not shown compelling results. Some further relevant research is under way. The Teacher Advancement Program (TAP) is testing whether bonuses of about \$2,000 for teachers improve student outcomes. An evaluation of Teacher Talent Transfer Initiative will determine whether or not an extra \$10,000 per year for up to two years is enough to convince highly effective teachers to move to hard-to-staff schools.

### *A new metric for comparing educational interventions*

Making substantial improvements in education is particularly challenging in the current fiscal environment. At the federal, state, and local levels, budgets are stretched thin, and there appears to be little ability or political appetite for new spending, even for high-return educational investments. Indeed, according to the Center on Budget and Policy Priorities, thirty-four states plus the District of Columbia have responded to new fiscal realities by reducing spending on K–12 education since 2008 (Johnson, Oliff, and Williams 2011). Many of the cuts are in areas that could significantly hamper student achievement. For example, several states have shortened the length of the school year, reduced funding for preschool, and increased class size.

In today's environment of tight school budgets, it becomes essential not just to know how different approaches impact student performance, but also how much they cost. Different types of interventions may produce the same improvement on student achievement, but some cost more than others. The goal of any school system should be to get the greatest "bang for the buck"—the largest value in terms of student performance for each dollar spent.

For example, compare remedial summer school for students to incentives for students to read books in schools with large disadvantaged populations—two approaches that show improved student achievement. The evidence suggests that summer school allows struggling students to gain a month's worth of learning. Providing incentives for students to read books appears to provide a bigger gain—the equivalent of about 2.25 additional months for the average student.

But these approaches vary considerably in their cost. Remedial summer school costs about \$2,000 per student. Programs paying kids to read cost only about \$44 per student. Thus

research indicates that we can improve student outcomes by an extra month’s worth of schooling through incentives for students for only \$20, whereas it costs nearly \$1,800 to achieve this through summer school. Motivating students during the school year is a more cost-effective way to improve student outcomes than remedial summer school. For those school systems that already have summer school programs, implementing an incentive system could induce cost savings elsewhere, such as the number of students in need of remedial summer school.

This metric cannot be the only basis on which decisions about educational policy are made: some schools will face too many barriers to implementing some options or some options may be politically infeasible. But this is a metric that policy-makers and school leaders should understand and take into account when considering educational policy shifts.

**TABLE 1**  
**Cost Effectiveness of Several Beneficial Educational Interventions**

	<b>Impact (Months of Schooling Equivalent)</b>	<b>Approximate Cost per Student</b>	<b>Cost for Each Month-equivalent of Educational Gain</b>
Paying students to read books	2.25	\$44	\$20
Restructuring schools to use K-8 rather than middle schools	1.25	\$50-\$250	\$40-\$200
Later start times	0.7	\$0-\$150	\$215 or less
Mandatory remedial summer school for 3rd graders	1.09	\$2,020	\$1,850

Note: The effect of paying students to read books is for native, English-speaking students (Allan and Fryer 2011). The effects of restructuring schools and later start times are from Jacob and Rockoff (2011, Table 1). The effect of remedial summer school is from Jacob and Lefgren (2004, Table 10).



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## Chapter 4: Conclusion

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A defining characteristic of the United States is our public school system. Any resident, regardless of race, gender, or religion, is provided access to an education—and more than 90 percent of students enroll in public schools. But our system faces mounting challenges. We now have among the highest rates of per pupil spending of OECD countries, yet we rank as mediocre on most measures of achievement and educational attainment. Whereas we once led the world in high school and college graduation rates, we now lag behind after thirty years of stagnant rates of high school and college completion. As a result, we are failing to give today's youth the chance to maximize their opportunities in the quickly changing global economy.

The consequences are evident throughout our society. The most salient example is in the labor market: in large part because of declining demand for less-skilled workers, the real wages of the median American male have declined substantially over the past forty years. For a large fraction of the population, the

prospect that each generation will do better than the last is at risk. While a rejuvenated education system cannot fix these problems alone, it is difficult to imagine a real solution that does not involve substantial changes in the American system of education.

There is reason to be optimistic about the future. Evidence guides us to both large-scale changes and smaller reforms that can spur improvements in student achievement and help boost educational attainment. Reversing the labor market trends of the past forty years requires making investments today to promote rising productivity in tomorrow's workers. For a century, investments in publicly available education fueled increases in the economy and promoted widely shared gains in the labor market. To continue that virtuous tradition it is necessary to reinvigorate our existing system of education. That process involves a number of difficult choices, but the students of today and the labor force of tomorrow are counting on us to get it right.

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# Endnotes

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1. We follow the literature in using test scores as a measure of benefits but translate these test-score impacts into months of schooling equivalents—how much time of regular schooling would be needed to produce the same benefit. Following Allan and Fryer (2011), one month of schooling is equal to 0.08 standard deviations of test scores.
2. Three-year effect for students who were offered admission to the charter school, regardless of whether they leave or complete their middle school education at the charter school. However, not all students entering a charter school complete their education there. Controlling for the amount of time students spent in a charter school produces larger estimates. For instance, Angrist, Dynarski, Kane, Pathak, and Walters, 2011 estimate that one year in a KIPP school increases achievement by 0.4 standard deviations for math and 0.1 standard deviations for reading. Similar estimates of completing three years at Harlem Children’s Zone Promise Academy Middle School has similarly large effects: 1.1 standard deviations for math, and 0.6 standard deviations in reading after three years (Dobbie and Fryer 2009).
3. For the case of New York, see New York City Independent Budget Office <http://www.ibo.nyc.ny.us/iboreports/charterschoolsfeb2010.pdf>.
4. States could apply for grants in four categories including (1) recruiting, developing, rewarding, and retaining effective teachers, (2) turning around states’ lowest-achieving schools, (3) building data systems to measure student growth and success and inform teachers and principals about instructional improvement, and (4) adopting new standards and assessments. Categories (1) and (3) are closely related, but (3) focuses on improving access to data and linking student data across time.
5. These include duplicated enrollments because students could be enrolled in more than one program (Parsad and Lewis 2009).

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# References

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- Aaronson, Daniel, Lisa Barrow, and William Sander. 2007. "Teachers and Student Achievement in the Chicago Public High Schools." *Journal of Labor Economics* 25 (1): 95–135.
- Aaronson, Daniel and Katherine Meckel. 2008. "The Impact of Baby Boomer Retirements on Teacher Labor Markets." *Chicago Fed Letter* 254 (September).
- Allan, Bradley M., and Roland G. Fryer, Jr. 2011. "The Power and Pitfalls of Education Incentives." Discussion Paper 2011-07, The Hamilton Project, Washington, DC.
- Angrist, Joshua D., Parag A. Pathak and Christopher R. Walters. 2011. "Explaining Charter School Effectiveness." Working Paper No. 17332, National Bureau for Economic Research, Cambridge, MA (August).
- Angrist, Joshua D., Susan M. Dynarski, Thomas J. Kane, Parag A. Pathak, and Christopher R. Walters. 2010. "Who Benefits from KIPP?" Working Paper No. 15740, National Bureau for Economic Research, Cambridge, MA (February).
- Autor, David. 2010. "The Polarization of Job Opportunities in the U.S. Labor Market: Implications for Employment and Earnings." The Center for American Progress and The Hamilton Project, Washington, DC.
- Barrow, Lisa, and Cecilia E. Rouse. 2004. "Using Market Valuation to Assess Public School Spending." *Journal of Public Economics*, 88 (9-10): 1747-1769.
- Bendor, J., Bordoff, E., and Furman, J. 2007. "An Education Strategy to Promote Opportunity, Prosperity, and Growth." The Hamilton Project, Washington, DC.
- Boyd, Don, Pam Grossman, Hamp Lankford, Susanna Loeb, and Jim Wyckoff. 2008. "Who Leaves? Teacher Attrition and Student Achievement." Working Paper 14022, National Bureau of Economic Research, Cambridge, MA (May).
- Bryk, Anthony S., Penny Bender Sebring, Elaine Allensworth, Stuart Luppescu and John Q. Easton. 2010. *Organizing Schools for Improvement: Lessons from Chicago*. Chicago: The University of Chicago Press.
- Card, David. 1995. "Using Geographic Variation in College Proximity to Estimate the Return to Schooling." In *Aspects of Labor Market Behaviour: Essays in Honour of John Vanderkamp*, edited by Louis N. Christofides, E. Kenneth Grant, and Robert Swidinsky. Toronto: University of Toronto Press.
- Card, David. 2001. "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems." *Econometrica* 69 (5): 1127-1160.
- Census Bureau. 2011. *Income, Poverty and Health Insurance Coverage in the United States: 2010*. Accessed at <http://www.census.gov/prod/2011pubs/p60-239.pdf>.
- Chetty, Raj, John N. Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. Forthcoming. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR." *Quarterly Journal of Economics*.
- Chetty, Raj, John N. Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. 2010. "\$320,000 Kindergarten Teachers." *Kappan* 92 (3): 22–25.
- Chiang, Hanley. 2009. "How Accountability Pressure on Failing Schools Affects Student Achievement." *Journal of Public Economics* 93 (9–10): 1045–1057.
- Clotfelter, Charles, Elizabeth Glennie, Helen Ladd, and Jacob Vigdor. 2008. "Would Higher Salaries Keep Teachers in High-Poverty Schools? Evidence from a Policy Intervention in North Carolina." *Journal of Public Economics* 92 (5–6): 1352–1370.
- Costrell, Robert M., and Josh B. McGee. 2010. "Teacher Pension Incentives, Retirement Behavior, and Potential for Reform in Arkansas." *Education Finance and Policy* 5 (4): 492–518.
- Costrell, Robert M. and Michael Podgursky. 2009. "Teacher Pension Reform: A Way Out of the Impasse." *Education Next* (November).
- Cuban, Larry. 2001. *Oversold and Underused: Computers in the Classroom*. Cambridge: Harvard University Press.
- Cullen, Julie Berry, and Randall Reback. 2006. "Tinkering Toward Accolades: School Gaming Under a Performance Accountability System." In *Improving School Accountability - Check-ups or Choice*, edited by Michael Baye and John Maxwell. Vol. 14 of *Advances in Microeconomics?*, edited by Timothy J. Gronberg and Dennis W. Jansen, 1–34. Amsterdam: Elsevier Science.
- Current Population Survey (CPS). Integrated Public Use Microdata Series [Machine-readable database], Version 3.0, by Miriam King, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick. Minnesota Population Center, Minneapolis, MN.
- Decker, Paul T., Daniel P. Mayer, and Steven Glazerman. 2004. "The Effects Of Teach for America on Students: Findings From a National Evaluation." *Mathematica*, Washington, DC.
- Dillon, Sam. 2011. "Troubled Schools Try Mimicking the Charters." *New York Times*, September 6. Accessed at <http://www.nytimes.com/2011/09/06/education/06houston.html>.
- Dynarski, Susan, Caroline Hoxby, Tom Loveless, Mark Schneider, Grover J. Whitehurst, John Witte, Michelle Croft. 2010. "Charter Schools: A Report on Rethinking the Federal Role in Education." Brown Center on Education Policy, Brookings Institution, Washington, DC. Accessed at [http://www.gcyf.org/usr\\_doc/charter\\_schools\\_brookings.pdf](http://www.gcyf.org/usr_doc/charter_schools_brookings.pdf).
- Evans, Gary W., and Michelle A. Schamberg. 2009. "Childhood poverty, chronic stress, and adult working memory." *PNAS* 2009 106 (16): 6545-6549.

- Figlio, David N. 2006. "Testing, Crime, and Punishment." *Journal of Public Economics* 90 (4–5): 837–851.
- Figlio, David N. and Lawrence S. Getzler. 2006. "Accountability, Ability and Disability: Gaming the System?" In *Improving School Accountability - Check-ups or Choice*, edited by Michael Baye and John Maxwell. Vol. 14 of *Advances in Microeconomics?*, edited by Timothy J. Gronberg and Dennis W. Jansen, 35–49. Amsterdam: Elsevier.
- Figlio, David N., and Cecilia E. Rouse. 2006. "Do Accountability and Voucher Threats Improve Low-Performing Schools?" *Journal of Public Economics* 90 (1–2): 239–255.
- Fryer, Roland. 2011. "Teacher Incentives and Student Achievement: Evidence from New York City Public Schools." Working Paper 16850, National Bureau of Economic Research, Cambridge, MA (March).
- Gleason, Philip, Melissa Clark, Christina Clark Tuttle, and Emily Dwyer. 2010. "The Evaluation of Charter School Impacts: Final Report." National Center for Education Evaluation and Regional Assistance, Washington, DC.
- Goldin, Claudia, and Lawrence Katz. 2001. "The Legacy of U.S. Educational Leadership: Notes on Distribution and Economic Growth in the Twentieth Century." *American Economic Review* 91 (2): 18–23.
- Gordon, Robert, Thomas J. Kane, and Douglas O. Staiger. 2006. "Identifying Effective Teachers Using Performance on the Job." Discussion Paper 2006-01, The Hamilton Project, Washington, DC.
- Government Accountability Office (GAO). 2011. "Race to the Top: Reform Efforts Are Under Way and Information Sharing Could Be Improved." GAO-11-658, Washington, DC.
- Greenstone, Michael, and Adam Looney. 2011. "Trends: Men in Trouble." *The Milken Institute Review* (Third Quarter), 8-16.
- Grossman, Michael. 2006. "Education and Nonmarket Outcomes." In *Handbook of the Economics of Education*, Volume 1, edited by Eric A. Hanushek and Finis Welch, 577–633. North Holland: Elsevier.
- Hamilton Project, The. 2011. "New Assessments for Improved Accountability." Policy Brief 2011-09. Washington, DC.
- Hanushek, Eric A. 2010. "The Economic Value of Higher Teacher Quality." Working Paper 16606, National Bureau of Economic Research, Cambridge, MA (November).
- Hanushek, Eric A., and Ludger Woessmann. 2010. "How Much Do Educational Outcomes Matter in OECD Countries?" Working Paper 16515, National Bureau of Economic Research, Cambridge, MA (November).
- Heckman, James J. 2006. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312 (5782): 1900–1902.
- Heckman, James J., and Paul A. LaFontaine. 2010. "The American High School Graduation Rate: Trends and Levels." *The Review of Economics and Statistics*, 92 (2): 244–262.
- Hoxby, Caroline M., Sonali Murarka, and Jenny Kang. 2009. "How New York City's Charter Schools Affect Achievement." The New York City Charter Schools Evaluation Project (September). Accessed at [http://www.nber.org/~schools/charterschoolseval/how\\_NYC\\_charter\\_schools\\_affect\\_achievement\\_sept2009.pdf](http://www.nber.org/~schools/charterschoolseval/how_NYC_charter_schools_affect_achievement_sept2009.pdf).
- Jacob, Brian A. 2005. "Accountability, Incentives and Behavior: Evidence from School Reform in Chicago." *Journal of Public Economics* 89 (5–6): 761–796.
- Jacob, Brian A., Lars Lefgren. 2004. "Remedial Education and Student Achievement: A Regression-Discontinuity Analysis." *The Review of Economics and Statistics*, 86 (1): 226–244.
- Jacob, Brian and Jonah E. Rockoff. 2011. "Managerial Reforms to Improve Student Achievement in U.S. Public Schools." Discussion Paper 2011-08, The Hamilton Project, Washington, DC.
- Johnson, Nicholas, Phil Oliff, and Erica Williams. 2011. "An Update on State Budget Cuts At Least 46 States Have Imposed Cuts That Hurt Vulnerable Residents and the Economy." Center on Budget and Policy Priorities, Washington, DC. Accessed at <http://www.cbpp.org/cms/index.cfm?fa=view&id=1214>.
- Kane, Thomas J., and Steven Cantrell. 2010. "Learning about Teaching: Initial Findings from the Measures of Effective Teaching Project." Measures of Effective Teaching, Bill and Melinda Gates Foundation. Accessed at [http://www.metproject.org/downloads/Preliminary\\_Findings-Research\\_Paper.pdf](http://www.metproject.org/downloads/Preliminary_Findings-Research_Paper.pdf).
- Kane, Thomas J., Jonah E. Rockoff, and Douglas O. Staiger. 2008. "What Does Certification Tell Us About Teacher Effectiveness? Evidence from New York City." *Economics of Education Review* 27 (6): 615–631.
- Kane, Thomas J., and Cecilia E. Rouse. 1995. "Labor-Market Returns to Two- and Four- Year College." *American Economic Review* 85 (3): 600–614.
- Kane, Thomas J., and Douglas O. Staiger. 2002. "The Promise and Pitfalls of Using Imprecise School Accountability Measures." *Journal of Economic Perspectives* 16 (4): 91–114.
- Kane, Thomas J., and Douglas O. Staiger. 2008. "Estimating Teacher Impacts on Student Achievement: An Experimental Evaluation." Working Paper No. 14607, National Bureau of Economic Research, Cambridge, MA (December).
- Kane, Thomas J., Eric S. Taylor, John H. Tyler, and Amy L. Wooten. 2010. "Evaluating Teacher Effectiveness." *Education Next* 11 (3): 55–60.
- Knowledge Is Power Program (KIPP). 2011. "The Promise of College Completion." Author, Washington, DC. Accessed at <http://www.kipp.org/ccr>.
- Korenman, Sanders, Jane E. Miller, and John E. Sjaastad. 1995. "Long-Term Poverty and Child Development: Evidence From the NLSY." *Child Youth Services Review* 17: 127–155.
- Krueger, Alan B. 1999. "Experimental Estimates of Education Production Functions." *Quarterly Journal of Economics* 114 (2): 497–532.
- Krueger, Alan B., and Molly E. Fifer. 2006. "Summer Opportunity Scholarships: A Proposal To Narrow the Skills Gap." Discussion Paper 2006-03, The Hamilton Project, Washington, DC.
- Lauer, Patricia A., Motoko Akiba, Stephanie B. Wilkerson, Helen S. Apthorp, David Snow and Mya L. Martin-Glenn. 2006. "Out-of-school-time programs: A meta-analysis of effects for at-risk students." *Review of Educational Research* 76 (2): 275–313.
- Lochner, Lance, and Enrico Moretti. 2004. "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports." *American Economic Review* 94 (1): 155–189.
- Loeb, Susanna, and Jason Grissom. 2009. "Triangulating Principal Effectiveness: How Perspectives of Parents, Teachers, and



- Assistant Principals Identify the Central Importance of Managerial Skills.” Urban Institute, Washington, DC. Accessed at <http://www.urban.org/publications/1001443.html>.
- Ludwig, Jens, and Isabel Sawhill. 2007. “Success by Ten.” Discussion Paper 2007-02, The Hamilton Project, Washington DC.
- Moretti, Enrico. 2004. “Estimating the Social Return to Higher Education: Evidence From Cross-Sectional and Longitudinal Data.” *Journal of Econometrics* 121 (1–2): 175 – 212.
- National Assessment of Educational Progress (NAEP). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES), Washington, DC. Downloaded from the NCES NAEP Data Explorer.
- National Council on Teacher Quality (NCTQ). 2010. “Blueprint for Change: National Summary.” Accessed at <http://www.nctq.org/stpy09/updates/national.jsp>
- National Center for Educational Evaluation and Regional Assistance (NCEE). 2011. “Do Low-Income Students Have Equal Access to the Highest-Performing Teachers?” NCEE 2011-4016, U.S. Department of Education, Washington, DC. Accessed at <http://ies.ed.gov/ncee/pubs/20114016/pdf/20114016.pdf>.
- Neal, Derek. 2006. “Chapter 9 Why Has Black–White Skill Convergence Stopped?” In *Handbook of the Economics of Education*, Vol. 1, edited by Eric A. Hanushek and Finis Welch, 511–576. North Amsterdam: Elsevier.
- Neal, Derek, and Diane Whitmore Schanzenbach. 2010. “Left Behind by Design: Proficiency Counts and Test-Based Accountability.” *Review of Economics and Statistics* 92 (2): 263–283.
- Organisation for Economic Co-operation and Development (OECD), Program for International Student Assessment (PISA). 2009. “The PISA 2009 Profiles by Country/Economy.” Accessed at <http://stats.oecd.org/PISA2009Profiles/#>.
- Organisation for Economic Co-operation and Development (OECD). 2010a. “Expenditure on Educational Institutions per Student and Change in Expenditure Due to Different Factors.” *OECD Factbook 2010: Economic, Environmental and Social Statistics*. Accessed at <http://www.oecd-ilibrary.org/sites/factbook-2010-en/09/02/02/index.html?contentType=&itemId=/content/chapter/factbook-2010-65-en&containerItemId=/content/serial/18147364&accessItemIds=&mimeType=text/html>.
- Organisation for Economic Co-operation and Development (OECD). 2010b. “Education at a Glance 2010: OECD Indicators.” Accessed at <http://www.oecd.org/dataoecd/45/39/45926093.pdf>.
- Oreopoulos, Philip, and Kjell G. Salvanes. 2009. “How Large Are Returns to Schooling? Hint: Money Isn’t Everything.” Working Paper 15339, National Bureau of Economic Research, Cambridge, MA (September).
- Ost, Ben. 2010. “How Do Teachers Improve? The Relative Importance of Specific and General Human Capital.” Working Paper, Cornell University, Ithaca, NY.
- Parsad, Basmat, and Laurie Lewis. 2009. “After-School Programs in Public Elementary Schools.” NCES 2009–043, National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC (February).
- Reback, Randall. 2008. “Teaching to the Rating: School Accountability and the Distribution of Student Achievement.” *Journal of Public Economics* 92 (5–6): 1394–1415.
- Rivkin, Steven G., Eric A. Hanushek, and John F. Kain. 2005. “Teachers, Schools, and Academic Achievement.” *Econometrica* 73 (2).
- Rockoff, Jonah E. 2004. “The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data.” *American Economic Review, Papers and Proceedings* (May).
- Rockoff, Jonah E., Brian Jacob, Thomas J. Kane, and Douglas O. Staiger. 2011. “Can You Recognize an Effective Teacher When You Recruit One?” *Education Finance and Policy* 6 (1): 43–74.
- Rockoff, Jonah E., and Cecilia Speroni. 2010. “Subjective and Objective Evaluations of Teacher Effectiveness.” *American Economic Review* 100 (2): 261–266.
- Rouse, Cecilia E., Jane Hannaway, Dan Goldhaber and David Figlio “Feeling the Florida Heat? How Low-Performing Schools Respond to Voucher and Accountability Pressure.” 2007. Working Paper No. 13681, National Bureau of Economic Research, Cambridge, MA (December).
- Roza, Marguerite. 2007. “Frozen Assets: Rethinking Teacher Contracts Could Free Billions for School Reform.” Education Sector, Washington, DC.
- Snyder, Thomas D., and Sally A. Dillow. 2011. *Digest of Education Statistics 2010*. NCES 2011-015, National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC. Accessed at <http://nces.ed.gov/programs/digest/>.
- Springer, Matthew G., Dale Ballou, Laura S. Hamilton, Vi-Nhuan Le, J.R. Lockwood, Daniel F. McCaffrey, Matthew Pepper, and Brian M. Stecher. 2010. “Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching.” National Center on Performance Incentives at Vanderbilt University, Nashville, TN. Accessed at [http://www.performanceincentives.org/data/files/gallery/ContentGallery/POINT\\_REPORT\\_9.21.10.pdf](http://www.performanceincentives.org/data/files/gallery/ContentGallery/POINT_REPORT_9.21.10.pdf).
- Staiger, Douglas O., and Jonah E. Rockoff. 2010. “Searching for Effective Teachers with Imperfect Information.” *Journal of Economic Perspectives* 24 (3): 97–118.
- Steele, Jennifer L., Richard J. Murnane, and John B. Willett. 2010. “Do Financial Incentives Help Low-Performing Schools Attract and Keep Academically Talented Teachers?” *Journal of Policy Analysis and Management* 29 (3): 451–478.
- Tuttle, Christina Clark, Bing-ru Teh, Ira Nichols-Barrer, Brian P. Gill, and Philip Gleason. 2010. “Student Characteristics and Achievement in 22 KIPP Middle Schools.” Mathematica Policy Research, Washington, DC.
- Weisberg, Daniel, Susan Sexton, Jennifer Mulhern and David Keeling. 2009. “The Widget Effect: Our National Failure to Acknowledge and Act on Differences in Teacher Effectiveness.” The New Teacher Project, New York. Accessed at <http://widgeteffect.org/downloads/TheWidgetEffect.pdf>

# Hamilton Project Papers on Education

## EDUCATION STRATEGY PAPERS

- **“An Education Strategy to Promote Opportunity, Prosperity, and Growth”**  
*by Joshua Bendor, Jason E. Bordoff, and Jason Furman*  
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*by Brian A. Jacob and Jonah E. Rockoff*  
Discusses three organizational reforms to increase student learning: moving to later start times for older students, encouraging K–8 configurations rather than maintaining middle schools or junior high schools, and ensuring teachers are assigned the grades and subjects in which they are most effective.
- **“New Assessments for Improved Accountability,”**  
*by Derek Neal*  
Proposes new assessments better suited for use in accountability systems than existing tests, to be used in combination with non-test metrics such as classroom observations, school inspections, and parental evaluations.
- **“College Grants on a Postcard: A Proposal for Simple and Predictable Federal Student Aid,”**  
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Proposes a simplification of the current system of educational grants and tax incentives into a single, streamlined grant administered through the Department of Education.
- **“Summer Opportunity Scholarships (SOS): A Proposal to Narrow the Skills Gap,”**  
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Proposes the creation of Summer Opportunity Scholarships (SOS) for economically disadvantaged children in kindergarten through fifth grade to participate in a summer school or summer enrichment program of their parents’ choosing.
- **“Investing in the Best and the Brightest: Increased Fellowship Support for American Scientists and Engineers,”**  
*by Richard B. Freeman*  
Proposes tripling the number of National Science Foundation graduate research fellowships, restoring the program’s balance between awards given out and the number of science undergraduates.
- **“Identifying Effective Teachers Using Performance on the Job,”**  
*by Robert Gordon, Thomas J. Kane, and Douglas O. Staiger*  
Proposes expanding federal support to help states measure the effectiveness of individual teachers—based on their impact on student achievement, subjective evaluations by principals and peers, and parental evaluations.
- **“Success by Ten: Intervening Early, Often, and Effectively in the Education of Young Children,”**  
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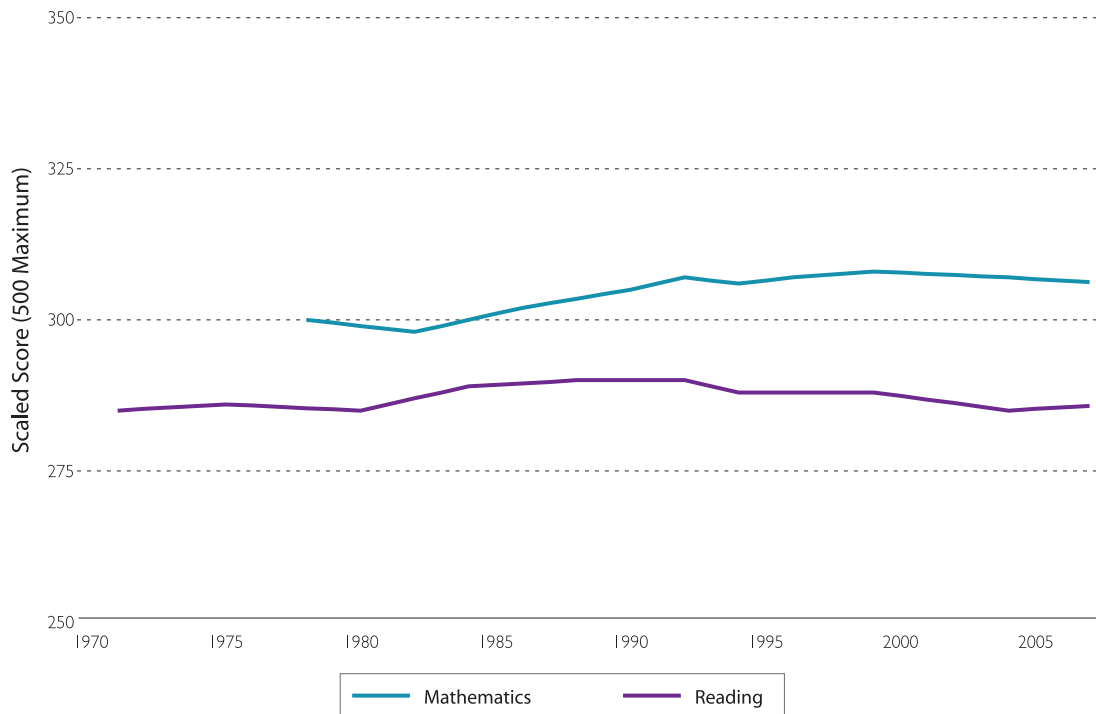
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Director

# Average Mathematics and Reading Test Scores for 17 Year Olds



NOTE: Average scaled scores for reading and mathematics, age 17. 1971-2004 original assessment format.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP).

Many measures of student achievement have barely budged in 30 years: the average student today scores about the same as his or her parents on the National Assessment of Educational Progress. Rates of educational attainment have also stagnated; the percentage of young Americans who have completed high school has hardly increased since the late 1970s, and gains in college completion rates have slowed considerably. This lack of progress contrasts with the increasing amounts the United States has been spending on education.

Since workforce skills are closely linked to productivity and compensation, the stagnation in educational attainment and performance has contributed to static or declining wages for many Americans. Indeed, consider working-age men, whose education rates peaked in the late 1970s: the earnings of the median man have declined roughly 28 percent since 1969, or roughly \$13,000. While a rejuvenated education system cannot reverse these distressing labor market trends by itself, it is difficult to imagine a real solution that does not involve substantial changes in the American system of education. That means reforming our education system so that it is more effective in raising our children's academic achievement and aiding their social and emotional development.



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