Social and Economic Returns to College Education

in the United States

MICHAEL HOUT

University of California, Berkeley

Contact: Institute for the Study of Societal Issues, 2420 Bowditch Street, Berkeley CA 94720-5670; mikehout@berkeley.edu

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Abstract Education correlates strongly with most important social and economic outcomes such as economic success, health, family stability, and social connections. Theories of stratification and selection created doubts about whether education actually caused good things to happen. Because schools and colleges select who continues and does not, it was easy to imagine that education added little of substance. Evidence now tips the balance away from bias and selection and in favor of substance. Investments in education pay off for individuals in many ways. The size of the direct effect of education varies among individuals and demographic groups. Education affects individuals and groups who are less likely to pursue a college education more than traditional college students. A smaller literature on “social returns” to education indicates that communities, states, and nations also benefit from increased education of their populations; some estimates imply that the social returns exceed the private returns.

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College graduates find better jobs, earn more money, and suffer less unemployment than high school graduates do. They also live more stable family lives, enjoy better health, and live longer. They commit fewer crimes and participate more in civic life. With all this going for them, it is hardly surprising that college graduates are significantly more likely than high school graduates to say they are “very happy.” Social science research has reproduced these patterns in many societies over many years; see, for example, (Fischer & Hout 2006, pp. 18-22) and (Kingston et al. 2003) for reviews of U.S. patterns.

Conventional wisdom — imparted by parents, teachers, guidance counsellors, and policy makers — reads these differences as evidence that young people would improve
their lives by staying in high school, graduating, going on to college, and earning a degree. Sociologists and other social scientists have been skeptical. Educated people have other advantages that may account for their good fortune. Education may merely be a manifestation of those advantages, imparting little value in and of itself. The advantages of educated people are almost as well known as their successes. They score well on ability tests, their parents bestow on them social, cultural, and economic assets that foster success, and they come to school with tacit knowledge and habits that are seldom part of the curriculum but foster success. In academic shorthand, the correlation between education and success might be spurious.

Or maybe education benefits the educated but would not help those who have left or been thrown out. Perhaps young people, schools, and colleges make well-informed decisions about who will benefit from education and who will not. The people who go far in the educational system are those who will benefit from all that schooling; the others either drop out or find themselves left out when they have nothing left to gain (Willis & Rosen 1979). If this selection is optimal, then forcing or enticing dropouts to go on would waste their time and society’s resources. In academic shorthand, the correlation between education and success might reflect positive selection bias in the educational system; schools “treat” those who will benefit from the “treatment.”

As this review will show, the conventional wisdom is mostly right this time, and social scientists’ skepticism, though well worth considering, is excessive. The correlations between education and desired outcomes reflect, in surprisingly large part, the causal impact of education on those outcomes. Important new research shows that selection bias is actually negative; unlikely college students benefit more than typical college students do (Brand & Xie 2010).

A smaller literature, mostly in economics and demography, has investigated what are
call the “social returns” to education (Topel 1999). Billions of dollars in public money gets invested in institutions and individuals on the theory that society benefits from having an educated populace. The evidence suggests that this theory is also right. To that economic evidence political sociologists add the observation that education also reduces prejudice and intolerance while increasing support for civil liberties. This subjective social return is also valuable, though no dollar sign is attached.

Being educated is not only good in its own right (Abbott 2002), it promotes good outcomes for individuals, their communities, and the nation as a whole.

EDUCATION AND ECONOMIC OUTCOMES

The correlation between education and economic fortunes in the United States has never been higher (Goldin & Katz 2007, pp. 71-85). The literature has dozens of studies that feature the role of education in economic outcomes. I illustrate the robust findings with my own calculations using the most recent data available (Fig. 1). My calculations focus on people in their prime working ages, 30-54 years old, in order to avoid biases that could creep into the analysis because some people extended their educations after failing to find a job and others retired early in lieu of a layoff. Conclusions do not depend on which of several meaningful ways of categorizing education is used (Fischer & Hout 2006, pp. 260-1).

Figure 1 about here

Newspapers featured stories about unemployed college graduates as the 2007-2009 recession ground on, but the data in the upper left of Figure 1 here show that the least-educated prime-age workers were almost four times more likely than college graduates to be unemployed. Prime-age workers with no credentials had an unemployment rate of 11 percent over the 2007-09 period compared with 7.4 percent for prime-age men and
5.2 percent for prime-age women with high school diplomas, 2.8 percent for prime-age college graduates, and less than 2 percent for prime-age workers with advanced degrees. College graduates also had much shorter spells of unemployment (Hout et al. 2011); in past recessions, laid off college graduates recovered more quickly (Gangl 2006).

People with more education also did more desirable jobs. I scaled occupations according to the percentage of people in the occupation who had annual earnings above the national median. Other scores from (Hauser & Warren 1997) give similar results. Getting a job that paid well rose almost linearly with educational levels; 7.4 points for each rung of the educational ladder among men and 7.8 points for each rung among women.\(^1\) Graduating from college instead of high school boosted prime-age men’s occupational standing up to 69 points from a base of 45 points; it boosted prime-age women’s occupational standing up to 59 points from a base of 34 points. Advanced degrees improved occupational standing beyond that achieved by college graduates.

College graduates made more money as well. Men’s and women’s annual earnings during their prime working ages rose about 20 percent for each educational level. Further analysis shows that men’s tendency and/or opportunity to work more hours explains almost half of the gender difference in annual earnings. Hourly wages were more similar for men and women. Hourly wages rose 17.5 percent for each educational level among prime-age men and women alike.\(^2\)

\(^1\)These slopes are from regressions using individual observations, not the few data points in the figures. With 96,000 men and 90,000 women in the data set, the difference of 0.4 is statistically significant at conventional levels.

\(^2\)The slopes from the individual observations were 0.2066 for men and 0.1964 for women. The slopes are significantly different in a statistical test, but 0.0102 is a substantively trivial difference. The slopes from the individual observations were 0.1745 for men and 0.1752 for women, a statistically and substantively trivial difference.
Family incomes combine educational differences in marriage and economic outcomes. That makes family income ill-suited for an analysis the seeks to parse the separate causal contributions to economic inequalities. But it also makes family income an interesting and useful summary measure of education’s combined potential (Harding et al. 2004). The incomes of prime-age men’s families were about 10 percent higher than those of prime-age women’s families because 30-54 year-old men are slightly more likely to be currently married and because unmarried men of these ages earn slightly more than unmarried women. Family incomes rise 21 percent for each educational level. Among men, college graduates’ family incomes were $91,800 compared to high school graduates’ $50,100; among women, the comparable figures were $86,700 and $45,200.

**Ability bias**

To say that education causes the good outcomes like the economic successes in Figure 1 is to move beyond the descriptive statement college graduates make more money than high school graduates to the counterfactual statement that this college graduate would be making less money if she had not gone on to college or that this high school graduate would be making more money if only he had earned a college degree. The burden of proof is much higher in a causal statement than in a descriptive one (Gangl 2010). The first step is to base comparisons on situations in which everything but education is equal by controlling for observable differences that correlate with education.

Ability is the key to the critique and the rebuttal. Academic abilities like speaking and writing clearly or doing arithmetic easily confer advantages both at school and at work. The K-12 curriculum emphasizes those skills, and college courses hone them. Teachers may try to offset pre-existing differences among students, but academic aptitudes and abilities affect who leaves schooling when. Consequently, people who score high on
verbal and math tests in tenth grade are more likely to graduate from college than people who test poorly (Hauser 2002). This correlation between academic abilities and educational outcomes makes it difficult to interpret familiar correlations like those in Figure 1 as cause-effect relationships.\(^3\) Without statistical controls or carefully chosen comparisons, it is hard to say if getting more education causes pay to increase or spuriously reflects the influence of abilities correlated with getting more education (Kaymak 2009).

Further complicating the task is the fact that abilities are only loosely coupled, not some overarching single thing (Fischer et al. 1996, Nisbett 2009). Controlling for some abilities but not others leaves doubts that all else is really equal in the comparisons behind the resulting coefficients (Card 2001). Abilities are not even necessarily all that academic. In addition to the ability to read, write, and count with ease, the abilities to stick with a task from start to finish, to get along with others, to interpret vague instructions correctly, or to solve practical problems quickly can all contribute to success in school and on the job. These things are coming to be known as “non-cognitive” skills in some literatures, e.g., (Heckman et al. 2006), an unfortunate term because the abilities in question do require thought. They are less academic and seldom part of the formal curriculum, though even that generalization must be qualified because teachers routinely insert them into the informal curriculum (Tyson 2002, Lareau 2003). But the point for causal inference is that abilities are so diffuse yet important, it is hard to know when statistical controls for observables have isolated the comparisons that truly gauge the impact of education.

With these problems in mind, economists turned to “instrumental variables” (IV) in

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\(^3\)Similar arguments could be made about how experience, hours worked, gender, racial ancestry, local labor market conditions, industry, and any number of other factors besides ability are correlated with education and might also be part of the differences in Figure 1, of course.
the 1980s. An instrumental variable is a source of natural variation that approximates the random assignment of an experiment. The random assignment breaks the connection between ability and education; everyone has their naturally occurring abilities (and all other attributes too) but now “the treated” have a random increment or decrement to their education while “controls” have their natural amount. The first such instrument researchers tried was compulsory schooling rules that affect people born late in the year more than people born early in the year (Angrist & Krueger 1991). Because people do not choose their birthdays, using month or quarter of birth as an instrument approximates the conditions of random assignment in states that compel people with birthdays in the first half of the year to stay in school longer than they might otherwise have. Other instrumental variables include Vietnam-era draft lottery number (some of the people who had low lottery numbers had to leave college and join the Army) (Angrist & Krueger 1992) and distance from home to the nearest college or university (a reduction in price uncorrelated with abilities) (Kane & Rouse 1995). The difference between treated and controls in earnings later in life provided an estimate of the effect of education net of abilities without the need to make exhaustive tests of abilities (or any other confounding factor).

The IV studies produced a surprise. Before looking at the data, economists supposed that OLS estimates of the effects of education were too large because they combined the education effect of interest and the contaminating influence of abilities. Yet the IV estimates in the seven leading studies were uniformly larger than the OLS estimates (Card 2001). The biggest difference was in a British study that used secondary and university reforms that took effect in 1947 and 1973 as IVs (Harmon & Walker 1995); the IV estimate was 2.5 times the OLS estimate in that study.

Apparently the IV estimates contained more than just a correction for ability bias.
One thought was that observed education — a self-report in each study — was measured with so much error that the OLS estimate contained more downward bias from measurement error than upward bias from unmeasured abilities. That seemed implausible. Most studies tout the accuracy of self-reported education. Evidence from multiple sources indicates that errors occur, more often when proxies state that the person of interest has more education than she does than from errors about one’s own education (Warren & Halpern-Manners 2007). The interplay of excluded variable bias and measurement error, is, nonetheless, complex, and easy generalizations are few (Griliches 1977).

Or perhaps IV estimates exceeded OLS estimates because researchers came up with flawed instruments. For example relatively few people with low draft numbers actually served in the U.S. Army, so that instrument was picking up something else about men in the cohorts exposed to the draft lottery. It is hard to say what the missing causal factor was, though.

A third explanation — causal heterogeneity — has gained support in new research. It requires significant exposition so we move to a new subsection.

**Causal heterogeneity: Education affects some students more than others**

Most statistical analyses approach observational data as if there is a single educational effect to be estimated. But intuition suggests that some students are going to get more out of schooling than others. What if the students who were treated with more education benefitted more from receiving it than most people do?

Educators’ instincts have, for the most part, been that high-ability students benefit more from education than do the students who struggle. That is why high-scoring students get to take more challenging courses in high school and why colleges insist on
tests and transcripts in addition to diplomas when they decide who to admit and who to reject. The plan is to provide the most education to those who would benefit most from it. Call that “positive selection.” Practically it implies that an experimental assignment to more education would expose young people who could not benefit from more education to what is to them a worthless treatment. If positive selection prevailed, then IV estimates would be less than OLS estimates. Data reveal the opposite pattern; IV estimates exceed OLS estimates (Card 2001). The data imply “negative selection.” Students who got more education than they otherwise would have actually benefitted more than their peers. Though it runs counter to intuition, it accords well with experience. Reforms that opened universities to students who did not used to go produced graduates who gained as much or more from their college degrees as the traditional college students did.

Bowen & Bok (1998) studied students who gained admission to 28 of the nation’s most selective liberal arts colleges and research universities (they referred to them as the College & Beyond or C&B schools); all used some form of racially sensitive affirmative action to increase student-body diversity (Bowen & Bok 1998). Compared to a nationally representative sample of college students from the same cohort, the C&B students did as well — and on some factors better. At the C&B schools, the probability of actually graduating with a bachelor’s degree was uniformly higher than in the national sample; more importantly, the probability of graduating did not depend on SAT scores at the C&B schools but rose sharply with SAT scores in the national sample. The earnings of African American men and women from C&B schools not only exceeded those of African American men and women in the national sample, they exceeded those of white men and women in the national sample. C&B minorities earned more advanced degrees than did whites in the national sample.

Attewell & Lavin (2007) tracked women from the first cohorts of students who entered
the City University of New York (CUNY) under its open admissions policy (Attewell & Lavin 2007). They compared women who would have been rejected under the previous admissions policies to those who would have been admitted and to a nationally representative sample of women. After 25 years, they found that the open-admits appeared to gain slightly more from college than the women who would have gotten into CUNY under the 1960s admissions policies. Few differences were statistically significant but all were positive. Interestingly, the children of open admits benefitted fully from having college-educated parents, too. Thus heritable ability differences, whatever they might be, appear to be small relative to the realized benefits of the university education.

Maurin & McNally (2008) compared French college students from the cohort of 1968 with those before and after because the famous events of May 1968 disrupted college entrance exams along with many other French institutions (Maurin & McNally 2008). Despite crowding in university classrooms and subsequently in the labor market, the 1968 entering cohort gained more from university than the previous and subsequent cohorts did. Furthermore, just as with the CUNY admits, their children are indistinguishable from the children of university graduates from other cohorts.

Researchers have also simulated natural experiments by comparing college students and high school graduates who are statistically matched on the propensity to attend university. If the matches are good, then the difference between the success of people who graduated from university and graduated from high school is a better estimate of the causal effect of university education than an ordinary estimates would be. Brand & Xie (2010) used two American data sets to make matches and estimate the effect of education this way. They found that the effect of education was biggest for the students who were least likely to go to college and smallest (though still significant and substantial) for the students most likely to go (Brand & Xie 2010).
These four findings about causal heterogeneity all reflect back on the IV puzzle from the previous subsection in a consistent way. Recall that the puzzle was why randomly assigning people to education yielded bigger estimates of the effect of education than ordinary methods did. Bowen & Bok, Attewell & Lavin, and Maurin & McNally all found that admitting students who would normally be rejected resulted in larger than average effects of college (some differences were not statistically significant). The random assignments in the IV studies identified the same kinds of people: those who usually choose to leave school as soon as they can but who, surprisingly, benefit more if they are required to continue. Brand & Xie’s propensity score methods show that this is actually a pretty general pattern.

The educator’s intuition is exactly backwards. The students who benefitted most from more education were the last ones admitted to that advanced math class or that university. The ones who oozed ability actually did well without fulfilling their potential for formal education. The marginal students gained the most from the opportunity to be educated. Anecdotes make for unreliable evidence, but, as food for thought, it is worth noting that several leaders of the computing industry, including Microsoft founder Bill Gates, Apple founders Steve Jobs and Steve Wozniak, and Facebook founder Mark Zuckerberg, dropped out of college to pursue business opportunities.\footnote{As far as the Wikipedia knows, Wozniak is the only one of the four to subsequently return to college and complete a degree.}

Research on secondary school effects shows a similar pattern. School effects on academic achievement are largest for students who score in the middle range of abilities (Hoffer et al. 1985). Students in the top and bottom quartiles of early test scores gain less from positive school effects (and suffer less from negative school effects) than students in the middle of the distribution do.
Further corroboration comes from the “summer learning” literature (Fischer et al. 1996, Downey et al. 2004). Students whose parents graduated from college and students who get high test scores learned more over the summer than most students did. Students whose parents had little education and students who get low test scores actually scored worse on tests after summer than before, suggesting they forgot some of what they had learned the previous year. In other words, schools affect educationally disadvantaged and low-scoring students more than advantaged and high-scoring students.

The secondary school effects literature focus on academic achievement as the outcome while the college effects of interest here address labor market outcomes. But the two literatures have converged to a consistent message. The most able young people hardly need schools, the least able do not get much benefit from them either, but students in the middle range of abilities gain from good treatments and suffer from bad treatments. High schools and colleges matter most for students in the middle.

One more piece of evidence corroborates this thread of research and supports the inference that education affects new or non-traditional students more than others. In research on American social mobility, I found that family background was a major factor constraining the social mobility of people who lacked college degrees but not those who had degrees (Hout 1984, Hout 1988). The same finding can be read this way: education affects the occupational success of lower-origin workers more than higher-origin ones (Breen & Luijkhx 2004).

These analyses of causal heterogeneity absorb and recast the concerns with ability bias. It now appears that education has a demonstrable causal impact on people of modest ability. It probably has a weaker effect, if any, on the most able. The literature to this point has not asked the question of whether education affects the pay low- or middle-ability people more.
Scholars have been discussing these issues at least since the late 1920s (Sorokin 1927, Houthakker 1959) and actively pursuing research that would separate them since the 1960s (Hauser 1970). The earliest projects used multivariate statistics to separate ability and education. Research since the mid-1980s has reevaluated that whole project and led to the conclusion that ability and education cannot be separated. The correct perspective is to ask how abilities make education more or less effective in producing the desired outcomes. Young people with the most abilities may learn and ultimately earn the most, but their education augments their success less than it augments less-able people’s success (in the range, roughly, from the median to the top of the ability distribution). Secondary education makes the biggest difference for people with modest abilities, and that is probably true of college too.5

Can the positive returns to education offset escalating costs?

College costs more every year; increases in the full cost of college outstripped inflation by large margins in both the public and private sectors (see Fig. 2). The full cost of attending a private, private four-year college or university averaged $31,300 in the 2008-09 academic year, up from $13,700 in 1981; both amounts are stated in 2009 dollars so the 127% increase is on top of the average rise in the price of goods and services.6 Public colleges and universities were a comparative bargain at $14,100 in 2008-09, but the rate of increase was almost identical — 125% since 1981 when full cost was $6,200. Tuition hikes were the main cause of above-inflation increases for both public and private colleges and universities; room and board increased at about the rate of overall inflation

5Because college is so selective we do not see many college students in the lowest quartile of test scores.

6“Full cost” includes tuition, fees, room, and board for full-time students who received no financial aid. All costs adjusted to 2009 prices.
Private and public full cost rose more or less in tandem throughout the thirty-year period. Private education rose slightly faster than public in the 1980s; public education rose slightly faster than private in the most recent decade (Fig. 2). Only the two-year public (community) colleges held tuition down for a significant period; the full cost of a community college education rose only as fast as other prices for the 15 years from 1985 to 2000.

The full-cost data show what a student would pay at an average private or public college or university. As with any average, there is variation above and below it; some colleges charge substantially more, others less. But most students pay less than the stated amount for their education. Scholarships and grants based on academic performance, financial need, or both reduced the cost for 64 percent of recent full-time students (NCES 2009).

Do these increases offset the returns students can expect? Are today’s full costs too much to pay up front for an uncertain increase to lifetime earnings? Academic researchers have given this issue surprisingly little attention. Fortunately, the Census Bureau published estimates of lifetime earnings differences that effectively answer the question (U.S. Bureau of the Census 2002). Even the most cautious reading of the evidence would agree that earning a college degree will pay back the cost of obtaining it several times over. In a forty-year work life, men with college degrees can expect to earn $2,955,000 over their lifetime (expressed in 2009 dollars); men with high school diplomas can expect $1,664,000 over theirs — a difference of $1.3 million. Women earn substantially less.7 Women with college degrees can expect to earn $1,673,000 over

7Men’s and women’s lifetime earnings appear to be much closer when the analysis is restricted to full-
their lifetime (barely more than high-school educated men); women with high school diplomas can expect $990,000 over theirs — a difference of $683,000. Five-years of full cost at the average four-year private college or university works out to $156,500 (with no financial aid). The average male college graduate’s degree yields about 8.2 times what it could cost; the average female college graduates degree yields 4.4 times what it could cost. Financial aid reduces cost but not payoff, so the yield is higher for the majority of graduates. At a public university, five years of full cost works out to $70,500. That investment pays off 18 times over for men and 10 times over for women.

The full return on a college investment must add in the yield on advanced degrees as well. Master’s, doctoral, and professional degrees compound the advantages graduating from college. When the lifetime earnings of men and women with advanced degrees are figured in, earning a college degree pays off even more. Quantifying the post-BA payoff is not possible from published sources, however, because comparable data on the cost of pursuing an advanced degree are not available.

The Census Bureau’s calculations have several important limitations. Lifetime earnings were extrapolated from a single year’s earnings of men and women at different ages. The earnings of today’s older men and women may or may not predict the earnings today’s young people will have in the future. We use them because they are as likely to err high as err low and we lack more direct observations.

Kane argued for excluding room and board from these calculations (Kane 1999). People have to pay for food and shelter whether they enroll or not. Removing living expenses time, full-year workers (U.S. Bureau of the Census 2002). So women who can reasonably expect to be fully employed instead of employed an average amount, can expect much higher lifetime earnings than the “average” women in the figure.
would further increase the estimated return on educational investment.

In conclusion, the returns to higher education are large enough to offset the historic full costs students now face. The difference between the earnings of college graduates and high school graduates has risen almost as much as tuition in the last 25 years so the yield now is almost as large as it was when tuition was lower.

Do Elite Colleges Yield Higher Returns?

Students strive for famous colleges. At least at the high end and probably throughout the range of selective colleges and universities, admissions rates have fallen since 1980 (Bound et al. 2009, Hoxby 2009) The lucky ones who get in usually pay more to attend these universities than they would have paid to attend a less selective one (Bowen et al. 2009). This suggests that they are getting more at these kinds of colleges and universities than they would elsewhere. Hoxby calculates the total investment in students at the top universities and concludes that the well-endowed, expensive universities actually invested $15,000 more than they charged (on average). Graduates entered the labor force endowed with the equivalent of a $250,000 education for which they paid, at most, $200,000. The investment in a public-university graduate was closer to $160,000. What was the return on the extra $90,000.

Finding an effect of graduating from an elite college on earnings has been surprisingly difficult. Average SAT scores and other markers of quality and status correlate with graduates’ earnings. But the literature has as many null findings as positive ones. Dale & Krueger (2002) studied college freshmen who were admitted to an elite, selective university. Freshmen who chose to enroll at a less selective university — despite admission to the elite one — subsequently earned as much as those who actually enrolled at the elite one (Dale & Krueger 2002). That is the strongest null evidence.
Black & Smith (2006) expanded the usual search for elite effects by using five measures of college quality. Combining measures produced an estimate of the effect of college quality on wages that was significantly higher than the estimates obtained by considering any measure alone. Graduates from colleges and universities that were in the top five percent of the quality distribution earned an average of 12 percent more per hour than graduates of average-quality universities. The 12 percent boost was statistically significant but disappointing next to the 56 percent investment advantage that they had (Hoxby 2009).

A degree from an elite college increases marriage prospects. For women, graduating from an elite college or university increases the probability of marrying a man with a high income; for men, graduating from an elite college or university increases the probability of marrying a woman from a privileged background (Arum et al. 2008). These patterns might well increase family income, even if the elite college does not increase earnings.

**Do Two-Year Colleges Yield Any Returns?**

The complement to worries that an expensive elite education will not pay off is the concern that community colleges divert non-traditional students from the lucrative academic track to lower-reward trade-oriented courses (Brint & Karabel 1989). That does occur at some two-year colleges, especially over-enrolled and under-endowed public community colleges (Rosenbaum et al. 2006). But other two-year colleges, even some for-profit ones, achieve good outcomes for students by off-setting their low cultural capital and knowledge about higher education (Rosenbaum et al. 2006). To some extent, vocational education is as remedial as academic education at community colleges in the sense that some people get the same value out of well-structured secondary school vocational training as others get out of similar training at two-year colleges (Arum 1998).
In short, degrees and certificates from two-year colleges boost the earnings for the students who complete those programs. In the language of causal analysis, there is evidence of an effect of the treatment on the treated. It does not imply that every student would benefit if reassigned from their preferred course of post-secondary education to a two-year college. But for the students who go, education at a two-year college is better than no post-secondary education at all (Stephan et al. 2009).

**ORIGIN, EDUCATION, AND OPPORTUNITY**

The opportunity to pursue an advanced education is profoundly and persistently unequal (Blau & Duncan 1967, Mare 1981, Raftery & Hout 1993, Lucas 2001, Bailey & Dynarski 2011, Hout & Janus 2011). This fact alone has made some sociologists skeptical of the efficacy of education. But that skepticism misses a key point. Education’s role in transmitting the advantages of social origins depends on its efficacy in the labor market (Blau & Duncan 1967, pp. 165-75). For the sake of exposition, let us strip the Blau-Duncan model to its essentials: education \((E)\) depends on socioeconomic origins \((X)\) abilities \((A)\), and variation in education that is uncorrelated with either family SES or academic ability \((\zeta)\). Subsequently, the person’s success in the form of a desirable job, salary, etc. \((Y)\) depends on socioeconomic origins, abilities, education, and the myriad causes of success that are uncorrelated with origins, abilities, and education \((\epsilon)\):

\[
E_i = \beta_{10} + \beta_{11}X_i + \beta_{12}A_i + \zeta_i \tag{1}
\]

\[
Y_i = \beta_{20} + \beta_{21}X_i + \beta_{22}A_i + \beta_{23}E_i + \epsilon_i . \tag{2}
\]

The correlation across generations can be expressed in terms of these relationships:

\[
r_{xy} = \beta_{21} + \beta_{22}r_{ax} + \beta_{23}(\beta_{11} + \beta_{12}r_{ax}) . \tag{3}
\]
If education has no net effect on the outcome of interest after controlling for socioecono-
momic origins and abilities, then $\beta_{23} = 0$, and all the terms involving education drop out
of equation (3). Thus, education is not the key to persistent inequality unless it directly
affects jobs, pay, and other outcomes.

The substantive implication of this simple illustration continues to hold as the model
is enriched with additional explanatory variables. The algebra grows more and more
complex as variables are added, but the conclusion is always the same. Education dis-
appears from the intergenerational correlation if education is not a cause of success.
Therefore, skepticism of education’s efficacy that is based on unequal access, i.e., on
$\beta_{11}$, is misplaced.

The other concern in the “engine of inequality” skepticism is that intergenerational
correlations are rising (Karen 2002). Data show no increase in $\beta_{11}$ in the last fifty years

SKEPTICS AND CRITICS

Some serious sociologists and economists developed strong arguments in the 1970s
about the limits of mass education (Berg 1970, Collins 1971, Collins 1979, Freeman
1976). They noted how few of the skills that define academic success translate to skills
used on the job. The disjuncture led them to doubt that education caused success. In-
stead education represented to them a tool elites used to limit opportunity to people like
them. (Collins 1971) articulates it this way: a) Society is composed of status groups
that are differentiated practices and habits informed by culture and norms. b) Practices
and habits turn into a status rank ordering through class advantages (and complementary
disadvantages). c) “The main activity of schools is to teach particular status cultures,
both in and outside the classroom. In this light, any failure of schools to impart technical
knowledge (although it may also be successful in this) is not important; schools primarily teach vocabulary and inflection, styles of dress, aesthetic tastes, values and manners” (Collins 1971, p. 1010). d) Education allows employers to select workers deemed to be “appropriate” on the basis of status group membership and then teach the job skills on the job. “Educational requirements for employment can serve both to select new members for elite positions who share the elite culture and, at a lower level of education, to hire lower and middle employees who have acquired a general respect for these elite values and styles” (Collins 1971, p. 1011). The Credential Society (Collins 1979) extends the argument.

Ivar Berg (Berg 1970) and Richard Freeman (Freeman 1976) provoked controversy by arguing that most college graduates had more education than they needed, at least more than they needed to get their jobs done. As Smith (Smith 1986) noted, these arguments have two parts: the link between education and occupation and differences in pay among workers with in the same occupation with different amounts of education.

All of this work carries the implicit assumption that the American economy somehow got the mix of high school and college educated labor right in the 1950s or 1960s and subsequent increases in the fraction with a college degree represent irrationality on the part of employers, students, or both. In Collins there is the nuance that employers are discriminatory or status-seeking. Berg adds that colleges and universities gain at some students’ expense by overpromising rewards while coming up short on delivering employable skills. Freeman focuses on the tension between individual incentives that promote more investment and collective action that dilutes the return on that investment (also see (Thurow 1975)).

All of these arguments arose at the lowpoint in the pay advantage of college graduates. When Collins, Berg, and Freeman were writing (1970-76), the difference between the
average earnings of college graduates and high school graduates was half of what it was in 1999 (Fischer & Hout 2006, pp. 114-20). Their concerns have been supplanted by the observation that education-based pay gaps are so close to the core of rising inequality (Fischer et al. 1996, Fischer & Hout 2006, Goldin & Katz 2007). As evidence of a true causal effect of education on pay accumulates, the discussions of credentialing, training robbery, and overeducation become irrelevant. Technology changes since roughly 1980 have put a premium on information, data processing, and the work of “symbolic analysts” (Reich 1992, Fernandez 2001). Those who know more about these things pull farther ahead, all else being equal. An educated person invents things, works around tough problems, understands directions, documents tasks, misses less work, and puts in a more nearly full day on the job — in short, educated workers possess the cognitive and non-cognitive skills that employers value (Fernandez 2001, Heckman et al. 2006, Goldin & Katz 2007).

In this new context, it is important to note that education and cognitive ability affect both workers’ occupational placements and their earnings in those occupations, but the effects are not additive (Carbonero 2007, Baker 2009). Returns to education and cognitive ability are significantly higher in occupations with high skill demands than in less skilled occupations. Similarly, majoring in a science, technology, engineering, or math (STEM) field paid off more than majoring in the humanities (Roksas 2005, Poletaev & Robinson 2008, Shauman 2009).

An educational credential is substance, not just status. It is also ability. Some of the ability may be a pre-existing talent, but most people need a schooling experience or a work experience to bring that talent out (Miller et al. 1986, Nisbett 2009).
SOCIAL RETURNS

Economists use the term “social returns” to characterize the impact of education on the whole economy (Topel 1999). All gain when more are educated. Research by my colleague Enrico Moretti (Moretti 2004a) typifies this field. He found that high-school graduates’ wages increase when the proportion of college graduates in the labor market rises and high-school dropouts’ wages increase even more in those places. A key issue for this literature is the presence of unobservable characteristics of individuals and cities that may raise wages and be correlated with college share — an issue very familiar to sociologists interested in context effects whether they are tied to schools, locales, or other aggregations. Moretti’s longitudinal model controls for the non-random selection of workers among cities by using two instrumental variables: the (lagged) city demographic structure and the presence of a land-grant college. He found that a percentage point increase in the supply of college graduates raised high-school dropouts’ wages by 1.9%, high-school graduates’ wages by 1.6%, and college graduates’ wages by 0.4%.

Everyone gains from the educated workforce. The least educated gain more (collectively) than the most educated, but even the college graduates received a bonus on top of their private returns to their own educations for working among other college graduates. Furthermore, data matching workers and firms indicates that the spillover effects come from productivity gains (Moretti 2004b).

Some of the productivity gains come from the social pressure more productive workers (regardless of education) create and how less productive workers feel that pressure (Mas & Moretti 2009). Highly productive workers might either stimulate co-workers to lift their performance or they might make it possible for co-workers to put in less effort yielding the same output overall. Mas & Moretti found that both occur, but that the social pressure to carry one’s weight plus the learning-by-observing predominate. They
reached that conclusion by recording the distance between the most productive person in a retail store and the other workers. Nearby workers had larger gains in productivity than workers farther away. Most tellingly, “workers exhibit cooperative behavior only when they are observed by coworkers and when they are likely to interact with them again in the future” (Mas & Moretti 2009, p. 143). This combination of social pressure and learning helps interpret the social returns to education.

If education boosts collective productivity as well as personal productivity as these papers and others like them suggest, then increasing educational attainment for a population might be a key causal factor in overall economic growth. In fact, estimated social returns to education exceed private returns (Lange & Topel 2006). Metropolitan areas, states, and nations gain from having educated populations.

**NONMONETARY RETURNS**

Education is more than a labor market asset. College graduates have more of the things people value in family life, live longer, healthier lives, participate more in social and community life, and feel happier.

**Family**

In the 1990s inequality researchers reported that family life was dividing along educational lines in ways that it had not done in the past (Ellwood & Jencks 2004). Children were substantially more likely to live with two adults if their mother was a college graduate than if their mother was a high-school drop-out (Fig. 4).

Figure 4 about here

Separating cause and selection here is complicated. Few studies have sorted through the links. Becker’s theories (Becker 1991) start with a very stable world of perfect
foresight that enables young women to choose a lifelong trajectory of schooling, mates, and babies all at once. They cannot have it all — at least not all at once — so they must choose the sequence and timing of events like graduation, marriage, and each birth, as well as the amount of education and number of children to strive for. This simultaneity of this strategizing decision makes separating causal effects of schooling on fertility or vice versa impossible.

That is theory; in real life many births are unplanned. Even in a world of effective contraception and legal abortion, errors occur. Accidental pregnancies result in extra births or births that occur sooner than planned; effectively delaying the trying to get pregnant often results in fewer births or births that occur later than planned (Morgan & Taylor 2006).

Demographers have used data on unplanned births and miscarriages to disentangle the effects of births and education. Some early studies (Rindfuss, Bumpass, & St. John 1980) used two-equation models to explore relationships and concluded that education almost certainly affected fertility but that the reciprocal effect was highly uncertain. Since then most analyses have been purely correlational. Now Brand & Davis (2011) have used propensity scores to estimate the effect of education on fertility. They find that entering college at 19 reduces children ever born by age 41 years (Brand & Davis 2011). Entering college clearly reduced women’s fertility if they were unlikely to enroll in college; it was not clear if going to college mattered for those whose family background and academic achievement made college very likely.

Beyond fertility, theory predicts that educated couples will stay together longer, contributing to the pattern in Fig. 4. Causal analysis has not resolved that issue, though the timing of events strongly supports the inference that education increases the stability of marriages (Schwartz 2010). Furthermore, the apparent increase in educational
homogamy reflects this greater stability, as having similar educations does not affect a couples’ probability of forming a union or a marriage; it just reduces their probability of divorcing (Schwartz 2010).

Health

College graduates are decidedly healthier than others (Fig. 5). This basic relationship has been replicated hundreds of times by researchers (Mirowski & Ross 2003). The question of causality is hard to settle, though. The relationship is not direct; many social, behavioral, and biological factors stand between the accomplishment of a college degree and the quality of health later in life. There is even some concern that healthy people might achieve more education by missing less school, concentrating better, and the like.

Adrianna Lleras-Muney used the state-to-state variation in mandatory schooling to identify a causal effect on mortality (Lleras-Muney 2005). Her IV estimate showed that achieving more schooling lowered the risk of premature death. Other studies have replicated the finding in Europe (Cutler & Lleras-Muney 2006).

John Mirowski and Catherine E. Ross argue for education as “learned effectiveness” (Mirowski & Ross 2003). They carefully specify the direct and indirect paths from education to positive health outcomes and conclude that the statistical associations are robust because in acquiring formal education people learn things that promote good health. Recent evidence shows that education does more to suppress the onset of health problems than to aid recovery (Herd et al. 2007).
Social Capital & Morale

College graduates participate more fully in civil society and politics (Verba et al. 1995, Nie et al. 1996, Putnam 2000). The question is whether education actually increases participation or perhaps educated people just have an attribute that increases both their education and their participation. (Milligan et al. 2003) produced IV estimates that imply that education increased voter registration, knowledge, and turnout in the United States. (Hauser 2000) studied academic abilities and concluded that education had a far stronger effect on young peoples’ social capital than their verbal and quantitative abilities. (Brand 2010) finds that a college degree raises the civic participation of unlikely college graduates more than it raises participation among traditional college graduates where participation consists of volunteering to do unpaid work for community organizations and charities. College graduates also have pro-social attitudes toward civil liberties and minorities (Kingston et al. 2003).

Happiness research has had a renaissance in psychology, sociology, and economics in the last two decades. Much of that work centers on the role of money in subjective well-being. But sociologists have given education an equal amount of attention. Figure 5 shows the simple association between the GSS happiness question and education along with the data on subjective health. Sophisticated analyses, e.g., (Yang 2008), show that educational differentials are robust with respect to happiness, but I know of no attempts to identify the causal effect.

CONCLUSION

Education makes life better. People who pursue more education and achieve it make more money, live healthier lives, divorce less often, and contribute more to the functioning and civility of their communities than less educated people do. We would expect
some of these patterns to emerge even if schools and colleges do little more than certify who is smart and who is not. But the evidence reviewed here points to a more substantive role for education in America. All recent evidence supports the proposition that education improves people in ways that matter later in life. Some of those are skills that they could, in principle, pick up at home, on the job, or elsewhere. For example, most people learn to read in school. The fact that some learn at home suggests that others could too. But education works for these kinds of widespread, general skills because the results are more sure and the process is more efficient in the school setting. It is also more egalitarian; acquiring the skill does not depend on parents and siblings mastering it and passing on their mastery.

Other skills are much harder to acquire outside school. Specific skills like how to calculate the forces on a weight-bearing wall, the elements of the periodic table, the formula for compound interest, or how to make sense of Shakespeare, Nietzsche, or Matisse come to mind. Then come broader skills like how to marshal facts and rhetoric to craft a reasoned argument, or how to discipline oneself to see a task through from beginning to end. Many people learn these things at home, but schools counter the inequality home-learning fosters. Inequality of educational opportunity persists (Lucas 2001, Lareau 2003, Hout & Janus 2011), but it would be even more unequal without schools (Downey et al. 2004).

For all the advances in establishing the causal role of education, we have learned surprisingly little about what exactly the educational treatment is. The research suggests that a mix of academic knowledge and useful habits make people better employees, patients, and citizens. And while having talent or potential can accelerate the learning that goes on in school, it is, demonstrably, the schooling itself that separates the promising from the accomplished young person. How high schools and colleges accomplish that
is far less clear. Researchers need to look more closely at the variety of educational experiences and its consequences. Accomplishing these next steps will not be easy. The problems of selection and heterogeneity compound as we move from the causal impact of education to the causal mechanisms of education. Take selective women’s colleges as a case in point. The young women who choose women’s colleges are hardly a random draw from the population of young women. Almost all of them have high school academic and social accomplishments that make them strong prospects for admission to equally selective co-educational colleges. Some have chosen the women’s college for reasons like a better financial aid package or it is near home. But most chose the women’s college over a comparable co-educational one because the women’s college was the “right fit” — their personal return was likely bigger than among women who went somewhere else.

Probably the biggest surprise in recent research concerns the interaction of ability and schooling. Evidence from both high school and college research implies that the young people who benefit most from education are not the most talented but those who have modest skills and abilities. It appears that the most talented students do well on their own and the least talented ones do not prosper anywhere. The broad middle range of roughly average talent respond to schooling the most. This is a crucial policy point. It means that throughout the history of American higher education we have seen appreciable gains by pushing the frontier of opportunity further (Goldin & Katz 1999). Continuing so that the nation can see half its young people succeed in college — the Obama administration’s goal — will yield even greater returns because the expansion will embrace precisely the segment of the population most likely to benefit from it.

(Stevens, Armstrong, and Arum 2008) characterized American higher education as a) sieve, b) incubator, c) temple, and d) hub. The research reviewed here underscores all
four. They overlap; there is no adjudicating among them. They refer to the ways higher education a) stands between the home environment of childhood and adult achievement, b) creates the world-apart of the residential college and, for those who commute, offers a respite from non-educational responsibilities, c) collectively and simultaneously produces new knowledge and legitimates both older and newer forms of knowing, and d) is the field on which the interests of family, industry, and the state coalesce. All four depend on and support the effects of education enumerated in this review. If higher education was not tied to economy and society by the causal relationships identified in recent research, then it would not be sieve, incubator, temple, or hub. It would still be the finishing school for the offspring of elites who showed an interest in the arts and sciences it once was.

Throughout this chapter I have taken the pragmatist’s point of view asking what education is good for. I nonetheless recognize the truth of what Andrew Abbott told an audience of freshmen in September 2001 (Abbott 2002): the pragmatic view undersells education. Knowledge is better than ignorance, even if we never find use for all our knowledge. But if the topic is public investment in education — and the United States is in the unenviable position of investing a lot but not enough — then education has to justify itself on pragmatic grounds. The research reviewed here shows that education yields both personal and social returns on investment. Education pays off because, in addition to sorting and certifying America’s young people, it adds value. College students acquire new skills and new perspectives in the nation’s colleges and universities that make them better workers, partners, and citizens. The universities do not merely identify the young people who fit the desired profile, they disseminate skills and foster values. Higher education causes good things to happen.
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Figure 1. Occupational Earnings Score, Personal Earnings, Family Income, and Unemployment by Years of Education and Gender: United States 2007-2009.

Notes: Personal earnings and family incomes were adjusted for inflation; expressed in 2009 dollars. Educational category legend is: <11 = 0-10 years completed, 11-12 = 11 or 12 years completed but no diploma, HS = high school diploma, SC = some college, AA = 2 year degree, BA = 4 year degree, MA = masters degree, PhD = doctoral degree, Prof. = professional degree (e.g., JD, MD, DDS).

Source: Author’s calculations from March Current Population Surveys, persons 30-54 years old, see (King et al. 2010).
Figure 2. Full cost of attendance by year, sector, and type of institution.

Notes: Full cost includes average total charges — tuition, fees, room, and board — for full-year, full-time attendance. Prices adjusted for inflation using the consumer price index for urban households (CPI-U) and expressed in 2009 dollars. The dotted lines show 30-year trends at a constant rate of increase (1.16% per year for public two-year colleges and 2.26% for the other three).

Figure 3. Lifetime Earnings by Years of Education and Gender: United States 1997-1999.

Notes: Lifetime earnings were estimated from cross-sectional data pooled from Current Population Surveys of 1997-1999; expressed in 2009 dollars. Educational category legend is: <11 = 0-10 years completed, 11-12 = 11 or 12 years completed but no diploma, HS = high school diploma, SC = some college, AA = 2 year degree, BA = 4 year degree, MA = masters degree, PhD = doctoral degree, Prof. = professional degree (e.g., JD, MD, DDS).

Source: (U.S. Bureau of the Census 2002).
Figure 4. Children Living with Two Adults: United States 1940-2000.

Source: Fischer & Hout, 2006, p. 82.
Figure 5. Happiness and Health by Education: United States 2004-2008.

Source: Author’s calculations from General Social Surveys, persons 25-64 years old, educated in the United States.