

Do the Benefits of College Still Outweigh the Costs?

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In recent years, students have been paying more to attend college and earning less upon graduation—trends that have led many observers to question whether a college education remains a good investment. However, an analysis of the economic returns to college since the 1970s demonstrates that the benefits of both a bachelor’s degree and an associate’s degree still tend to outweigh the costs, with both degrees earning a return of about 15 percent over the past decade. The return has remained high in spite of rising tuition and falling earnings because the wages of those without a college degree have also been falling, keeping the college wage premium near an all-time high while reducing the opportunity cost of going to school.

The sluggish labor market recovery from the Great Recession has refueled the debate about the value of a college degree. Although the unemployment rate of college-educated workers has remained well below average, there is mounting evidence that recent college graduates are struggling to find good jobs.¹ At the same time, college tuition has risen sharply, reaching record highs, and college graduates are increasingly finding themselves saddled with debt from student loans used to finance their education. By the end of 2013, aggregate student loan debt in the United States exceeded \$1 trillion, and more than 11 percent of student loan balances were either severely delinquent or already in default.² With the costs of college rising and the benefits in doubt, many are wondering whether earning a college degree still pays.

In this edition of *Current Issues*, we examine the costs, benefits, and economic return of a college education. By analyzing more than four decades of data, we are able to put the recent experience of college graduates—those with either a bachelor’s degree or an associate’s degree—into historical perspective. Our analysis reveals that the average wages of college graduates have been falling for the better part of a decade, with the pace of decline accelerating after the Great Recession. Further, we show that tuition has increased sharply over time, although average costs are typically much lower than the published “sticker price” would suggest because of the wide availability of student aid and tax benefits. Nonetheless, while it might seem as if the value of a college degree has declined because of falling wages and rising tuition, we show that this is actually not the case. Instead, after climbing impressively between 1980 and 2000, the return to a college degree has held steady for more than a decade at around

¹ See Abel, Deitz, and Su (2014).

² See Federal Reserve Bank of New York (2014).



15 percent, easily surpassing the threshold for a sound investment. The driving force behind this seeming contradiction is that the wages of those without a college degree have also been falling, keeping the college wage premium near an all-time high while reducing the opportunity cost of going to school. Indeed, while the past decade has been a challenging time for college graduates, those with less education have struggled even more.

Finally, we investigate whether the return on a bachelor's degree varies with students' areas of specialization. Perhaps not surprisingly, we find that the return differs markedly across college majors. In particular, students majoring in fields that provide technical training, such as engineering or math and computers, or fields geared toward growing parts of the economy, such as health care, have tended to earn high returns on their educational investments. By contrast, many students majoring in fields such as leisure and hospitality, agriculture, architecture, or the liberal arts have tended to fare worse, particularly if they find themselves chronically underemployed. Thus, while the benefits of college still outweigh the costs on average, not all college degrees are an equally good investment.

Economic Benefits of College

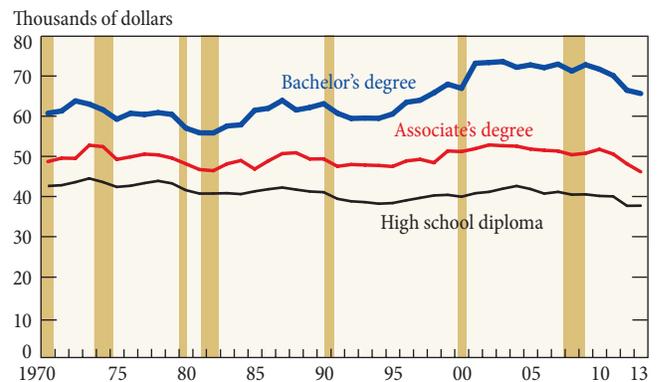
The economic benefits of a college degree can be thought of as the extra wages one can earn with a college degree relative to what one would earn without one. We measure this wage differential by comparing the average wages earned by college graduates with the average wages earned by high school graduates. The wage differentials we estimate provide only a rough guide to the economic benefits of a college degree, and come with a few important caveats. First, as a group, those pursuing a college degree may well have aptitudes, skills, and other characteristics that make them different from those who do not go on to college. This implies that part of what we estimate as a benefit to a college degree may reflect the different abilities of those who earn a college degree, and not the added value of a college education itself. Furthermore, our analysis is based on the historical earnings of college and high school graduates who entered the labor market at different points in time, and there is no guarantee that these earnings patterns will hold in the future. Finally, the results we present are average outcomes. Thus, by definition, some individuals will have better or worse outcomes than our estimates suggest.

We utilize data from the March supplement of the Current Population Survey to calculate average annual wages between 1970 and 2013 for three groups of workers: those with only a high school diploma (including workers who earned a GED), those with only an associate's degree, and those with only a bachelor's degree.³ We exclude those

³ See Ruggles et al. (2010).

Chart 1

Average Annual Wages, by Education 1970-2013



Sources: U.S. Census Bureau and U.S. Bureau of Labor Statistics, Current Population Survey, March Supplement; U.S. Bureau of Labor Statistics, consumer price index.

Notes: Dollar figures are expressed in constant 2013 dollars. Wages are adjusted to control for differences in worker characteristics. The shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

with a graduate degree from our analysis in order to focus on the return to a bachelor's degree in and of itself. However, it is important to note that those with a postgraduate education tend to earn more than those with only a bachelor's degree, so part of the payoff to a bachelor's degree is its utility as a stepping stone to a postgraduate degree.⁴ These gains are not captured in our analysis.

To obtain comparable wage estimates for workers in each education group, we restrict our sample to full-time workers aged sixteen to sixty-four. Thus, our analysis excludes those who are unemployed or are working part-time. This restriction tends to understate the wage benefits of a college degree since those with only a high school education are more likely to be unemployed or to work part-time than those with a college degree, and this gap has widened over time.⁵ We use regression models to control for differences in observable characteristics of people over time and across education groups, and express all figures in constant 2013 dollars using the consumer price index to adjust for inflation (see Box). In essence, these restrictions and adjustments allow us to calculate wages for the average worker within each group that are comparable over time.

The College Wage Premium

As one might expect, average wages for those with a college degree are far greater than average wages for those with only a high school diploma (Chart 1). In the period between 1970 and 2013 as a whole, those with a bachelor's degree earned about

⁴ See Lindley and Machin (2013).

⁵ See Abel, Deitz, and Su (2014).

Estimating Average Wages Using a Fixed Composition Approach

We use a linear regression model to estimate average wages that control for differences in observable characteristics of workers between education groups and over time. Specifically, for each individual i , we estimate the following wage equation separately for each education group and year:

$$w_i = \beta X_i + \varepsilon_i,$$

where w_i is an individual's annual wages; X_i is a vector of individual-level characteristics, including age, age-squared, race, marital status, gender, and the U.S. Census division in which each individual is located; β is a vector of corresponding parameter estimates; and ε_i is a standard error term. With three education groups and forty-four years of data, we estimate this model 132 times using cross-sectional microdata on individual workers.

To estimate the average wages shown in Chart 1, we evaluate the regression model using the 2013 mean value of each independent variable to obtain a fitted wage value for each education group and year. The means of all independent variables are calculated using the combined sample of all workers for the year 2013. Thus, the average wage values we estimate are driven by variation in the estimated coefficients over time. Fixing the average worker's characteristics to 2013 values allows us to take the characteristics of today's workforce and recast prior years to fit these same demographics. For example, the labor market experience of women differs in various ways from that of men. With the rise in female labor force participation over the past few decades, women's share of the workforce is higher today than it was in 1970. Our approach allows us to account for this difference by using the share of women in the workforce today to estimate average wages in prior years when the demographics were different.

We also use the results from these equations to estimate lifetime earnings profiles for each education group and year, as depicted in Chart 2 for the year 2013. Here, we use the results obtained from the regression equations, again holding the independent variables constant at their 2013 mean values, with the exception of age and age-squared. We then substitute age values to predict the average wage of each type of worker at each age of their working life. Since our data are cross-sectional, we do not follow individuals over time to see how their earnings change; rather, we observe what people of various ages earn in a given year. Thus, the lifetime earnings profiles we estimate rely on the wage outcomes of people at different ages in a particular year to predict what one could expect to earn during a lifetime. For example, the 1990 lifetime earnings profile yields an estimate of the average wage a person with a certain level of education might expect to earn at age twenty, thirty, forty, and fifty, based on what twenty-, thirty-, forty- and fifty-year-old workers with that same level of education typically earned in that same year.

\$64,500 per year and those with an associate's degree earned about \$50,000 per year, while those with a high school diploma earned only \$41,000 per year. Thus, over the past four decades, those with a bachelor's degree have tended to earn 56 percent more than high school graduates while those with an associate's degree have tended to earn 21 percent more than high school graduates.⁶ However, these wage premiums have fluctuated over time.

Average Wages over Time

Perhaps somewhat surprisingly, the average wage of workers with a bachelor's degree does not always rise—in fact, it spent as much time declining as increasing during the past four decades. Consider first the 1970s. Although wages drifted down for all workers between 1970 and 1982, those with a bachelor's degree saw their wages decline the fastest. Average wages for this group fell from a little more than \$60,000 to about \$56,000, or 8 percent—nearly double the rate of decline in wages for those with either an associate's degree or a high school diploma. In fact, the falling wages of workers with a bachelor's degree during the 1970s raised concerns that the large number of people going to college had produced an overeducated workforce.⁷ However, circumstances changed dramatically in the early 1980s.

The wages of college graduates increased sharply in both absolute and relative terms beginning in the early 1980s and continuing through the 1990s. In many ways, these may well have been the “golden years” for college graduates. As technological advancement and the computer revolution took hold, the demand for skilled workers steepened. Indeed, although college enrollment grew steadily during this time, the demand for college-educated workers increased even more.⁸ Further, the introduction of new technologies helped college graduates become more productive.⁹ These forces combined to push wages up rapidly for college graduates. Between 1982 and 2001, the average wage earned by workers with a bachelor's degree jumped 31 percent and the average wage for those with an associate's degree rose 12 percent, while the average wage for a high school graduate was essentially unchanged. As a result, the wage premium earned by those with a college degree doubled over this period, reaching nearly 80 percent for workers with a bachelor's degree and almost 30 percent for those with an associate's degree.

Since then, however, it has been a challenging time for all workers, and the prospects of college graduates have once

⁶ Although wage dispersion has increased over time for all three education groups, the college wage premium measured at the 25th, 50th, and 75th percentiles is nearly identical to the college wage premium measured at the means for the entire 1970-2013 time period.

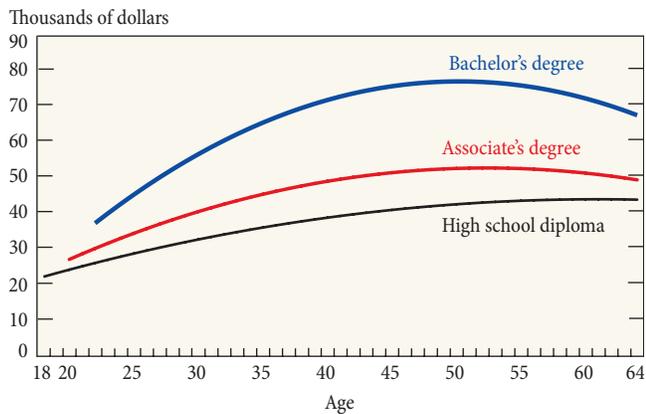
⁷ See Freeman (1976).

⁸ See Goldin and Katz (2008).

⁹ See Autor, Levy, and Murnane (2003).

Chart 2

Life-Cycle Wage Profiles, by Education 2013



Source: U.S. Census Bureau and U.S. Bureau of Labor Statistics, Current Population Survey, March Supplement.

Note: Wages are adjusted to control for differences in worker characteristics.

again come into question. Between 2001 and 2013, the average wage of workers with a bachelor's degree declined 10.3 percent, and the average wage of those with an associate's degree declined 11.1 percent; for high school graduates, the average wage dropped a more modest 7.6 percent. It is not clear whether this trend is a consequence of the two recessions and jobless recoveries that came in close succession beginning in the 2000s, or a more permanent reversal in the demand for the skills of college graduates.¹⁰ However, even with the recent decline in wages, those with a bachelor's degree have, on average, continued to enjoy a 75 percent wage premium, while those with an associate's degree still earn over 20 percent more than high school graduates. As we explain in detail later, these wage differentials are a critical component in determining whether a college degree remains a good investment.

Lifetime Earnings

Significantly, the economic benefits associated with earning a college degree last over an entire lifetime. Chart 2 shows the life-cycle wage profiles for each education group using 2013 data. These wage profiles can be used to estimate expected lifetime earnings by adding up the wages a worker typically earns over his or her career (see Box). For simplicity, we assume that all workers retire at age sixty-five and that those who, as students, pursued a college degree followed the traditional full-time path—taking two years to complete an associate's degree or four years to complete a bachelor's degree—and did not earn wages while enrolled in school. Despite entering the labor force at a later age, workers with a bachelor's degree on average earn

well over \$1 million more than high school graduates during their working lives, while those with an associate's degree earn about \$325,000 more.¹¹

Economic Costs of College

As with all investments, a college education requires paying some upfront costs in order to capture the expected benefits that accrue over the lifetime of the investment. In this section, we estimate these costs for the typical college student. We measure two components of the costs associated with obtaining a college education. The first is *direct costs*, which include the out-of-pocket expenses associated with attending college that would not otherwise be incurred. Tuition is the clearest example of a direct cost. By contrast, room and board—another large expense commonly associated with attending college—needs to be paid regardless of whether someone decides to go to college, so it is not considered a direct cost of college from an economic perspective. The second type of cost is an *opportunity cost*, which represents the value of what someone must give up to attend college. For most people, the opportunity cost of a college education is equivalent to the wages that could have been earned by working instead of going to college.

Direct Costs

To measure the direct costs of college, we rely on information from the College Board and the U.S. Department of Education. These sources provide data on the average tuition and fees paid by undergraduate students at two-year institutions, which primarily produce associate's degrees, and four-year institutions, which primarily produce bachelor's degrees. While published tuition and fees represent the “sticker price” for attending college, many students, if not most, do not actually pay this price. Because of the many forms of financial aid students receive, including grants from the institutions themselves, the actual prices students pay may differ significantly from these figures. Using data on the various forms of aid students receive, we compute the average “net tuition” cost, which subtracts funds students receive that need not be paid back, including grants, tuition concessions, and tax benefits. Thus, net tuition is more representative of the out-of-pocket expenses paid by the average student.

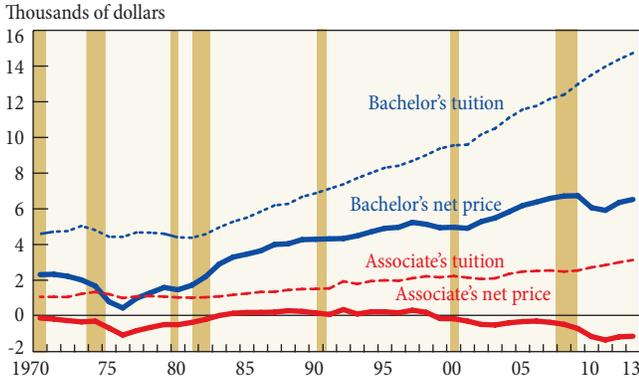
Chart 3 shows the trend in published and net tuition for the average student over time, adjusted for inflation and expressed

¹⁰ See Beaudry, Green, and Sand (2013).

¹¹ College graduates entering the labor market during recessions start their careers earning less than those who enter in better times, and this wage penalty can carry forward throughout their working lives (Kahn 2010). Because the wage profiles we estimate rely on a cross-section of workers who started their careers at different points in the business cycle, it is possible that the lifetime earnings of those graduating during the Great Recession may not be as high as our estimates suggest.

Chart 3

Annual Published and Net Tuition for Bachelor's and Associate's Degrees 1970-2013



Sources: U.S. Bureau of Labor Statistics, consumer price index; U.S. Department of Education, Digest of Education Statistics 2012; The College Board, Trends in College Pricing 2013 and Trends in Student Aid 2013.

Notes: Net tuition is published tuition minus the grants, tuition concessions, and tax benefits given to students. Dollar figures are expressed in constant 2013 dollars. The shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

in constant 2013 dollars. For bachelor's degrees, net tuition has held at around half of the sticker price. In 2013, the average sticker price was about \$14,750, while the net price was just \$6,550. Although published tuition for an associate's degree has ranged between \$1,000 and \$3,000, net tuition has hovered around zero, and in fact has been negative in recent years. This means that the actual cost of an associate's degree was more than fully subsidized by various tax benefits and other forms of aid. For example, on average, a student pursuing an associate's degree in 2013 received about \$4,300 in student aid and tax benefits, which was more than enough to cover the average published tuition of just over \$3,000.

As for how much these costs have changed over time, the sticker price of a bachelor's degree has increased sharply, more than tripling from about \$4,600 per year in the 1970s to nearly \$15,000 per year in 2013. Net tuition rose at a similar pace, from around \$2,300 per year in the 1970s to about \$6,500 per year in 2013. Similarly, the sticker price of an associate's degree nearly tripled from roughly \$1,100 per year in the 1970s to more than \$3,000 per year in 2013, while the net price fell below zero. All in all, although the sticker price of college has risen to a high level, the amount actually paid out-of-pocket remains much lower than what the sticker price suggests.

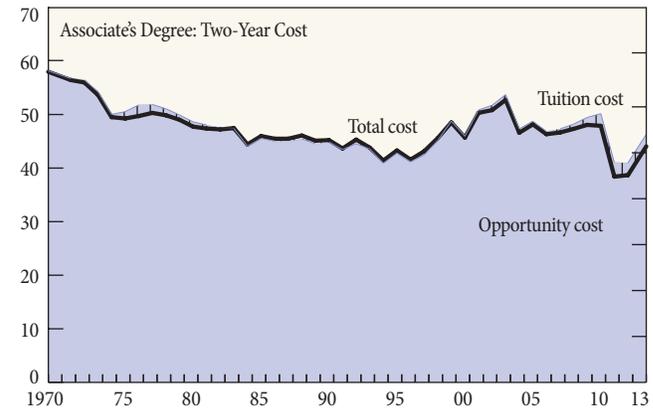
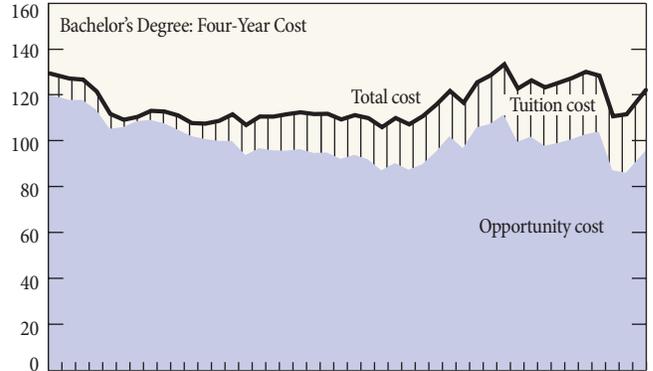
Opportunity Costs

While the high and rising costs of college tuition receive considerable attention, out-of-pocket expenses prove to be only a

Chart 4

Total Cost of a College Degree 1970-2013

Thousands of dollars



Sources: U.S. Census Bureau and U.S. Bureau of Labor Statistics, Current Population Survey, March Supplement; U.S. Bureau of Labor Statistics, consumer price index; U.S. Department of Education, Digest of Education Statistics 2012; The College Board, Trends in College Pricing 2013 and Trends in Student Aid 2013.

Note: Dollar figures are expressed in constant 2013 dollars. For associate's degree figures, net tuition costs are negative when opportunity costs exceed total costs.

small part of the total cost of college once opportunity costs are considered. As explained earlier, attending college on a full-time basis often requires delaying entry into the labor market and forgoing wages that would be available to those with a high school education. Thus, the average wages earned by a high school graduate during his or her first two or four years of employment provide a good proxy for the opportunity cost of college. Our 2013 life-cycle wage estimates indicate that someone pursuing a bachelor's degree would forgo almost \$96,000 in wages—nearly four times more than net tuition costs. Similarly, we estimate that someone pursuing an associate's degree would forgo almost \$46,000 in wages. Thus, with the subsidies available for someone pursuing an associate's degree, forgone earnings during the two years it typically requires to complete such a degree are the only true economic cost incurred.

Total Costs

We now put the pieces together, adding direct costs and opportunity costs to estimate the total costs of a bachelor's degree and an associate's degree over time (Chart 4). As an example, we first look at total costs for the year 2013—when net tuition for a bachelor's degree was at its highest point. We estimate that over the four years typically required to earn a bachelor's degree, a student would have paid about \$26,000 in tuition and fees and would have forgone nearly \$96,000 in wages. Thus, the total economic cost of a bachelor's degree was about \$122,000 (top panel). For an associate's degree, total costs amounted to roughly \$43,700 in 2013 (bottom panel). As the Chart makes clear, forgone wages have represented the vast majority of the total costs of college for more than four decades.

Looking at the change in total costs over time, we see that the cost of a bachelor's degree held fairly steady from the mid-1970s up through the mid-1990s, then rose until the early 2000s before falling again shortly after the Great Recession. For the 1970-90 period, tuition costs were rising, but the increase was offset by falling opportunity costs as the wages of high school graduates declined. During the mid-1990s, opportunity costs began to rise as the wages of high school graduates, and everyone else, climbed with the robust economic expansion of the period. During the first decade of the 2000s, while tuition costs continued to rise, opportunity costs held steady, resulting in little change in total costs. Between 2010 and 2013, total costs fell, largely reflecting the decline in wages for high school graduates. Overall, despite the steady rise in tuition, the total cost of a bachelor's degree has not changed that significantly over the past several decades, ranging between \$110,000 and \$130,000 (top panel). The total cost of an associate's degree, while much lower than the cost of a bachelor's degree, followed a similar pattern, remaining in the \$40,000 to \$60,000 range over the same period (bottom panel).

The Return to College

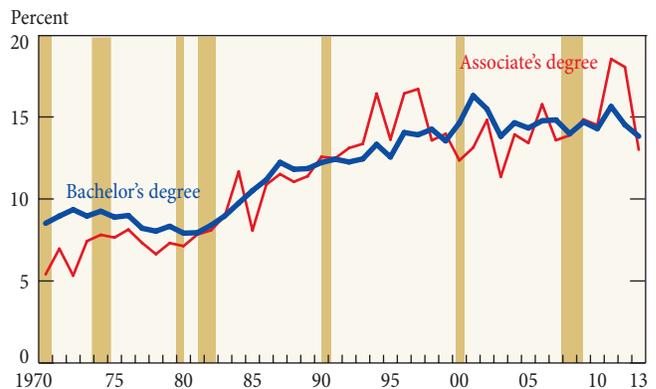
We now put together the full set of costs and benefits to calculate the return to completing a college degree. To do so, we use the internal rate of return, a formula that investors use to calculate the economic value of different kinds of investments.¹² Essentially, this calculation weighs the costs against the benefits of an investment, in this case a college degree, and accounts for the fact that both the costs and benefits accrue over time.

Our rate of return calculations assume that the costs of college are incurred fully during the years in which people are enrolled in school (two years for an associate's degree, four years for a bachelor's degree), and that students forgo

¹² Specifically, the internal rate of return is the discount rate that makes the net present value of all cash flows from a particular investment equal to zero.

Chart 5

Return to Bachelor's and Associate's Degrees 1970-2013



Sources: U.S. Census Bureau and U.S. Bureau of Labor Statistics, Current Population Survey, March Supplement; U.S. Department of Education, Digest of Education Statistics 2012; The College Board, Trends in College Pricing 2013 and Trends in Student Aid 2013.

Note: The shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

employment while they are pursuing their education.¹³ Once students graduate from college, the benefits are counted as the extra wages they would earn relative to those with only a high school diploma, received each year until retirement at age sixty-five.¹⁴ In general, it is only worth undertaking an investment if its rate of return exceeds a predetermined threshold—for example, the cost of capital or the return that could be earned on an alternative investment—but investments with higher rates of return are always more profitable than those with lower rates of return.

Before presenting the results of this analysis, we again emphasize that our rate of return estimates are meant to provide only a rough guide to the value of a college degree. Significantly, our rate of return estimates pertain to those who complete a college degree; the estimates do not account for the risks associated with not completing the degree and dropping out of college. Indeed, while college dropouts incur at least some of the costs associated with going to college, they enjoy far fewer benefits. Thus, incorporating dropout risk into our analysis would reduce the estimated return to college, particularly for those who are most likely to have difficulty completing their degree.¹⁵ Finally, it bears repeating that the results we present are based on

¹³ In exchange for paying interest, people can take out student loans to delay paying their college expenses. Thus, it is not necessary to incorporate such financing options into our rate of return analysis. In fact, because interest rates on student loans are often subsidized at below-market rates, student loans generally allow people to earn higher returns than our results would indicate.

¹⁴ To the extent that some people continue to work beyond the conventional retirement age, our analysis understates the true economic return to college.

¹⁵ See Castex (2011).

historical wages and costs, and are meant to characterize average outcomes—some individuals who obtain a college degree will have better or worse outcomes than our estimates suggest.

The Return to College over Time

The return to college increased sharply until the 2001 recession and has generally held at a high level since then (Chart 5). The return to a bachelor’s degree averaged about 9 percent during the 1970s, and then nearly doubled to about 16 percent by 2001, and has remained at around 14 to 15 percent for the past decade. The return to an associate’s degree increased from about 6 percent in the early 1970s to more than 16 percent in the second half of the 1990s, and, except for a few years, has generally ranged between 13 and 15 percent since then. These results indicate that the rate of return to an associate’s degree has been fairly close to the return for a bachelor’s degree since around 1980. However, this finding largely reflects the much lower cost of an associate’s degree. As shown in Chart 2, those with a bachelor’s degree still tend to earn significantly more over their lifetime than those with only an associate’s degree.

These rates of return indicate that, for the average student, a college degree remains a good investment. To put these findings in perspective, consider that investing in stocks has yielded an annual return of 7 percent and investing in bonds an annual return of 3 percent since 1950.¹⁶ These figures can serve as thresholds for evaluating whether college is a sound investment. A return of at least 7 percent is clearly a good investment because it exceeds the historical return on stocks; a return below 3 percent would be a poor investment since one could do better by investing in bonds. The return to each type of college degree remains well above 7 percent, despite the fact that returns have not grown in more than a decade. In fact, what might be most surprising is that the return to college climbed for as long as it did.

Does Your Major Matter?

Investing in a college degree appears, on average, to be a wise decision, but are all college degrees equally good investments? To address this question, we turn to newly available data from the 2012 American Community Survey that allows us to identify the undergraduate majors of those with a bachelor’s degree.¹⁷ These data on college majors are relatively new, and so we focus on estimating a rate of return for 2012 only. Parallel information is not available for those with an associate’s degree. We classify bachelor’s degrees into one of thirteen different majors, and utilize this information to estimate composition-adjusted life-cycle wage profiles for each major. We then combine this information

Return to Bachelor’s Degree, by Major 2012

	College Graduates Overall (Percent)	Underemployed College Graduates (Percent)
Total, all majors	15	12
Engineering	21	17
Math and computers	18	14
Health	18	13
Business	17	14
Communications	15	13
Technologies	15	12
Social sciences	15	12
Sciences	14	12
Architecture	14	8
Liberal arts	12	9
Agriculture and natural resources	11	9
Leisure and hospitality	11	9
Education	9	7

Sources: U.S. Census Bureau, American Community Survey; U.S. Department of Labor, O*NET; U.S. Department of Education, Digest of Education Statistics 2012; The College Board, Trends in College Pricing 2013 and Trends in Student Aid 2013.

with our estimates of the total cost of college to determine the rate of return for each major.¹⁸

In presenting our findings, we emphasize that not all majors are feasible for every college student. For example, recent research has shown that graduating with a math or science major is more difficult than pursuing other fields of study.¹⁹ Thus, some of the economic return associated with particular majors may reflect differences in the abilities of the students who choose these majors, and not necessarily the skills obtained through majoring in these fields.²⁰

We find that the return to college varies considerably across majors, as shown in the first column of the table above. In general, majors providing technical training—that is, training that focuses on quantitative and analytical skills—earned the highest return; engineering majors and math and computer majors are cases in point, with rates of return of 21 percent and 18 percent, respectively. Health majors also earned an above-average return; the growth of this sector in recent years has likely increased the demand for health care workers and consequently boosted their wages. Business majors also rank relatively high. At the other end of the spectrum, those majoring in the liberal arts, agriculture and natural resources, leisure

¹⁶ See Greenstone and Looney (2011). Using a similar approach, these authors estimate a 15 percent return to a bachelor’s degree and a 20 percent return to an associate’s degree in 2010.

¹⁷ See Ruggles et al. (2010).

¹⁸ In general, college students pay the same tuition regardless of their major, though some higher education institutions have recently experimented with differential pricing by instructional program. See Stange (2013).

¹⁹ See Stinebrickner and Stinebrickner (2013).

²⁰ See Arcidiacono (2004) and Zafar (2011).

and hospitality, and education all have below-average returns. For education majors, the relatively low rate of return in part reflects the lower wages of teachers, who typically work less than a full year and receive generous nonwage benefits, such as pensions. Moreover, the relatively low returns for this major may also reflect the fact that we do not capture teachers with a master's degree, a common job requirement, and instead may over-represent education majors outside of the teaching occupation. Nonetheless, regardless of major, the return to college remains a good investment, on average, because each major has a rate of return exceeding 9 percent.

What about the Chronically Underemployed?

Recent research has shown that college graduates with a bachelor's degree are increasingly finding themselves underemployed—that is, working in a job that does not typically require their degree.²¹ For these graduates, was the pursuit of a bachelor's degree a wise investment? To be sure, college graduates who find themselves underemployed upon graduation are unlikely to remain underemployed for their entire working life. Indeed, our own research suggests that the likelihood of being underemployed declines significantly with age, and that most college graduates work their way into college-level jobs by the time they reach their thirties. Nonetheless, about a third of those who obtain a college degree do spend much of their careers in jobs that typically do not require a bachelor's degree.

To analyze the benefits of a college education for this last group, we calculate the rate of return for the scenario of college graduates who remain underemployed over their entire working lives. To identify underemployed college graduates, we utilize data from the U.S. Department of Labor's Occupational Information Network (O*NET). O*NET contains information on job-related requirements for hundreds of occupations, collected from interviews of incumbent workers and with input from professional occupational analysts. We use the following question from the O*NET Education and Training Questionnaire to determine whether an occupation requires a college degree: "If someone were being hired to perform this job, indicate the level of education that would be required." We consider a college education to be a requirement for a given occupation if at least 50 percent of the respondents working in that occupation indicate that a bachelor's degree is necessary to perform the job. We then merge these data on the educational requirements for each occupation with data on the actual occupation in which a worker is employed. A college graduate is considered underemployed if he or she is working in an occupation that does not typically require a bachelor's degree.

We follow the steps described previously to estimate a rate of return, but we estimate new age-earnings profiles for the subset of college graduates who are underemployed. This

allows us to simulate lifetime earnings for the average worker who remains underemployed throughout his or her entire career. The benefit for these underemployed workers is measured as the extra wages they earn beyond the wages of a high school graduate, while costs remain the same as estimated previously. Further, we extend our analysis to estimate the return to college for underemployed workers with different majors.

Even for the chronically underemployed, it turns out that the benefits of college still tend to outweigh the costs for the average worker regardless of major (Table 1). While people in these non-college jobs receive lower returns than their counterparts working in jobs that require a bachelor's degree, they still tend to earn a relatively high positive return, with the lowest being 7 percent for education majors. These findings indicate that employers are willing to pay a premium for college graduates relative to those with just a high school diploma, even in jobs that are not typically considered college-level positions.

Conclusion

With tuition rising, wages falling, and many college graduates struggling to find good jobs, the value of a college degree may seem to be in doubt. However, these factors alone do not determine whether a college education is a good investment. Indeed, once the full set of costs and benefits is taken into account, investing in a college education still appears to be a wise economic decision for the average person.

Why is this the case? The answer lies in the declining fortunes of those without a college degree—a key consideration in assessing the economic costs and benefits of obtaining a college degree. On the benefit side, although the wages of college-educated workers have stagnated since the early 2000s—and even declined in the years since the Great Recession—the wages of high school graduates have also been falling. As a result, the college wage premium has remained near its all-time high. On the cost side, rising college tuition has largely been offset by the declining opportunity cost of attending school, which, again, is driven by the falling wages of high school graduates.

When we put all the pieces together, the good news for college graduates is that the return to college remains high on average, regardless of one's college major. However, the bad news is that college students are paying more to go to school and are earning less upon graduation. At this point, it is not clear whether these trends will continue. Indeed, an important caveat about our analysis is that it is based on the historical earnings of college and high school graduates who entered the labor market at different points in time, and we have no guarantee that these earnings patterns will hold in the future. Nonetheless, despite the recent struggles of college graduates, investing in a college degree may be more important than ever before because those who fail to do so are falling further and further behind.

²¹ See Abel, Deitz, and Su (2014).

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Are Recent College Graduates Finding Good Jobs?*Jaison R. Abel, Richard Deitz, and Yaqin Su*Federal Reserve Bank of New York *Current Issues in Economics and Finance*, vol. 20, no. 1, 2014

According to numerous accounts, the Great Recession has left many recent college graduates struggling to find jobs that utilize their education. However, a look at the data on the employment outcomes for recent graduates over the past two decades suggests that such difficulties are not a new phenomenon: individuals just beginning their careers often need time to transition into the labor market. Still, the percentage who are unemployed or “underemployed”—working in a job that typically does not require a bachelor’s degree—has risen, particularly since the 2001 recession. Moreover, the quality of the jobs held by the underemployed has declined, with today’s recent graduates increasingly accepting low-wage jobs or working part-time.

Is it Still Worth Going to College?*Mary C. Daly and Leila Bengali*Federal Reserve Bank of San Francisco *Economic Letter*, no. 2014-13, May 5, 2014

Earning a four-year college degree remains a worthwhile investment for the average student. Data from U.S. workers show that the benefits of college in terms of higher earnings far outweigh the costs of a degree, measured as tuition plus wages lost while attending school. The average college graduate paying annual tuition of about \$20,000 can recoup the costs of schooling by age forty. After that, the difference between earnings continues such that the average college graduate earns over \$800,000 more than the average high school graduate by retirement age.

The College Wage Premium*Jonathan James*Federal Reserve Bank of Cleveland *Economic Commentary*, August 8, 2012

The return on educational investments has risen substantially in the past thirty years. While the primary focus has been on the college wage premium, new evidence shows that the value of going to college is affected by a host of other important educational decisions, each of which has a potential large effect on future earnings. This Commentary examines the impact of two of these other decisions on earnings: the choice of a college major and the pursuit of an advanced degree. In some cases, differences in the college major premium are as large as the college wage premium itself.

College Degrees: Why Aren’t More People Making the Investment?*Maria E. Canon and Charles S. Gascon*Federal Reserve Bank of St. Louis, *The Regional Economist*, April 2012

Over the past thirty years, some of the benefits of furthering one’s education have become more pronounced, specifically, higher earnings and lower unemployment. Some studies have even found a positive relationship between higher education and better health. Surprisingly, over the same period, high school dropout rates have declined only modestly, and close to one-third of all high school graduates still do not enroll in any form of college. Even though a greater percentage of high school graduates enter college today than thirty years ago, this rise has not been met by a proportional increase in completion rates. In the past few years, college graduation rates actually have fallen as a consequence of increasing college dropout rates. This begs the question: If the benefits to education appear to be so high, why don’t more people seek a college degree?

Economists and policymakers have been particularly interested in trying to explain this phenomenon. Some possible factors that have been considered are: higher tuition costs, changes in assistance programs, fear of failure, earnings risk and, more recently, the recession and financial crisis. This article will pay special attention to failure and earnings risk, as these forces are particularly useful in understanding why one individual may choose college but another may not.

Measuring Student Debt and Its Performance*Donghoon Lee, Wilbert Van der Klaauw, Andrew F. Haughwout, Meta Brown, and Joelle Scally*Federal Reserve Bank of New York *Staff Reports*, no. 668, April 2014

Studies continue to indicate that higher education is frequently a worthwhile investment for individuals and that it raises the productivity of the workforce as a whole. While the rising cost of post-secondary education has not eliminated this “college premium,” it has raised new questions about how growing numbers of students can make these investments. One solution to this problem is student loans, which have come to play an increasingly important role in financing higher education. Yet, despite its importance, educational debt is not well understood. Among the reasons is that there exist few central repositories of information on the characteristics and performance of all student loans, which currently include loans made by both government and private lenders. In this paper, we bring a new data set to bear on this important issue and present a brief

analysis of the historical and current levels of student debt and how those loans are performing. We also briefly discuss the implications of student loans for borrowers and the economy.

The Economics of Student Loan Borrowing and Repayment

Wenli Li

Federal Reserve Bank of Philadelphia *Business Review*, Third Quarter, 2013

Reports in the popular press and policymakers' concerns about student loans have greatly intensified in recent years because of rising student loan balances and defaults. Even greater cause for concern arose as student loans outstanding passed credit card debt to become the single largest nonmortgage household debt in 2012. Worries about the risk of massive default have even prompted a comparison with the subprime mortgage crisis.

Insuring Student Loans against the Financial Risk of Failing to Complete College

Satyajit Chatterjee and Felicia Ionescu

Federal Reserve Bank of Philadelphia Working Papers, no. 12-15, 2012

Participants in student loan programs must repay loans in full regardless of whether they complete college. But many students who take out a loan do not earn a degree (the dropout rate among college students is between 33 to 50 percent). The authors examine whether insurance, in the form of loan forgiveness in the event of failure to complete college, can be offered, taking into account moral hazard and adverse

selection. To do so, they develop a model that accounts for college enrollment and graduation rates among recent U.S. high school graduates. In their model, students may fail to earn a degree because they either fail college or choose to leave voluntarily. The authors find that if loan forgiveness is offered only when a student fails college, average welfare increases by 2.40 percent (in consumption equivalent units) without much effect on either enrollment or graduation rates. If loan forgiveness is offered against both failure and voluntary departure, welfare increases by 2.15 percent and both enrollment and graduation are higher.

Determinants of College Major Choice: Identification Using an Information Experiment

Matthew Wiswall and Basit Zafar

Federal Reserve Bank of New York *Staff Reports*, no. 500, June 2011, revised January 2013

This paper studies the determinants of college major choice using an experimentally generated panel of beliefs, obtained by providing students with information on the true population distribution of various major-specific characteristics. Students logically revise their beliefs in response to the information, and their subjective beliefs about future major choice are associated with beliefs about their own earnings and ability. We estimate a rich model of college major choice using the belief data. While earnings are a significant determinant of major choice, tastes, which are heterogeneous, are the dominant factor in the choice of major. We also investigate gender differences in major choice.



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