

THE
HAMILTON
PROJECT

STRATEGY PAPER

FEBRUARY 2007

An Education Strategy to Promote Opportunity, Prosperity, and Growth

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The Hamilton Project seeks to advance America's promise of opportunity, prosperity, and growth. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by making economic growth broad-based, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments. Our strategy—strikingly different from the theories driving economic policy in recent years—calls for fiscal discipline and for increased public investment in key growth-enhancing areas. The Project will put forward innovative policy ideas from leading economic thinkers throughout the United States—ideas based on experience and evidence, not ideology and doctrine—to introduce new, sometimes controversial, policy options into the national debate with the goal of improving our country's economic policy.

The Project is named after Alexander Hamilton, the nation's first treasury secretary, who laid the foundation for the modern American economy. Consistent with the guiding principles of the Project, 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.





An Education Strategy to Promote Opportunity, Prosperity, and Growth

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Abstract

This paper discusses a framework for education policy, from early childhood through post-secondary education, along with major reform ideas consistent with that framework. We present evidence showing that education is critical to broad-based economic growth. Investments in education yield large returns to both society and the individual. Furthermore, expanding access to high-quality education directly addresses one of the major causes of increased inequality: technological changes that increasingly reward skilled workers.

The paper presents evidence suggesting that America's educational system is neither in crisis nor reaching its full potential. To better secure the benefits of a strong education system, the paper outlines an evidence-based strategy that calls for new investments in some areas (such as early education) and structural reforms in others (such as the teacher tenure system). A recently proposed early education program for disadvantaged children and a proposal to dramatically simplify the federal student financial aid system are discussed in detail.

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Introduction

America's extraordinary growth in the twentieth century was underpinned by a huge expansion in education. In 1940, fewer than 25 percent of Americans over twenty-five years of age had a high school diploma; by 2000, more than 80 percent had graduated from high school. In addition, the percentage of Americans over twenty-five with a bachelor's degree rose fivefold during that period, going from 4.6 percent in 1940 to 24.4 percent in 2000 (U.S. Census Bureau 2003, p. 4). In the twenty-first century, knowledge will be even more important. Our nation's continued prosperity depends on educating our students and building a high-skilled workforce, focusing especially on expanding the quality of schooling. Improving the quality of education will require innovative policy solutions. Toward that effort, The Hamilton Project has released several discussion papers addressing such issues as improving teacher quality, stanching "summer learning loss," expanding early childhood education, and expanding access to higher education.

To equip American workers to succeed in the global economy, we must provide a high-quality education that fosters the creativity, innovation, and analytical rigor necessary to keep America at the frontier of the development of new knowledge and the creation of entirely new industries that will drive economic growth. Additionally, in an era of rising inequality, it is more critical than ever that all Americans have the tools they need to become part of tomorrow's high-skilled work-

force and share in our nation's prosperity. Expanding the opportunities for high-quality education directly addresses one of the major causes of increased inequality: technological changes that increasingly reward skilled workers.¹

Some believe that education is all that is needed to address our economic challenges. Provide Americans with more knowledge and skills, they argue, and the rising tide of inequality will ebb. They are wrong: education is only one part—albeit a critical part—of an overall economic strategy to achieve broad-based

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economic growth. Education has large benefits, but they take years or even decades to materialize—only a small consolation to families facing economic anxiety today. Furthermore, other factors have also contributed to rising inequality—as evidenced by the big increase in inequality between people with similar educational backgrounds. Consequently, other measures are also needed to allow Americans to share more broadly in the nation's prosperity.

Others have overreacted to the "education only" approach, denying that the skills gap plays an important role in increasing inequality or that education can play

1. For a nuanced discussion of recent trends and explanatory factors that emphasizes that wage inequality has stabilized in the bottom part of the wage distribution while continuing to rise in the top part, see Autor et al. (2005) and Acemoglu (2002).

a role in reducing it. This is misguided. While it is true that the economic benefits of investment in preschool will not start to materialize for fifteen years or more after the investment, they are so large that they may eventually repay the full initial investment many times over. Thus, we must help those experiencing hardship today get back on their feet in addition to, not instead of, making the educational reforms and investments that will address the root causes of tomorrow's problems. Legitimate disagreements about the evidence on trade and labor market regulation should not diminish the broadly shared enthusiasm for making critical improvements to our educational system.

An inclusive approach that helps all Americans share in the benefits of education is not just equitable, it is also economically efficient. The American economy will do best if all Americans have the opportunity to develop and express their talents.² If the poorest quarter of Americans, for example, is essentially denied access to college, America could miss out on the next great innovator. Equality of opportunity is not just an American ideal, it is also critical to promoting the most broadly shared, strongest economic growth.

More Resources and Wiser Spending

Many educational proposals begin with ideas for new investments. Certainly, new investments are needed: there are major funding gaps in the current educational system and substantial evidence that additional money would bring large benefits. But in a world of limited resources—and one in which the federal government already has made substantial budget obligations it cannot afford at current tax rates—it is important for new investments to be based on sound evidence. This is even more important because creating government programs with inadequate evidence can undermine public confidence in government if such programs ultimately prove ineffective or inefficient.

TABLE 1
Estimated spending on education in the United States, 2007, in billions of dollars

	Preschool	K-12	Higher Education	Totals
Federal	7	35	38	80
State & Local	9	448	83	540
Private	5	51	116	171
Other	n/a	n/a	82	82
Totals	21	533	320	874

Notes: All values are in billions of 2007 dollars and are estimated based on several sources. For higher education, the "other" category includes revenue from auxiliary enterprises, educational activities, hospitals, and other; the private category includes revenue from tuition, private gifts and grants, and endowment returns (ED 2006b). Sources are CBO 2006; ED 2006b, Tables 26, 31, 153, 330, 334; OECD 2006, Table B3.2a; National Institute for Early Education Research 2005; Barnett and Masse (in press); OMB 2006a, Table 19-1; OMB 2006b, Table 3-2.

We already know enough about each of the principal areas in education—early childhood, K-12, and higher education—to begin implementing certain key reforms and to guide experimentation in others. As these experiments bear fruit, they will help us decide how to further refine existing programs and choose new initiatives to implement at full scale.

Early education. A broad range of individuals and organizations—from Nobel Prize-winning economist James Heckman, to the Business Roundtable, and the Committee on Economic Development—have argued that substantial new investments in preschool would have large economic benefits. Evidence shows that a child's early years are particularly important for mental development, and that investments in these years are likely to more than pay for themselves over the coming decades. Yet there is relatively little public money for preschool (see Table 1), and fewer than 50 percent of three- and four-year-olds are enrolled in any form of preschool (U.S. Census Bureau 2006, p. 16). Many preschool programs, including Head Start, do not focus sufficiently on preparing children for school. And although the evidence shows that children whose Head Start teachers have a college degree perform better in

2. To quote Alexander Hamilton, "To cherish and stimulate the activity of the human mind, by multiplying the objects of enterprise, is not among the least considerable of the expedients, by which the wealth of a nation may be promoted. . . . Every new scene, which is opened to the busy nature of man to rouse and exert itself, is the addition of a new energy to the general stock of effort" (Hamilton 1791).

school, only sixteen states require preschool teachers to have a bachelor's degree (National Institute for Early Education Research 2005).

Primary and secondary education. The K-12 years are crucial for building the basic skills students will need to prepare for college and succeed in the working world. Many students are not establishing this basic educational foundation, however. Recent research shows that, in 2002, only 34 percent of American students left high school with the skills and qualifications necessary to attend college (Greene and Winters 2005).

The biggest potential gains in K-12 education, however, will not come from new investments, but from improving the investments we make today. Even the most ambitious proposals for new spending are dwarfed by the \$483 billion that federal, state, and local governments already spend annually on K-12 education (see Table 1). Moreover, although America lags behind other countries in many measures of education, it also spends more than most other countries. America spends \$8,935 per pupil in kindergarten through twelfth grade (K-12), which is 30 percent more than per pupil spending in the United Kingdom (OECD 2006, Table B1.1c).

Instead, a promising framework for improving the quality of our educational institutions rests on three principles: (1) measurement and accountability, (2) appropriate use of market forces, and (3) experimentation and scientific evaluation. For example, accountability standards can create incentives for schools to improve; market forces can improve teaching by creating a more-flexible teacher salary schedule that allows districts to reward performance and attract top teachers to tougher schools; and experimentation can lead to the discovery and dissemination of better ways to organize schools and to teach.

Higher education. The average cost of a four-year college degree for a state resident at a public school is about \$65,000, with private schools averaging about \$130,000 (College Board 2006b).³ Though these costs seem prohibitively large for most families, evidence shows that a college degree pays back more than \$440,000 in higher wages on average, in present-value terms (Barrow and Rouse 2005; value is deflated to estimated 2007 dollars⁴). While college costs have risen sharply, so has the quality of a college education and the returns to college. Society should not use its limited resources to subsidize those who would attend college without such aid, because those students already recoup more than they invest in college. But public investments are needed to help those students who are prevented from attending college because of liquidity constraints or uncertainty about the returns to schooling. The first step should be making better use of the complex and duplicative resources already dedicated to financial aid. Such uses include helping prospective students to better understand the aid that is available to them and to borrow against future earnings to pay for tuition, and helping those who fall significantly short of those average future earnings, which is increasingly likely because the returns to education have become increasingly disparate (see, e.g., Lemieux 2006).

Additional spending is certainly needed, but the biggest potential gains in education will come from improving the investments we make today.

But while the current stock of knowledge can help guide reforms and new investments, there is much that we do not know about education. Today, the Department of Education spends less than 1 percent of its budget on research, whereas 2.5 percent of the U.S. economy as a whole goes to R&D (U.S. Department of Education [ED] 2006c, Bureau of Economic Analysis and National Science Foundation 2006). According to the Coalition

3. Values include tuition and fees, books and supplies, room and board, transportation, and other expenses. The calculation uses a 3 percent discount rate and assumes that college costs increase as they have over the past three decades. A complete accounting would include forgone wages as part of the opportunity cost of attending college.

4. Throughout the paper, such estimates are made using data from Congressional Budget Office, 2007, Table D.1

for Evidence-Based Policy, a project of the Council for Excellence in Government,

Education is a field in which a vast number of interventions, such as ability grouping and grade retention, have gone in or out of fashion over time with little regard to rigorous evidence. . . . Our extraordinary inability to raise educational achievement stands in stark contrast to our remarkable progress in improving human health over the same time period—progress which . . . is largely the result of evidence-based government policies. (Coalition for Evidence-Based Policy 2002)

An evidence-based approach to education policy not only means adding resources for programs that work, but also eliminating or scaling back programs that don't. For example, studies have found that Title I funding could do much more to support schools that serve poor children. In response, a Hamilton Project discussion paper would have schools devote their Title I resources to Success for All, a reading program with a proven track record, or other instructional programs that have been proven effective (Ludwig and Sawhill 2007). Similarly, there is evidence that up to 19 percent of school district spending goes to common teacher contract provisions that have a weak impact on student learning, such as seniority-based raises or hiring a prescribed number of classroom aides (Roza 2007). This is money that could be better spent on other types of teacher compensation such as rewards for exceptional performance, additional compensation for teachers who agree to work in disadvantaged schools, or better pay for math and science teachers.

To be sure, while increasing the quality of public education is critical, families must play their part, too. Children spend most of their time at home, not at school, so much of the educational opportunity and responsibility lies with parents. For example, evidence supports the conventional wisdom that children benefit when they live in homes with a supportive learning environment, as measured by the number of books in the household (see, e.g., Fryer and Levitt 2002).

Improving Education Is Key to Achieving Broad-Based Economic Growth

Increases in education levels are powerful drivers of national economic growth and productivity (Krueger and Lindahl 2001). In fact, the increase in education of the American workforce accounted for nearly one-quarter of the total growth in labor productivity from 1915 to 1999 (Goldin and Katz 2001). As one well-known study put it, “Education is both the seed and the flower of economic development” (Harbison and Myers 1965, p. xi). Investing in human capital is especially important given how much of the productive power of the U.S. economy lies with its people. The Office of Management and Budget (OMB), for example, has estimated that all privately owned commercial buildings and equipment in the United States are worth \$13 trillion, but that the nation's human capital, as embodied in the skills of its workforce, is worth more than three times that: \$48 trillion (Office of Management and Budget 2006a, p. 195).

Investments in education yield large returns to both society and the individual. Just as investments in physical capital carry a rate of return, so, too, do investments in human capital. Indeed, studies suggest that the real rate of return on investments in education and training programs—in terms of payoff to lifetime earnings relative to the up-front costs—is between 5 and 15 percent per year. (For a good survey, see Card 2003.) By increasing wages and opportunities, education investments thus strengthen the economic security of American families. Related public benefits of increased education include greater tax payments from more high-income earners and reduced spending on public assistance, as well as lower crime rates (Vernez et al. 1999, pp. 13–31, Cunha et al. 2005). Higher levels of education are also associated with better health, which is obviously good for the individual, but which also decreases societal health-care costs (Cutler and Lleras-Muney 2006, p. 22, Elo and Preston 1996).⁵ Finally, new skills training, which will be discussed in future Hamilton Project papers, can

5. For example, 20 percent of the U.S. workforce is functionally illiterate, and therefore unable to understand the directions on, for example, prescription medications (Heckman 2006).

be critical both for dislocated workers and for workers moving up their career ladders.

Investing in formal education also helps share the gains of economic growth more broadly throughout the economy. Increasing returns to education are one of the major drivers of increasing inequality (Autor et al. 2005, Acemoglu 2002). Since the 1970s, a combination of increased demand for skilled workers (possibly due to the computer revolution, among other factors) and a deceleration in the supply of skilled workers (as the rapid expansion of years of schooling tapered off) have combined to raise the premium paid for skilled workers. As a result of this and other factors, the gains of growth over the past few decades have largely accrued to the wealthiest Americans, in stark contrast to the trend that persisted for most of American history (Friedman 2005, pp. 435–36).

Investing in education can help to offset this rise in inequality. Increasing education levels doesn't only help those who get a college degree.

Even workers who don't receive any additional education will benefit indirectly as the reduction in the supply of less-educated workers drives up their wages.

Although economists generally agree that technology is the main cause of rising inequality, it is not the only important factor and changes in labor laws, the minimum wage, immigration and international trade all affect the skill premium. In addition, there has been a substantial increase in inequality among workers with similar educational and skill backgrounds, what economists call "within-group" inequality. The increase in within-group inequality is unlikely to be explained by these factors; to the degree policy makers view it as a problem, much of the solution lies outside the area of education.

Promoting broad-based growth requires careful attention to the sources of disparities in educational attainment and outcomes. For example, evidence shows that a substantial share of the skills gap between high- and low-socioeconomic students emerges during the summer months when school is not in session. During the school year, these students make roughly similar progress. Formal schooling, therefore, helps to overcome much of the learning deficits associated with low socioeconomic status when schools are in session (Fifer and Krueger 2006). By narrowing the skills gap between those at the top and the bottom of the economic ladder, public education helps to create a workforce that

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can more broadly share the gains of economic growth. Additionally, investing in early childhood education, which economists widely agree yields significant long-term benefits, can narrow the gap between high- and low-income families.

Throughout the twentieth century, much of our educational gains came from expanding the number of years of schooling for much of the American population. In the twenty-first century, the potential gains from increased schooling will be far more limited, so it is critical that we focus our energy on improving the quality of schooling that students currently receive. Doing so requires that we first take stock of where our education system is wanting, and then that we map out and prioritize potential reforms.

The State of America's Education System

There is widespread concern about the state of America's educational system. A widely reported recent study by the National Center on Education and the Economy ([NCEE] 2006, p. xix) concluded that “the core problem is that our education and training systems were built for another era.” A recent report on the future of higher education commissioned by the secretary of education expressed concern about the decline of educational attainment in the United States relative to the rest of the world and found that “too many Americans just aren't getting the education that they need—and that they deserve” (ED 2006a, p. vii).

The U.S. education system is failing to realize its potential—partly because of underinvestment and partly because of structural barriers to high performance.

Such concerns, and the concomitant clarion calls for reform, have been echoed repeatedly through the last century. As one leading scholar notes,

for most of the twentieth century, Americans have argued about their public schools. . . . Each generation supposes that its complaints are unprecedented. Critics of the schools in the 1980s looked back to the 1950s as a halcyon era; critics in the 1950s looked back on their own Depression-era schooling as a high-water mark. (Ravitch 2001, p. 13)

In fact, in the early 1980s, a major panel on federal education policy cautioned that “the frequency with which crises have been identified in American education sug-

gests that caution be exercised in characterizing educational difficulties, so that the rhetoric used does not automatically escalate problems into something more” (Peterson 1983, p. 30).

Mindful of this plea for caution, it is important to recognize that, despite the unquestionable need to make education reform a national priority, educational outcomes in the United States have actually been improving, albeit modestly, over the past few decades. National scores in basic math, reading, and science have showed a modest upward trend since the early 1970s.⁶ High school students are also taking more difficult courses than they used to.⁷ For these measures, improvement has been strong across all racial groups, and often particularly strong among

African Americans, who started the period among the furthest behind. The labor market also continues to value high school degrees; in fact, the earnings advantage of high school graduates roughly doubled between 1979 and 1996, from 19 to 40 percent (Krueger 1997), and the median income of high school graduates (\$32,200) is currently about 28 percent higher than for those who only completed

school through grades 9–11 (\$25,100) (College Board 2006a, p. 4). More young people are going to college and getting degrees, and bachelor's degrees provide an even greater reward, with a median income of \$54,800.⁸

Nonetheless, there is significant reason to worry that the U.S. education system is failing to realize its potential—partly because of underinvestment and partly because of structural barriers to high performance. Following dramatic increases throughout much of the twentieth century, the increase in average educational attainment in the workforce has slowed substantially. As former U.S. Treasury Secretary Lawrence Summers has emphasized, “to an extent we have not fully appreciated, we have had rising human capital as a

6. For example, a student scoring in the fiftieth percentile in the late 1990s would have been in the fifty-sixth percentile in the early 1970s (Krueger 1997).

7. For example, the percentage of students taking a core curriculum in high school more than tripled between 1982 and 1994, the percent of high school graduates completing Algebra II and Trigonometry went up by more than 50 percent, and the share of students taking advanced placement (AP) exams went up by a factor of 2.5 over thirteen years (Kober and Rentner 2000, p. 10).

8. Data include full-time, full-year workers from ages thirty-five to forty-four as recorded in 2005 (College Board 2006a, p. 4).

wind behind our backs in improving the performance of the economy over the past twenty years, and we will not have a similarly large thrust from increasing levels of human capital in the future” (Summers 2003, p. 290).

Evidence suggests that we are treading water while the rest of the world is pushing forward. Though our elementary school students do well on international tests compared to students from other industrialized nations, by middle school our students are only average and by high school they are below average (Boe and Shin 2005).⁹ While we currently have the most educated population in the world, the expected educational level of five-year-old Americans is only average for the developed world (OECD 2006, p. 40).

Over the past few decades teacher pay and quality have declined.¹⁰ Meanwhile, teacher salary structures and hiring practices are antiquated, at best (Teaching Commission 2006). In this and other areas, such as early education, we are turning a blind eye to promising investment opportunities, in effect reducing our future economic growth.

While many calls for reform focus on increasing funding for education, the relative weakening of the American education system has occurred despite large increases in education funding. Public spending on elementary and secondary education has increased from about \$980 per capita in 1980 to about \$1,700 in 2006 (ED 2006b, Table 160; ED 1990, Table 151; U.S. Census Bureau n.d., 2000; both amounts are in estimated constant 2007 dollars). The U.S. education system is expensive but inefficient. Even the most ambitious proposals to expand investments in education are modest compared with the scale of existing investments—which implies that the largest educational gains will come from making our current expenditures more effective.

A New Approach

At each stage of the education system—early education, primary and secondary, and higher education—we can already identify areas where reforms will work or where further experimentation is promising.

Early Education

Extensive evidence has demonstrated that education investments in the early years of life have the highest potential rates of return; conversely, failures to invest in children at these early stages are the most costly human capital policy failures. Children from disadvantaged backgrounds benefit particularly from such policies. Gaps in ability among children of different income groups emerge early on, widen slightly in the first few years of schooling, and stay constant after age eight (Heckman 2006). Over time, it becomes increasingly costly and difficult to narrow these gaps.

Helping young children from disadvantaged families get on the right track has the highest potential returns of any education policy. Nobel Prize-winning economist James Heckman observes that “it is a rare public policy initiative that promotes fairness and social justice and at the same time promotes productivity in the economy and in society at large. Investing in disadvantaged young children is such a policy” (Heckman 2006, p. 2). Indeed, small-scale programs have shown phenomenal results. Compared with a control group, the children who enrolled in the Abecedarian project in North Carolina—all born to low-income, at-risk women—achieved significantly higher IQ scores (close to the national average), had much lower rates of unemployment as adults, were half as likely to become teen parents, and were 2.5 times more likely to go to college (Ludwig and Sawhill 2007). In this particular experiment, the total benefits of preschool were estimated to be about twice its costs (Barnett and Masse forthcoming). Other programs, such as Perry Preschool and the Chicago Child-Parent Centers, have had similarly impressive benefits (Cunha et al. 2005).

9. This is based on the aggregation of six international tests and includes testing on mathematics, civics, reading, and science.

10. Teachers in other countries have seen similar relative wage declines, suggesting that this phenomenon may not be confined to the United States (Lakdawalla 2006).

A recent RAND study of twenty early childhood programs found that nineteen were effective (Karoly et al. 2005).

Currently, the government's spending priorities do not reflect the importance of these early years. The federal government's program for disadvantaged children—Head Start—covers only 49 percent of income-eligible three- and four-year-olds through its annual budget of \$6.8 billion. For those students who are covered, the program is not nearly as intense as more successful ones such as Abecedarian. Early Head Start, which is designed for children under the age of three, has only about one-tenth of regular Head Start's budget, and serves only about 62,000 children. These programs provide too little, too late.

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While the evidence shows that investments in early childhood education reap large benefits, the extent of the benefits depends on how the programs are designed. In the RAND study, for example, not only did one program prove ineffective, but the returns in the others ranged from \$1.26 to \$17.07 per dollar invested (Karoly et al. 2005). Policy makers must not only spend more resources on these programs, they also must focus on key design issues so that those resources are spent effectively and efficiently. Especially given the significant sums needed for large-scale early intervention programs, they need to be designed based on evidence about what works and include metrics to evaluate their efficacy before they are expanded or continued.

Scaling up early childhood programs is a key challenge. The Abecedarian project, for example, involved only about one hundred children. Other oft-cited examples of successful early childhood intervention programs involved similarly small groups of children. Moving from small- to large-scale programs can dilute impacts for a variety of reasons: For example, small-scale programs can draw on a small set of par-

ticularly committed and talented teachers that may be unavailable for new deployment in much larger numbers. In addition, carefully designed curricula can be implemented with more fidelity when the organization is small. In other ways, the large-scale expansion of early education could have broader social benefits that are not discernable in more limited pilot projects. For example, if larger numbers of young people are better prepared for school, peer effects could improve learning and behavior both inside and outside the classroom.

Despite these obstacles to scaling up early intervention programs, Head Start, which is a large-scale program, has yielded significant long-term benefits (albeit less than Perry Preschool or Abecedarian; Garces et al. 2002). White children who attended Head Start were about twenty percentage points more likely to graduate from high school and go to college than their siblings who did not attend Head Start. The evidence regarding educational attainment was less conclusive regarding African American children who attended Head Start (for suggestive evidence of a positive effect, see Ludwig and Miller forthcoming. The authors also find significant evidence of reduced mortality rates.)

In a discussion paper for The Hamilton Project, Jens Ludwig of Georgetown University and Isabel Sawhill of The Brookings Institution propose a program called Success by Ten. This program would give children from low-income families high-quality, full-time education for the first five years of life, and then would use proven-effective methods to give them extra help during their elementary school years. The early childhood program would be based on the successful Abecedarian Project; it could be thought of as “Head Start on steroids,” as it would combine, expand, and transform the Early Head Start and Head Start programs. Ludwig and Sawhill estimate that, if fully implemented, Success by Ten could increase GDP by up to 0.8 percent, while, on an individual level, bringing the dramatic benefits of Abecedarian—greater employment and college entry, reduced teen pregnancy and crime—to millions of American children.

While the evidence in favor of such early education programs is quite strong, it comes from a set of experiments that are relatively small in number and scale. Therefore, Ludwig and Sawhill recommend that their proposed transformation be phased in over ten years in a way that would foster rigorous evaluation of the program's impacts and allow experimentation with alternative interventions that might prove to be even more effective.

Primary and Secondary Education

Enhancing school quality improves educational outcomes, keeps students in school longer, and increases their future wages (Card and Krueger 1992). To address the critical challenges to our primary and secondary education system, we need to move beyond the tired ideological debate between two outdated schools of thought.

One school of thought believes that market forces on their own will yield the highest quality educational outcomes by giving parents the right to choose education providers for their children, be they private, public, or parochial, so that schools compete for students. Adherents of this view largely see government education policy as merely adding unnecessary layers of bureaucracy to an educational function that should primarily be fulfilled by parents and local entities. Despite mixed evidence as to their effectiveness, they believe that vouchers would empower individual parents and get government out of the way, thereby improving school quality through market-force competition.

The other school of thought resists large structural changes, arguing that our current education system's ills are largely the result of inadequate resources. Adherents of this view reject most efforts to increase accountability or use market pressure to improve public schools.

Between these divergent views, a promising middle ground exists. This approach recognizes opportunities for unleashing the power of market forces in ways that preserve those structural elements of the current system that do serve society well. Likewise, this approach

accepts that improving quality requires not only adequate funding for proven programs, but also measuring performance, demanding accountability, and rigorously evaluating alternative policies. Additional funding should be contingent on complementary reforms to improve accountability. Above all, this approach emphasizes focusing reform efforts on hard evidence about what works in order to increase the effectiveness and efficiency of K-12 spending.

Broadly speaking, this approach rests on three principles: First, that performance measurement and accountability systems are instrumental to the development and implementation of better education policies. Second, that market forces can be harnessed to improve the efficiency of education spending even within the context of our current system of education. And third, that experimentation in educational policies and practices should be encouraged, and, whenever possible, scientifically evaluated. Each of these principles contributes to the overarching goal of improving school quality in a way that will allow us to get more out of each dollar that is invested in education.

Many worthwhile reforms have been proposed, and in some cases implemented, that are consistent with these principles and goals. Rather than repeat them all here, this paper focuses on a few policies and policy proposals as examples of how building on these principles can lead to effective and innovative reform.

The first principle to this approach to improving school quality is that measurement and accountability are the cornerstones of improving school quality. The logic of this is straightforward: Performance measures indicate levels and changes in school quality, which is necessary both for assessment and for demonstrating the effectiveness of policy alternatives. Accountability standards identify under- or well-performing schools, and provide motivating sanctions and rewards.¹¹ Both market-based and directed educational reforms depend on the information generated by measurement and accountability systems: neither markets nor policy makers can function effectively without information.

11. For evidence that state-based accountability systems introduced during the 1990s had a positive impact on student achievement, but not on a narrowing of the black-white achievement gap, see Hanushek and Raymond 2004.

The No Child Left Behind Act (NCLB), which focuses on increased accountability through testing and on improving the performance of groups of low-achieving students through disaggregating test scores, is the most prominent example of a recent policy innovation focused on measurement and accountability (U.S. Congress 2001). Whatever the practical merits or weaknesses of the act, its focus on measurement is well-placed: a well-crafted measurement regime could generate an invaluable knowledge base on school performance and focus policy debates on concrete measures of school performance. To be sure, many specific measures of NCLB have proved controversial or problematic in their implementation, and further evaluation of the accountability provisions is needed.¹² A complete discussion of the act is, however, beyond the scope of this paper.¹³

The second principle for this approach to improving school quality is to recognize the potential role of market forces in educational reform. The power of competition and choice in well-functioning markets to generate efficient outcomes is undeniable. To be sure, acknowledging that market forces can improve our educational system does not obviate the need for a robust government role in the provision of education. Those who believe that government is an unnecessary barrier to unleashing the power of markets ignore the government's need to make sure that our public education system works effectively for all students. Market-based reforms in education policy, thus, must contend in an area where a well-functioning market may be harder to establish, while also clearing the hurdle of preserving or enhancing equitable provision and universal access. This cautions a measured way forward with such policies.

A promising approach to K-12 education rests on three principles:

1. Performance measurement and accountability systems are instrumental to the development and implementation of better education policies.
2. Market forces can be harnessed to improve the efficiency of education spending even within the context of our current system of education.
3. Experimentation in educational policies and practices should be encouraged and scientifically evaluated.

The most far-reaching and well-known proposals to introduce market forces in education policy involve providing parents with vouchers to redeem at their choice of schools. Researchers using randomized experiments to evaluate the effects of vouchers on student performance have found mixed results (see Gill 2001 for a review of the literature). Some studies have found substantial gains,¹⁴ some have found moderate to small gains,¹⁵ and some found no gains at all (Krueger and Zhu 2002). Where gains have been found, they have only been present for African American students.¹⁶ On the positive side of the ledger, there is evidence that students who stay in the public schools that are threatened with voucher competition also show substantial gains (Hoxby 2003). Overall, problems with the data in these experiments mean that the conclusions are far from ironclad (Goldhaber 2001). The idea of vouchers may hold promise, but further rigorous experimentation is needed.

12. There has been much debate about the efficacy of the NCLB accountability measures, with inconclusive results. In truth, it is probably too early to know. Thomas Loveless of the Brookings Institution says this of the debate: "Let's put it this way—reading scores were flat and math scores on the rise before No Child Left Behind, and reading scores are flat and math scores are still up after No Child Left Behind. It's impossible to know whether NCLB had an impact—either positively or negatively" (Lois Roman, "Test Scores Move Little in Math, Reading: Improvement Appears Slight Since No Child Left Behind," Washington Post, October 20, 2005).

13. On concerns with the definition of "adequate yearly progress," see, e.g., Wenning et al. 2002. On concerns with the definition of proficiency, see, e.g., Paul Tough, "What It Takes to Make a Student," New York Times, November 26, 2006. On concerns with the treatment of subgroup performance, see, e.g., Novak and Fuller 2003, Kane and Staiger 2002.

14. For example, Howell and Peterson found that the average gain for African American students across three cities (Dayton, OH, New York City, and Washington, DC) was six percentile points in reading and math scores after two years, the same as the average national gain for all students between the early 1970s and the late 1990s (Howell and Peterson 2006).

15. Studying the Milwaukee program, Rouse found somewhat smaller gains in math, and no gains in reading (Rouse 1998). A study of the Cleveland voucher program found no significant overall gains, but it did find significant gains for students who used vouchers in two of the five subject areas: social studies and language (Plucker et al. 2006).

16. It is not clear why only African American students showed substantial gains. Hoxby conjectures that it might be an accident of the location of the programs, or due to the fact that African American students are particularly underserved in the public school system (Hoxby 2003).

While proposals to increase the role of market forces in education policy typically focus on creating markets for schools, there are other policy areas where market forces are better grounded in evidence. Consider, for example, the teacher labor market.

Perhaps the most important determinant of how much students learn, as discussed briefly above, is the quality of their teachers, yet several factors have combined to adversely affect teacher quality recently.¹⁷ Over the past few decades, the teacher pay scale has become more compressed, so that higher-aptitude teachers earn not much more than lower-aptitude teachers (Hoxby and Leigh 2004). At the same time, expanded opportunities for women in the labor market have led talented women who might have become teachers a generation ago to pursue other career opportunities (Corcoran et al. 2002). As a result, the share of top-quality teachers has fallen, while the share of lower-aptitude teachers has increased. For example, in 1971, about a quarter of new female teachers scored in the top 10 percent of high school academic tests; by 1992, only 10 percent did (Corcoran et al. 2002).

The compression of the teacher pay scale has isolated the teacher labor market from many market forces (Teaching Commission 2006). Unlike in most sectors of the economy, payment is generally based not on performance, but on seniority and paper-based qualifications (Goldhaber and Liu 2003). In addition, whereas the rest of the economy pays workers more for graduating from a selective college, getting good grades, majoring in science and mathematics, or taking an unusually difficult job, teaching does not (ibid). Some talented people who would make excellent teachers may be discouraged from entering a profession that does not adequately reward good performance relative to other professions (ibid). Furthermore, the single salary schedule means that there is no extra compensation for teaching in high-needs schools, where the work is likely to be more difficult. As a result, the best teachers are more likely to go to better-performing districts where they are needed less but the pay is the same and life is less trying (see e.g., Hanushek and Rivkin 2004).

Recently, states and localities have started to implement teacher merit pay programs, and early studies have found that these programs improve student achievement (see, e.g., Figlio and Kenney 2006, Dee and Keys 2004). Further research on how to best structure teacher pay could be an important part of the evidence-based education policy agenda.

Another promising idea to improve teacher quality is to remove barriers to entry in the market for teachers, as proposed in a recent Hamilton Project discussion paper (Gordon et al. 2006). Policy makers have traditionally regulated teacher quality by requiring certain credentials for teachers entering the profession. Recent research, though, suggests that such paper qualifications do not help identify effective teachers: people can look good on paper but turn out to be ineffective in the classroom, and those who lack paper qualifications can turn out to be remarkably effective as teachers. The nation therefore needs a major paradigm shift in how teachers are hired and evaluated. Rather than continuing to focus on teacher *credentials*, it would make more sense to increase the focus on teacher *effectiveness* on the job. The result would be that a larger number of teachers would be hired each year, including individuals with and without certification, but a smaller percentage—only those who perform well on the job—would receive tenure.

Finally, the third principle for this approach to improving school quality is to encourage experimentation in the delivery of education, and to rigorously evaluate alternative policies. These alternative policies may include variations in the level or mix of school inputs, the size and organization of schools, or curricula and pedagogical techniques used; examples abound. The key is that experimentation must be followed by scientific evaluation in order to achieve systematic improvements in the quality of education. Rigorous evaluation of program efficacy is necessary if policy makers are to make well-informed judgments about which programs are worth their cost.

At the vanguard of experimentation with educational methods and techniques are charter schools: public

17. Two studies have found that variation in teacher quality accounts for about 8 percent of the total variation in student achievement, equivalent to about 40 percent of the variation due to schooling (Goldhaber et al. 1999, Hanushek et al. 1998).

schools that operate outside the normal governance structure of the public school system. In recent years, charter schools such as the Knowledge Is Power Program (KIPP) and Achievement First have upended the way Americans think about educating disadvantaged children, eliminating the sense of impossibility and hopelessness and suggesting a set of highly promising methods (for an evaluation of the KIPP schools, see e.g. Educational Policy Institute 2005).

To be sure, charter schools are not necessarily good schools. In fact, numerous studies have shown that the average charter school performs no better, and in some cases performs slightly worse, than the average public school (Bifulco and Ladd 2006, Sass 2006, Hanushek et al. 2005). The promise of charter schools is that the most successful ones could provide models for a large number of new, high-quality schools. Thus, the key next step is to figure out how to replicate these successful models while maintaining a reasonably consistent level of quality (see, e.g., Hess 2006). Some networks, including KIPP, have begun this process.

Of course, innovative teaching methods can be designed within the regular public school system. Before being widely adopted, these new methods should be subject to rigorous experimentation to test whether they are fads or truly good ideas. One of the few programs that has been subject to and passed such tests with flying colors is Success for All, a comprehensive whole-school reform model that focuses on reading achievement, which Ludwig and Sawhill propose using as the basis for their elementary school intervention (Slavin et al. 2005, Ludwig and Sawhill 2007). Similarly, the use of educational software in the classroom should be subject to evidence of its effectiveness. Testing is important because different products can have dramatically different results: some software programs have been shown to be incredibly effective, whereas others produce only marginal gains (Koedinger et al. 1997, Rouse and Krueger 2004). Unfortunately, we are far from where we want to be, for as Cecilia Rouse and Alan Krueger of Princeton

point out, educational products are “rarely evaluated using rigorous analytical methods” (ibid, p. 1).

In a number of areas, there is evidence that certain policies are effective, but further research is needed to determine whether they are an efficient use of the dollars spent on them. Data show, for example, that smaller classes probably help students learn, but it is not clear if they do so in a cost-effective way (Krueger and Whitmore 2000, Krueger 2002).¹⁸ Another way to increase students’ exposure to teachers is by increasing the length of the school day or year. However, while many high-achieving schools use significantly longer school days (including KIPP and Achievement First), the research that has been done (albeit at other institutions) on small increases in the school day or year show that they produce small benefits, and do not appear to be cost effective (Glass 2002). This may be because small changes in time allocated to schooling do not result in curricular changes, so that the same lessons are drawn out over a longer period of time. It is possible that substantial increases in school time would have a substantial impact; whether they would, and whether that would be a cost-effective way of achieving those improvements, is an important area for further research.¹⁹

The size of schools and districts is another area that warrants further study and possible reform. A number of studies have found that, in many cases, small schools improve student achievement and reduce drop-out rates, though they may actually harm achievement in affluent communities (Howley 2002). Further research is needed to determine whether these improvements are cost effective. Smaller school districts may also be more efficient (Barrow and Rouse 2002, p. 29, Fowler and Walbert 1991). This may result from the difficulties in dealing with a large organization that may not benefit from economies of scale. For example, the problems facing school budgets—that they are often opaque and convoluted, inhibiting proper management and parental engagement—may be exacerbated in large districts (Roza and Hill 2004).

18. Krueger finds that class size reductions may be cost effective, depending on a few parameters, including the discount rate. At a discount rate of 4 percent (equal to U.S. government bond interest rates), then the benefits, as measured by increased lifetime earnings, are double the costs. At a discount rate of 6 percent—using a higher value because the payoff is uncertain—the benefits are about equal to the costs. However, this does not include the benefits from reduced crime or welfare dependency, or the positive effects on the wages of others (Krueger 2002).

19. International comparisons do not establish a clear link between academic achievement and days in school (National Education Commission on Time and Learning 1993).

Higher Education

The American system of colleges and universities is extremely successful. According to a recent study, the United States has one-third of the five hundred best universities in the world, more than half of the top one hundred, and seventeen of the top twenty (Shanghai Jiao Tong University 2005). We also have an excellent system of community colleges (Kane and Rouse 1995). Private returns to higher education are high, at just under 14 percent (OECD 2006). The success comes from good institutions and strong financial support: we spend 2.9 percent of our national income (GDP) on higher education, which is the highest rate in the world (OECD 2006).

And yet there is substantial room for improvement. For example, while the United States is still a world leader in the proportion of all adults with a college degree, its position is less dominant among young adults (Wagner 2006). The recent report on the future of U.S. higher education commissioned by Education Secretary Margaret Spellings observed that, though once the leader, the United States now ranks twelfth among major industrialized countries in overall higher education attainment and sixteenth in high school graduation rates (ED 2006a, p. 12; also known as the Spellings Report).

In addressing these challenges, the Spellings Report called particular attention to the lack of clear, accessible information about the cost and value added of American institutions of higher education. Lacking this information hampers policy makers trying to make effective reforms, as well as students trying to decide which school to attend (ED 2006a, pp. vii, 4, 13–14). In response, the report (*ibid.*, pp. 20–21) called on the federal government to create a “consumer-friendly information database on higher education” dealing with the cost and quality of in-

dividual institutions; to seek to collect “more and better information on the quality and cost of higher education . . . [for] policymakers, researchers and the general public”; and to encourage the creation of tests to measure student performance.

College is expensive and a source of concern for millions of students and their families, but policy makers need to understand that the high and rising cost of college is matched by a substantially higher and also rising benefit of a college education. For most students, college is a good long-term investment. The focus of college policies should not be redistributing resources to more-affluent students who are getting a degree that will increase their earnings by hundreds of thousands of dollars. Instead, it should be about assisting more students to go to college and enjoy these gains, as well. This involves both removing barriers and sending a clear signal that if you want to go to college the up-front costs will never be an impediment.

The goal of college aid should be increasing enrollment and completion by those who would otherwise not go to college.

One barrier, for example, is a liquidity constraint: the inability of would-be students to borrow to finance their education (see Kane 1994; Ellwood and Kane 2000; Carneiro and Heckman 2002). Some barriers are also likely due to the tremendous opacity and glacial pace of the current system of financial aid, under which students must fill out extremely long, complex forms, only to discover how much aid they are eligible for late in the spring of their senior year. And some students may be discouraged by the increased variance in returns to higher education: while evidence shows that the average rate of return to a college degree is positive, evidence also shows the investment is much riskier than it used to be, paying off handsomely for

20. A significant gap in college completion rates by socioeconomic status exists even after controlling for some measures of ability. For example, more than 70 percent of students who performed in the top 25 percent of their class in eighth-grade math in 1988 and were in the top 25 percent of socioeconomic status went on to attain a bachelor's degree. Yet among students who scored in the top 25 percent but were in the bottom 25 percent of socioeconomic status, only 29 percent went on to complete college (ED 2005b, p. 50).

some and not at all for others (see, e.g., Lemieux 2006). These obstacles may help explain why the gap in college completion rates by family income is substantial. In fact, only 7 percent of students from families with low socioeconomic status achieve a bachelor's degree, compared with 63 percent of students from families with high socioeconomic status (ED 2006b, Table 306).²⁰

Only 7 percent of students from families with low socioeconomic status achieve a bachelor's degree, compared with 63 percent of students from families with high socioeconomic status.

One approach that states should consider is shifting toward a higher tuition, higher aid model. By allocating tax dollars to state schools, state governments implicitly subsidize education at these colleges and universities. However, this subsidy is not well-targeted to those who need it most, and in fact goes mostly to middle- and higher-income students, since they go to college at higher rates. Moreover, these subsidies are often financed by regressive taxes, such as state sales taxes. By increasing tuition rates and financial aid, states could better target this subsidy (see, e.g., Kane and Orszag 2003, Mumper 2001). While this approach has many advantages, it makes it even more important to ensure that the aid process is simple and transparent so that potential beneficiaries are not discouraged from even applying by the sticker shock of list tuition.²¹

Another approach that some have called for is increased federal funding for higher education grants and loans. More resources can certainly be useful if well-targeted, but there are also significant limitations to such an approach. First, there is some evidence that increased federal financial aid will encourage colleges to raise tuition to take advantage of the greater federal subsidy, thereby

not reducing the costs borne by individual students (Long 2003). Additionally, making increased federal funds available is a highly inefficient way of mitigating the greater risk involved with investing in higher education, because it reduces the risk to those for whom the bet fails but also enriches those for whom it already pays off.

A more promising approach would focus on improving the effectiveness of the current federal aid program. In a new discussion paper released by The Hamilton Project, Susan Dynarski and Judith Scott-Clayton, both of Harvard University, argue that the complexity and slug-

gishness of the federal system for distributing student financial aid creates serious obstacles to college attendance by making it enormously difficult for low- and moderate-income students to assess their eligibility for aid. Indeed, studies have found scant evidence that the federal program of grants and tax credits actually increases enrollment, in contrast to the proven effects of much simpler programs such as the Social Security Student Benefit Program and Georgia's HOPE program. While the complexity of the current system is intended to target aid to those who need it most, Dynarski and Scott-Clayton show that a dramatically simplified aid process could nearly reproduce the current distribution of aid. Under their proposal, students could figure out their grant aid eligibility by looking at a small, simple table that fits easily on a postcard. In fact, the table would be put on a postcard and distributed through schools and the mail so that aid information could be simple, certain, and delivered early. Meanwhile, the application process could be as easy as checking a box on the family's regular tax returns. Dynarski and Scott-Clayton estimate that their proposed program would increase enrollment among the grant-eligible population by between 5.6 and 7.4 percentage points. They estimate that federal student

21. Only 38 percent of full-time undergraduates pay the full cost of college, and many of these offset some cost with tax benefits. The rest receive grant aid from the federal or state government, their college or university, or private sources such as employers. On average, grants from all sources plus federal tax credits and deductions cover about 30 percent of tuition, fees, room, and board at private four-year colleges, 24 percent at four-year public colleges, and 25 percent at public two-year colleges (College Board 2006b, pp. 2, 15–17).

aid would need to rise \$2 billion to \$6 billion to pay for this increased college enrollment and for the greater number of aid-eligible students that would apply under the simplified system. In addition, Dynarski and Scott-Clayton recommend increasing federal aid by an additional \$2 billion to \$3 billion so that no income group would receive less under the new system than it does under the current system (Dynarski and Scott-Clayton 2007).

Tom Kane of Harvard University outlines another approach to make financial aid more effective. In a forthcoming paper to be released by The Hamilton Project, Kane argues that the federal student loan program is poorly structured. For example, borrowers in the default plan pay the same amount per month at age twenty-five as they do at age thirty-five, though their expected wages at age thirty-five are 66 percent higher. This means that the repayment plan demands too much early on, and too little later in life. Furthermore, the current system does not have an adequate safety-valve mechanism to ease the burden on borrowers who have particularly low incomes in a given year. This increases the risk posed by loans and may reduce their effectiveness in encouraging college enrollment. Kane will propose a number of reforms to solve these and other problems with the federal student loan program.

Of course, there are many other important steps that should be taken to improve higher education, such as increasing the high school completion rate, increasing accountability, improving the quality of instruction, focusing resources on subjects related to economic productivity such as science

and engineering, expanding access to adult education, better leveraging our network of community colleges to provide workforce training, and streamlining foreign student visa requests, among many others. The focus on the rising cost of higher education is not to deny the importance of other higher education policy reforms, but rather to focus on one issue of rapidly increasing importance to American families and for which there is significant evidence available about the types of policy approaches that will be effective.

Conclusion

During the past century, America's remarkable economic growth raised the nation's living standards and lifted millions out of poverty. Much of this growth was powered by rising levels of educational attainment in the American workforce. If we are to have another century of such strong economic success, it is critical that we build a strong education system today. Additionally, as growing returns to education exacerbate rising levels of inequality, it is imperative that we make the necessary investments in education to promote more broad-based economic growth. Only by doing so can we fulfill the quintessential American promise that each generation can do better than the one that preceded it.

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References

- Acemoglu, Daron. 2002. Technical change, inequality, and the labor market. *Journal of Economic Literature* 40 (March): 7–72.
- Autor, David, Lawrence Katz, and Melissa Kearney. 2005. Trends in U.S. wage inequality: Re-assessing the revisionists. Working Paper 11627, National Bureau of Economic Research, Cambridge, MA.
- Barnett, W. Steven, and Leonard N. Masse, (in press). Funding issues for early childhood care and education programs. In *Early childhood education and care in the USA*, edited by D. Cryer. Baltimore: Paul H. Brookes Publishing Co. <http://nieer.org/docs/?DocID=39>
- Barnett, W. Steven, and Leonard N. Masse. Forthcoming. Comparative benefit-cost analysis of the Abecedarian program and its policy implications. *Economics of Education Review* 26 (1): 1–144 (February).
- Barrow, Lisa, and Cecilia E. Rouse. 2002. Using market valuation to assess public school spending. Working Paper 9054, National Bureau of Economic Research, Cambridge, MA (July).
- Barrow, Lisa, and Cecilia E. Rouse. 2005. Does college still pay? *The Economists' Voice* 2 (4): 5–6.
- Bifulco, Robert, and Helen F. Ladd. 2006. The impacts of charter schools on student achievement: Evidence from North Carolina. *Education Finance and Policy* (Winter).
- Boe, Erling E., and Sujie Shin. 2005. Is the United States Really Losing the International Horse Race in Academic Achievement? *Phi Delta Kappan* 86 (May): 688–695.
- Bureau of Economic Analysis (BEA) and National Science Foundation (NSF). 2006. R&D satellite account: Preliminary estimates. BEA-06–44, Bureau of Economic Analysis, Washington, DC (September 28). <http://bea.gov/bea/newsrelarchive/2006/rdspend06.htm>.
- Card, David, and Alan B. Krueger. 1992. Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy* 100 (1): 1–40.
- Card, David. 2003. Estimating the return to schooling: Progress on some persistent econometric problems. *Econometrica* 69 (5): 1127–60.
- Carneiro, Pedro, and James J. Heckman. 2002. The evidence on credit constraints in post-secondary schooling. Working Paper 9055, National Bureau of Economic Research, Cambridge, MA (July).
- Coalition for Evidence-Based Policy. 2002. Bringing evidence-driven progress to education: A recommended strategy for the U.S. Department of Education. Coalition for Evidence-Based Policy, Washington (November).
- College Board. 2006a. Education pays: Second update. College Board, Washington, DC. http://www.collegeboard.com/prod_downloads/press/cost06/education_pays_06.pdf.
- College Board. 2006b. Trends in college pricing. College Board, Washington, DC. http://www.collegeboard.com/prod_downloads/press/cost06/trends_college_pricing_06.pdf.
- Congressional Budget Office. 2006. The budget and economic outlook: fiscal years 2008 to 2017. Congress, Washington, DC.
- Corcoran, Sean, William Evans, and Robert Schwab. 2002. Changing labor market opportunities for women and the quality of teachers 1957–1992. Working Paper 9180, National Bureau of Economic Research, Cambridge, MA (September).
- Cunha, Flavio, James J. Heckman, Lance Lochner, and Dimitry V. Masterov. 2005. Interpreting the evidence on life cycle skill formation. Working Paper 11331, National Bureau of Economic Research, Cambridge, MA (May).
- Cutler, David M., and Adriana Lleras-Muney. 2006. Education and health: Evaluating theories and evidence. Working Paper 12352, National Bureau of Economic Research, Cambridge, MA (June).
- Dee, Thomas S., and Benjamin J. Keys. 2004. Does merit pay reward good teachers? Evidence from a randomized experiment. *Journal of Policy Analysis and Management* 23 (3): 471–88.
- Dynarski, Susan M., and Judith Scott-Clayton. 2007. College Grants on a postcard: A proposal for simple and predictable federal student aid. Discussion Paper 2007-01, The Hamilton Project, Washington, DC.
- ED. See U.S. Department of Education.
- Educational Policy Institute (EPI). 2005. Focus on results: An academic impact analysis of the Knowledge Is Power Program (KIPP). Educational Policy Institute, Virginia Beach, VA (August).
- Ellwood, David, and Thomas Kane. 2000. Who is Getting a College Education?: Family Background and the Growing Gaps in Enrollment. In *Securing the Future: Investing in Children from Birth to College*, edited by Sheldon Danziger and Jane Waldfogel. New York: Russell Sage.
- Elo, Irma T., and Samuel H. Preston. 1996. Educational differentials in mortality: United States, 1979–85. *Social Science and Medicine* 42 (January): 47–57.
- Fifer, Molly E., and Alan B. Krueger. 2006. Summer opportunity scholarships (SOS): A proposal to narrow the skills gap. Discussion Paper 2006–03, The Hamilton Project, Washington, DC.
- Figlio, David N., and Lawrence Kenny. 2006. Individual teacher incentives and student performance. Working Paper 12627, National Bureau of Economic Research, Cambridge, MA (October).
- Fowler, William J., and Herbert J. Walbert. 1991. School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis* 13 (2): 189–202.
- Friedman, Benjamin M. 2005. *The Moral Consequences of Economic Growth*. New York: Knopf.
- Fryer, Roland G. Jr., and Steven D. Levitt. 2002. Understanding the Black-White test score gap in the first two years of school. Working Paper 8975, National Bureau of Economic Research, Cambridge, MA (June).
- Garces, Eliana, Duncan Thomas, and Janet Currie. 2002. Longer-term effects of Head Start. *American Economic Review* 92 (4): 999–1012.
- Gill, Brian. 2001. What do we know about vouchers and charter schools? Separating the rhetoric from the reality. RAND Research Brief 8018-EDU, RAND, Santa Monica, CA.
- Glass, Gene V. 2002. Time for school: Its duration and allocation. In “School reform proposals: The research evidence,” edited by Alex Molnar. Education Policy Research Unit (EPRU), Arizona State University, Tempe, AZ (January).
- Goldhaber, Dan D. 2001. Significant, but not decisive. *Education Matters* (Summer).
- Goldhaber, Dan D., and Albert Yung-Hsu Liu. 2003. Teacher salary structure and the decision to teach in public schools: An analysis of recent college graduates. Paper presented at the American Education Finance Association (March 28).
- Goldhaber, Dan D., Dominic Brewer, and Deborah J. Anderson. 1999. A three-way error components analysis of educational productivity. *Education Economics* 7 (3): 199–208.

- Goldin, Claudia, and Lawrence F. 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.
- Greene, Jay P., and Marcus Winters. 2005. Public high school graduation and college-readiness rates: 1991–2002. Working Paper 8, Manhattan Institute, New York. http://www.manhattan-institute.org/html/cwp_08.htm.
- Hamilton, Alexander. 1791. Report on manufactures. In *The Papers of Alexander Hamilton*, 26 vols., edited by Harold C. Syrett, Caralouise Miller, Patricia Syrett, Dorothy Twohig, New York and London: Columbia University Press, 1961–79.
- Hanushek, Eric A., and Margaret E. Raymond. 2004. Does school accountability lead to improved student performance? Working Paper 10591, National Bureau of Economic Research, Cambridge, MA (June).
- Hanushek, Eric A., and Steven G. Rivkin. 2004. The revolving door. *Education Next* (1).
- Hanushek, Eric A., John F. Kain, and Steven G. Rivkin. 1998. Teachers, schools, and academic achievement. Working Paper 6691, National Bureau of Economic Research, Cambridge, MA.
- Hanushek, Eric A., John F. Kain, Steven G. Rivkin, and Gregory F. Branch. 2005. Charter school quality and parental decision making with school choice. Working Paper 11252, National Bureau of Economic Research, Cambridge, MA.
- Harbison, Frederick, and Charles Myers, eds. 1965. *Manpower and Education*. New York: McGraw-Hill.
- Heckman, James J. 2006. Investing in disadvantaged young children is an economically efficient policy. Presented at the Committee for Economic Development forum, “Building the Economic Case for Investments in Preschool,” New York (January 10).
- Hess, Frederick M. 2006. There’s got to be a market. *National Review* (September 28).
- Howell, William G., and Paul E. Peterson. 2006. The education gap: Vouchers and urban schools. Brookings Institution Press, Washington, DC.
- Howley, Craig. 2002. Small schools. In “School reform proposals: The research evidence,” edited by Alex Molnar. Education Policy Research Unit (EPRU), Arizona State University, Tempe, AZ (January).
- Hoxby, Caroline M. 2003. School choice and school competition: Evidence from the United States. *Swedish Economic Policy Review* 10.
- Hoxby, Caroline M., and Andrew Leigh. 2004. Pulled away or pushed out? Explaining the decline of teacher aptitude in the United States. *American Economic Review* 94 (2): 236–40.
- Kane, Thomas J. 1994. College Entry by Blacks since 1970: The Role of College Costs, Family Background, and the Returns to Education. *Journal of Political Economy* 102(5):878–911.
- Kane, Thomas J., and Cecilia E. Rouse. 1995. Labor-market returns to two- and four-year college. *American Economic Review* 85 (3): 600–14.
- 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 Peter R. Orszag. 2003. Funding restrictions at public universities: Effects and policy implications. Working paper, Brookings Institution, Washington, DC (September).
- Karoly, Lynn A., M. Rebecca Kliburn, Jill S. Cannon, James H. Bigelow, and Rachel Christina. 2005. Many happy returns: Early childhood programs entail costs, but the paybacks could be substantial. *Rand Review* (Fall).
- Kober, Nancy, and Diane Stark Rentner. 2000. Do you know . . . the good news about American education? Center on Education Policy, Washington, DC.
- Koedinger, Ken, John R. Anderson, William H. Hadley, and Mary A. Mark. 1997. Intelligent tutoring goes to school in the big city. *International Journal of Artificial Intelligence in Education* 8: 30–43.
- Krueger, Alan B. 1997. Reassessing the view that American schools are broken. Working Paper 95, Princeton Industrial Relations, Princeton, NJ. Prepared for the New York Federal Reserve Bank Conference on Excellence in Education, New York (November 14).
- Krueger, Alan B. 2002. Economic considerations and class size. Working Paper 8875, National Bureau of Economic Research, Cambridge, MA (April).
- Krueger, Alan B., and Diane M. Whitmore. 2000. The effect of attending a small class in the early grades on college-test taking and middle school test results: Evidence from Project STAR. Working Paper 7656, National Bureau of Economic Research, Cambridge, MA.
- Krueger, Alan B., and Mikael Lindahl. 2001. Education for growth: Why and for whom? *Journal of Economic Literature* 39 (4).
- Krueger, Alan B., and Pei Zhu. 2002. Another look at the New York City school voucher experiment. Working Paper 9418, National Bureau of Economic Research, Cambridge, MA (December).
- Lakdawalla, Darius. 2006. The economics of teacher quality. *Journal of Law and Economics* XLIX (April).
- Lemieux, Thomas. 2006. Post-secondary education and increasing wage inequality. Working Paper 12077, National Bureau of Economic Research, Cambridge, MA (March).
- Long, Bridget Terry. 2003. The impact of federal tax credits for higher education expenses. Working Paper 9553, National Bureau of Economic Research, Cambridge, MA (March).
- Ludwig, Jens, and Douglas L. Miller. Forthcoming. *Quarterly Journal of Economics*.
- Ludwig, Jens, and Isabel Sawhill. 2007. Success by ten: Intervening early, often, and effectively in the education of young children. Discussion Paper 2007–01, The Hamilton Project, Washington, DC.
- Mumper, Michael. 2001. State efforts to keep public colleges affordable in the face of fiscal stress. In *The Finance of Higher Education: Theory, Research, Policy, and Practice*, edited by Michael P. Paulsen and John C. Smart. New York: Agathon Press.
- National Center on Education and the Economy (NCEE). 2006. *Tough Choices or Tough Times: The Report of the New Commission on the Skills of the American Workforce*. Washington, DC: Jossey-Bass.
- National Education Commission on Time and Learning (NECTL). 1993. Research findings. National Education Commission on Time and Learning, Washington, DC.
- National Institute for Early Education Research (NIEER). 2005. The state of preschool: 2005 state preschool yearbook. <http://nieer.org/yearbook/pdf/yearbook.pdf>.
- Novak, John R., and Bruce Fuller. 2003. Penalizing diverse schools? Similar test scores, but different students, bring federal sanctions. Policy Brief 03–4, Policy Analysis for California Education, Berkeley, CA (December).
- OECD. See Organisation for Economic Co-operation and Development.
- Office of Management and Budget (OMB). 2006a. Analytical perspectives: Budget of the United States fiscal year 2007. Office of Management and Budget, Washington, DC.
- Office of Management and Budget (OMB). 2006b. Historical tables: Budget of the United States fiscal year 2007. Office of Management and Budget, Washington, DC.
- Organisation for Economic Co-operation and Development (OECD). 2004a. Evidence-based policy research in education. Sponsored by the OECD Centre for Education Research and Innovation, and the U.S. Education Department’s Institute of Education Sciences,

- Washington, DC (April 19–20). <http://coexgov.securesites.net/index.php?keyword=a433923e816991>.
- Organisation for Economic Co-operation and Development (OECD). 2004b. Learning for tomorrow's world: First results from PISA 2003. Organisation for Economic Co-operation and Development, Paris.
- Organisation for Economic Co-operation and Development (OECD). 2006. Education at a glance: OECD indicators 2006. Organisation for Economic Co-operation and Development, Paris.
- Peterson. Paul E. 1983. *Making the Grade: Report of the Twentieth Century Fund Task Force on Federal Elementary and Secondary Education Policy*. New York: Twentieth Century Fund.
- Plucker, Jonathan, Patricia Mueller, John Hansen, Russ Ravert, and Matthew Makel. 2006. Evaluation of the Cleveland scholarship and tutoring program: Summary report 1998–2004. Center for Evaluation and Education Policy, Bloomington, IN (February).
- Ravitch, Diane. 2001. *Left Back: A Century of Failed School Reforms*. New York: Simon and Schuster.
- Rouse, Cecilia E., Alan B. Krueger. With Lisa Markman. 2004. Putting computerized instruction to the test: A randomized evaluation of a “scientifically based” reading program. Working Paper 10315, National Bureau of Economic Research, Cambridge, MA (February).
- Rouse, Cecilia E. 1998. Private school vouchers and student achievement: An evaluation of the Milwaukee parent choice program. *Quarterly Journal of Economics* 113 (2): 553–602.
- Roza, Marguerite, and Paul Hill. 2004. Pennywise and pound foolish in education. *Public Administration Times* 27 (9).
- Roza, Marguerite. 2007. Frozen assets: Rethinking teacher contracts could free billions for school reform. Education Sector Reports, Washington, DC (January 8).
- Sass, Tim R. 2006. Charter schools and student achievement in Florida. *Education Finance and Policy* (Winter).
- Shanghai Jiao Tong University. 2005. *Academic Ranking of World Universities—2005*. Shanghai, China: Institute of Higher Education, Shanghai Jiao Tong University.
- Slavin, Robert E., Nancy Madden, Alan Cheung, Anne Chamberlain, Bette Chambers, and Geoffrey Borman. 2005. *A Randomized Evaluation of Success for All: Second-Year Outcomes*. Baltimore, MD: The Johns Hopkins University, Center for Data-Driven Reform in Education.
- Summers, Lawrence H. 2003. Comments. In *Inequality in America: What Role for Human Capital Policies*, edited by Benjamin M. Friedman. Cambridge, MA: MIT Press.
- Teaching Commission. 2006. Teaching at risk: Progress and potholes. The Teaching Commission, New York. www.theteachingcommission.org.
- U.S. Census Bureau. 2000. Historical national population estimates: July 1, 1900 to July 1, 1999. U.S. Census Bureau, Washington, DC. <http://www.census.gov/popest/archives/1990s/popclockest.txt>.
- U.S. Census Bureau. 2003. Educational attainment: 2000. Census 2000 brief. U.S. Census Bureau, Washington, DC. <http://www.census.gov/prod/2003pubs/c2kbr-24.pdf>.
- U.S. Census Bureau. 2006. Nursery and primary school enrollment of people 3 to 6 years old, by age, mother's labor force status and education, family income, race, and Hispanic origin: October 2005. U.S. Census Bureau, Washington, DC. <http://www.census.gov/population/socdemo/school/cps2005/tab03-01.xls>.
- U.S. Census Bureau. n.d. U.S. POPClock projection. U.S. Census Bureau, Washington, DC. <http://www.census.gov/population/www/popclockus.html> (accessed January 2007).
- U.S. Congress. 2001. *Elementary and School Education Act* (No Child Left Behind Act), 107th Cong., 1st sess.
- U.S. Department of Education. 1990. Digest of education statistics 1990. National Center for Education Statistics, U.S. Department of Education, Washington, DC. <http://nces.ed.gov/pubs91/91660.pdf>.
- U.S. Department of Education. 2004. Highlights from the Trends in International Mathematics and Science Study (TIMSS) 2003. National Center for Education Statistics, U.S. Department of Education, Washington, DC (December).
- U.S. Department of Education. 2005a. 10 Facts about K-12 education funding. U.S. Department of Education, Washington, D.C. <http://www.ed.gov/about/overview/fed/10facts/index.html>.
- U.S. Department of Education. 2005b. Youth indicators 2005: Trends in the well-being of American youth. National Center for Education Statistics, U.S. Department of Education, Washington, DC.
- U.S. Department of Education. 2006a. A test of leadership: Charting the future of U.S. higher education: A report of the commission appointed by Secretary of Education Margaret Spellings. U.S. Department of Education, Washington, DC (prepublished September).
- U.S. Department of Education. 2006b. Digest of education statistics 2005. National Center for Education Statistics, U.S. Department of Education, Washington, DC.
- U.S. Department of Education. 2006c. Fiscal year 2006 congressional action. U.S. Department of Education, Washington, DC. <http://www.ed.gov/about/overview/budget/budget07/07action.pdf>.
- Vernez, Georges, Richard A. Krop, and C. Peter Rydell. 1999. Closing the education gap: Benefits and costs. RAND Corporation, Santa Monica, CA.
- Wagner, Alan. 2006. Measuring up internationally. National Center for Public Policy and Higher Education, San Jose, CA (September).
- Wenning, Richard J., Paul A. Herdman, Nelson Smith. 2002. No child left behind: Who is included in new federal accountability requirements? Paper presented at a conference sponsored by the Thomas B. Fordham Foundation, “Will no child truly be left behind? The challenges of making this law work” (February 13).

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Acknowledgments

The authors thank Karen Anderson, Michael Deich, Douglas Elmendorf, Robert Gordon, Rebecca Kahane, Cecilia Rouse, Robert E. Rubin, Lawrence H. Summers, and Tracy Williams for their thoughtful advice. Bill Congdon deserves special thanks for his invaluable edits.



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