HAS THE RETURN TO INVESTING IN A COLLEGE EDUCATION DECLINED?

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Kent Hill, Ph.D.
Research Professor, Department of Economics; and Principal Research Economist,
L. William Seidman Research Institute

P3 | PRODUCTIVITY AND PROSPERITY PROJECT

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

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A Report from the Productivity and Prosperity Project (P3), Supported by the Office of the University Economist

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Research Professor, Department of Economics;
and Principal Research Economist, L. William Seidman Research Institute

Center for Competitiveness and Prosperity Research
L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University
Box 874011
Tempe, Arizona 85287-4011

(480) 965-5362
FAX: (480) 965-5458
EMAIL: Kent.Hill@asu.edu
wpcarey.asu.edu/research/competitiveness-prosperity-research
economist.asu.edu

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

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SUMMARY

A number of articles have appeared recently questioning the proposition that higher education, e.g., a four-year college education, provides a very high financial return. Several sound and important points are made which need to be recognized if students are to make good choices about investing in higher education. The purpose of this report is to evaluate the particular claim that the return to a college education has declined broadly for the average student who successfully completes a four-year program.

Using data on tuition and earnings for the period from 2000 through 2002, the annualized real internal rate of return on a four-year college investment is estimated to be 14.2 percent. College tuition rates have outpaced inflation over the past 10 years. The earnings premium received by college graduates over what is earned by those who have only completed high school also has declined, although it remains near levels that have been unmatched over the past 100 years. The combination of rising tuition and a declining college earnings premium serves to reduce the real internal rate of return calculated for the period from 2010 through 2012 to 13.0 percent. So there is indeed evidence of a fall in the average return on a college investment over the past decade. But the estimated return is still very high and remains well above the long-run returns provided by financial assets, including the stock market.

RECENT CRITICISM

A principal point made by several authors is that the return realized by a college student varies greatly depending on the type of institution attended and the major or field of study chosen (Schneider 2010, Owen and Sawhill 2013, and Selingo 2013). The recent attention given to the variability of financial returns across individuals has been driven by the emergence of new data sources which make it possible to measure these differences with greater detail and specificity.[1]

That some college graduates enjoy much more financial success than others is no real surprise. Graduates of top Ivy-League schools expect that they will earn more upon graduation than will graduates of colleges with less-highly ranked faculty and less selective admissions policies. Students have long been aware that they will have a difficult time finding high-paying jobs if they major in psychology, history, or the arts. For decades, students have been responding to job market realities by increasingly choosing to major in accounting, finance, or computer science. Nevertheless, it may be that the variability in the financial rewards from a college education has widened recently with respect to institutions and fields of study. Any improvements in information that enable students to make better choices about their higher education should certainly be welcomed.

In questioning the policy of broadly encouraging students to attend college, several authors emphasize that there is a significant chance that a student will not be able to complete a four-year program (Vedder 2011, Canon and Gascon 2012, and Owen and Sawhill 2013). Recent data indicate that, on average, fewer than 60 percent of those who enter a four-year school finish within six years. At four-year public universities, the failure rate may be as high as 50 percent. Failure rates appear to have increased with the growth in college enrollments. Those who drop out of college incur substantial costs, economic and psychological. Both the prospective student and the institution need to be realistic about the college readiness of an applicant and the likelihood that he or she will be able to complete a program of study.

Some who take a contrarian view to the value of attending college caution that the return is highly variable across individuals and that failure rates are high but concede that on average, for those who complete a four-year degree, the financial benefits greatly exceed the costs (Owen and Sawhill 2013). There are others, however, who have suggested that the return to a college education is in general decline, even for the average graduate (The Economist 2012 and Folbre 2013). Every article written about the financial worth of a college degree points out that tuition rates have been rising rapidly, much faster than the average rate of inflation. High tuition costs, in themselves, could undermine the return on a college education. On the benefits side, it is noted that unemployment rates among college graduates have risen sharply in the Great Recession and that an increasing number of graduates are underemployed and/or are disappointed with their earnings experiences. Folbre speculates that we may be witnessing a fundamental change in the demand for college-educated labor, where only the demand for graduates with highly specific technical skills has remained strong while the demand for versatile liberal arts graduates has fallen. The Economist warns of a decline in the quality of graduates. Students are spending less time studying, an increasing number of college courses require very little reading, and literacy of college graduates is declining. With a fall in the average quality of college graduates, it would be surprising if at some point market wages did not weaken correspondingly.

This report will evaluate the claim that the return to investing in college has declined for the average student who successfully completes a four-year program. The analysis focuses on a 10-year period, from 2000 through 2002 to 2010 through 2012. The calculations are based on average net tuition rates across U.S. four-year colleges and universities and mean earnings by level of education as estimated by the Census Bureau from its Current Population Survey. Three-year periods are used to reduce sampling error from this survey.

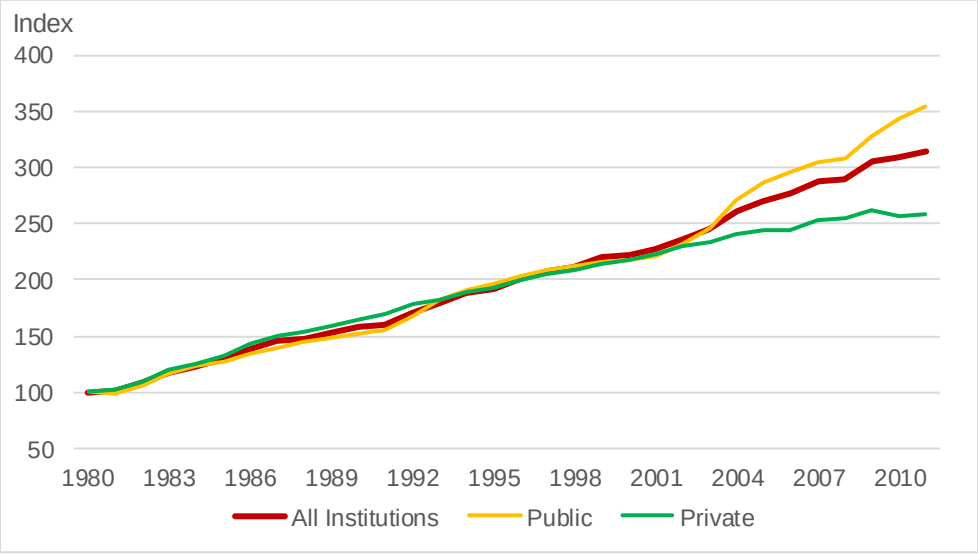
TUITION TRENDS

Average tuition and fees for full-time students at U.S. four-year universities have increased by 76 percent over the most recent 10-year period for which data are available, from $7,372 in 2001 to $12,967 in 2011. Of course, there has been some general inflation over this period. Chart 1 shows what has happened since 1980 to inflation-adjusted tuition rates. Tuition rates were adjusted for inflation using the U.S. Consumer Price Index (CPI-U) and then expressed as an index with 1980 equal to 100. Three series are shown: tuition at public four-year institutions, tuition at private four-year institutions, and an overall average weighted by enrollments.

What is striking about the figures shown in Chart 1 is not that tuition has outpaced inflation over the past 10 years. Inflation-adjusted tuition rates have been rising since 1980. In fact, real average tuition rates have increased more slowly in recent years, at an annual rate of 3.3 percent from 2001 through 2011 as compared with an annual rate of 4.0 percent from 1980 through 2001. What is really notable about the last 10 years is the divergence in public and private tuition trends. From 2001 through 2011, inflation-adjusted tuition at public institutions increased at an average annual rate of 4.8 percent, while real tuition at private schools rose only 1.5 percent per year. The more rapid rise in tuition rates at public universities has been driven in part by a decline in real government appropriations per student in states throughout the nation.

Chart 1 does confirm the frequent claim that college tuition rates have increased significantly for the average student. To be fair, it should also be recognized that financial aid received by students has also grown rapidly. Pell grant awards per undergraduate student, for example, have increased from $580 in 2001 to $1,975 in 2011. Tuition net of these scholarships has risen 62 percent over the 10-year period. This is still much more rapid than the general rate of inflation. When examining whether the return on a college education has declined, it is necessary to incorporate the effects of rising tuition.

CHART 1
TUITION AND FEES AT FOUR-YEAR INSTITUTIONS BY TYPE OF INSTITUTION
Expressed in 2011 Dollars, Indexed to 1980



Source: National Center for Education Statistics.

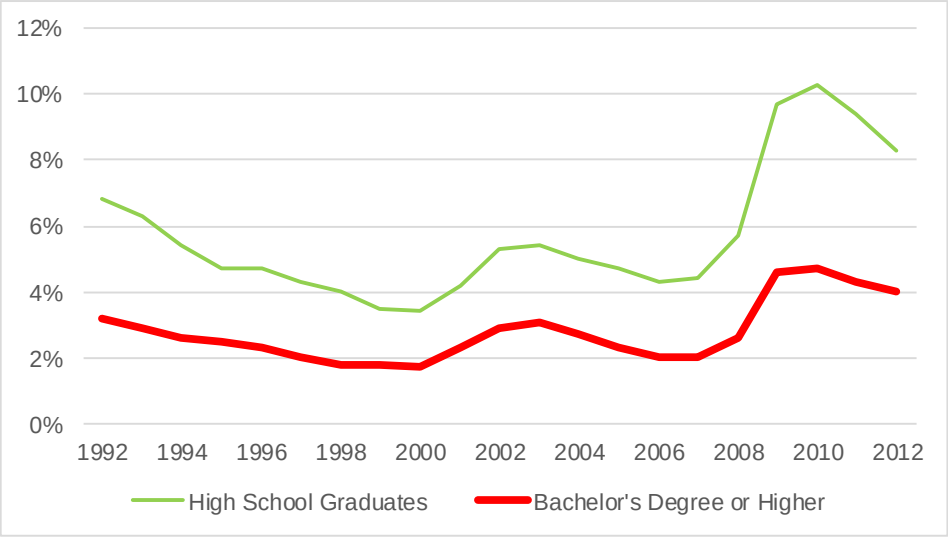
EARNINGS TRENDS

Have labor market outcomes deteriorated for college graduates? Start with unemployment rates (see Chart 2). Unemployment rates for those with at least a bachelor's degree have risen in recent years, from 2.0 percent in 2007 to 4.0 percent in 2012. Of course, this may be a cyclical and temporary phenomenon associated with the Great Recession. A more important point to be made, however, is that it is not the unemployment rate of college graduates per se that matters, but their unemployment rate relative to the unemployment rate of those with only a high school degree. The return on a college investment depends on the labor market success of college graduates compared to the experiences of those trying to find work with only a high school degree. As Chart 2 makes clear, unemployment rates for those with at least a bachelor's degree are still well below the unemployment rates of high school graduates. The gap, in fact, widened during the Great Recession in favor of college graduates. In any case, there is certainly no evidence of a long-term decline in the unemployment gap.

Some who argue that the financial worth of a college degree has declined point out that the earnings of graduates have failed to keep pace with inflation (The Economist 2012). Indeed, real mean earnings of men with only a four-year college degree have fallen 11 percent over the past 12 years, from $91,710 in 2000 (when expressed in 2012 dollars) to $81,380 in 2012. But again, it is the differential in the earnings of college graduates relative to the earnings of high school graduates that matters, not the level of college earnings.

Chart 3 provides information on trends since 1980 in the college earnings premium for men who work full time. The data are from the Census Bureau's Current Population Survey. The earnings premium is defined as the percentage excess of mean earnings of those with a bachelor's degree over the mean earnings of those with only a high school degree. Any turning point in the college earnings premium is likely to become evident first among workers in young age groups. So, the

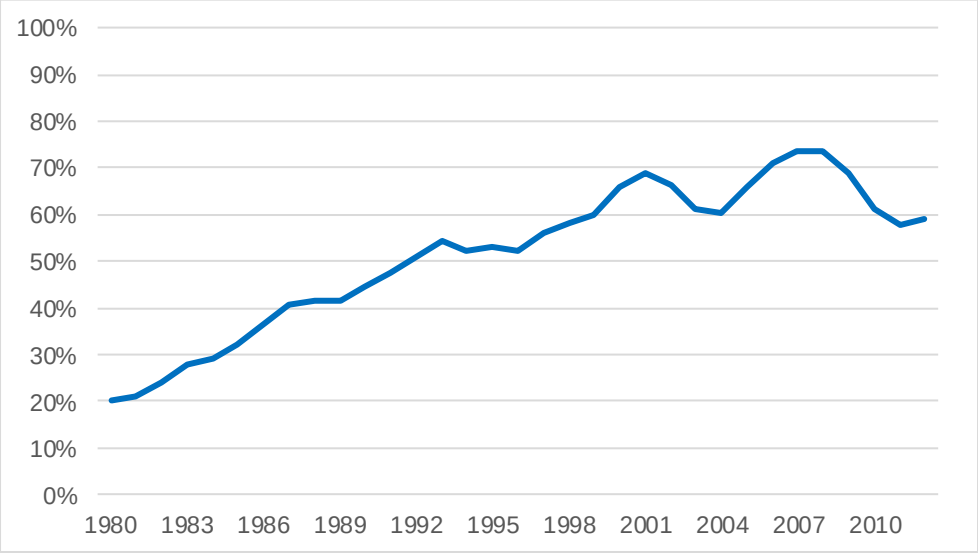
CHART 2
UNEMPLOYMENT RATES BY LEVEL OF EDUCATION
For All People 25 Years and Older



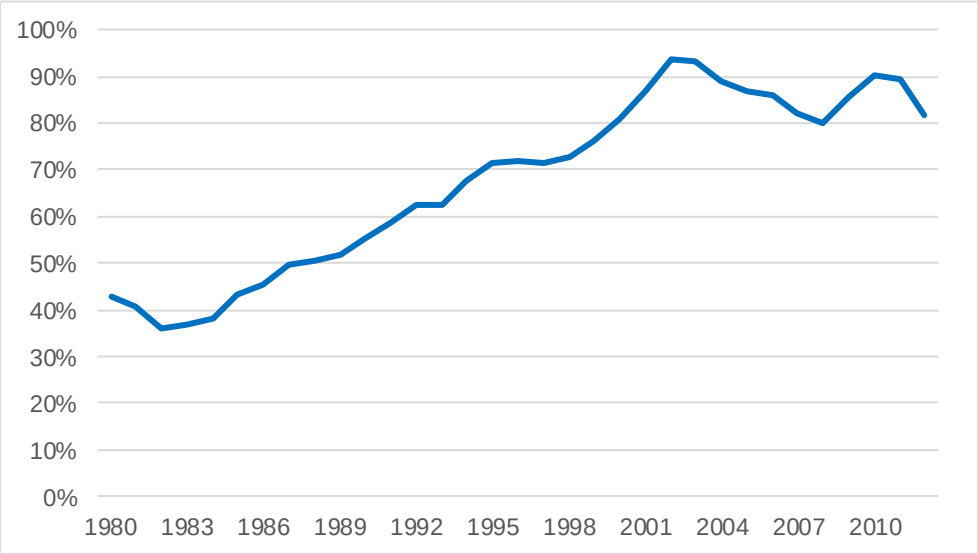
Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

CHART 3
COLLEGE EARNINGS PREMIUM
FOR FULL-TIME, YEAR-ROUND MALE WORKERS
Expressed as a Three-Year Moving Average

AGES 25 TO 34



AGES 35 TO 44



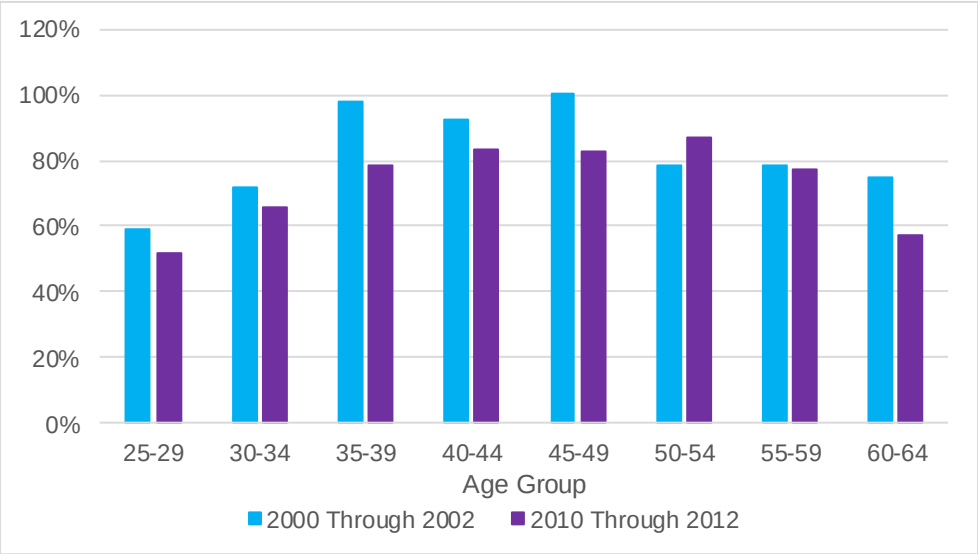
Source: U.S. Department of Commerce, Census Bureau, Current Population Survey

graphs focus on the earnings premium for men between 25 and 34 years old and between 35 and 44 years old. Because of high year-to-year sampling variability, the data are smoothed using a three-year moving average.

Both of the graphs in Chart 3 clearly reveal that a shift has occurred in long-run trends in the college earnings premium beginning sometime around the year 2000. The steady upward march in the earnings premium that was present throughout the 1980s and 1990s ended about a decade ago. Because of recent volatility in the premium, volatility that may be associated with the last two recessions, any new trend is difficult to identify. But the earnings premium of college graduates in today's labor market is certainly no more favorable, and may be somewhat less so, than the premium enjoyed by graduates a decade ago. Having said this, it is important to keep in mind that the current college earnings premium is still near the historical highs of the past 100 years (Goldin and Katz 2008).

Specific calculations made to measure the extent of any decline in the return to a college education use averages of data over two time periods: 2000 through 2002 and 2010 through 2012. Chart 4 shows for each five-year age group what happened to the male college earnings premium between these two periods. The chart indicates that there has indeed been a general decline in the earnings premium. The premium has fallen for every age group except for workers aged 50 to 54. Calculations of internal rates of return presented in the next section will reveal the extent to which these changes in the earnings premium, along with increases in tuition, have affected the return on a college investment.

CHART 4
COMPARING THE COLLEGE EARNINGS PREMIUM FOR MALE WORKERS: 2000 THROUGH 2002 VERSUS 2010 THROUGH 2012



Source: U.S. Department of Commerce, Census Bureau, Current Population Survey

CHANGES IN THE RETURN ON A COLLEGE EDUCATION

Table 1 provides a basic cost-benefit analysis of the decision to invest in a four-year college education. The top of Table 1 is based on data from the period 2000 through 2002; in the bottom portion, the analysis is repeated using data from the period 2010 through 2012. The decision represented is whether an 18-year-old should spend four years getting a bachelor's degree or stop with a completed high school diploma and enter the job market right away. Because men typically have fewer career interruptions than women, the methodology is simpler and the results easier to interpret if the analysis is done for men.

The costs of going to college consist of tuition and fees net of scholarships and the earnings foregone while the individual is in college. If the individual decides to attend college, it is assumed that he will devote all of his time to school work (no part-time employment) and finish in four years. The benefits of going to college consist of the incremental increase in earnings made possible by a college education. The college earnings premium is taken directly from data collected in the Current Population Survey for the period of study, e.g., mean earnings of full-time, year-round male workers from 2000 through 2002 or 2010 through 2012 cross-tabulated by age and level of education. The individual is assumed to work continuously through age 65. For each period of study, the calculations utilize data which are in that period's dollars. So the calculated return is a real return.

The top portion of Table 1 shows the value of a four-year college education as estimated from data for the period from 2000 through 2002. Average net tuition and fees at that time were $6,792, or approximately $27,200 over four years. The other component of the cost of going to college, the earnings foregone while the individual is in college and out of the labor force, is $87,800. This opportunity cost is three times as large as the out-of-pocket tuition expenses. The lifetime earnings benefit of going to college is $1,350,100, which is 11½ times as large as the total cost. Of course, these simple sums greatly exaggerate the value of a college education because they fail to account for the time value of money. The earnings benefits of a college education are much more distant than the costs. Using a 4 percent real interest rate to discount figures to the period when the individual is 18 years old, the present value of the lifetime earnings premium proves to be $502,600. The present value of benefits net of costs is $394,300.

The value of a college education should be expressed net of costs and in present value terms. So, it is accurate to say that the expected value of a college education at this time was around $395,000. It would be wrong and seriously misleading to use the undiscounted lifetime earnings total to say that a college education was worth an extra $1.35 million. This is the primary point made by Mark Schneider in his 2009 article "How Much is that Bachelor's Degree Really Worth? The Million Dollar Misunderstanding."

Another way of expressing the investment value of a college education is to calculate its "internal rate of return." This is the annualized discount rate that would equalize the present value of benefits with the present value of costs. The concept of internal rate of return allows the value of investments with different lifetimes or terms to maturity to be directly compared. Using data for the period from 2000 through 2002, the (real) internal rate of return on a four-year college investment is found to be 14.2 percent. In making these calculations, it was assumed that the individual completed his program of study in four years, and no adjustment was made for

TABLE 1
VALUE OF A BACHELOR'S DEGREE IN THE UNITED STATES
Based on Mean Earnings of Full-Time, Year-Round Male Workers

2000 THROUGH 2002

Costs (Ages 18 to 21)	
Net Tuition and Fees	$27,200
Foregone Earnings	87,800
Total Costs	115,000
Total Costs Discounted at 4 Percent Real Interest	108,300
Benefits (Ages 22 to 65)	
Earnings for High School Graduates	1,687,600
Earnings for Holders of a Bachelor's Degree	3,037,700
Differential in Earnings	1,350,100
Earnings Differential Discounted at 4 Percent Real Interest	502,600
Net Present Value of a Bachelor's Degree	394,300
Internal Rate of Return	14.2%

2010 THROUGH 2012

Costs (Ages 18 to 21)	
Net Tuition and Fees	$44,000
Foregone Earnings	96,200
Total Costs	140,200
Total Costs Discounted at 4 Percent Real Interest	132,000
Benefits (Ages 22 to 65)	
Earnings for High School Graduates	2,019,200
Earnings for Holders of a Bachelor's Degree	3,463,600
Differential in Earnings	1,444,400
Earnings Differential Discounted at 4 Percent Real Interest	537,200
Net Present Value of a Bachelor's Degree	405,200
Internal Rate of Return	13.0%

Source: Calculated from data of the U.S. Department of Commerce, Census Bureau.

possible ability bias in the earnings premium observed in data on earnings cross-tabulated by education. Adjustments for these factors shave a couple of percentage points off of the estimated internal rate of return.[2]

The bottom portion of Table 1 repeats the analysis using data on tuition and earnings for the period from 2010 through 2012. When discounted using a 4 percent interest rate, the present value of the college earnings differential continues to exceed the present value of the costs of attending college, and by a wide margin. In 2010-12 dollars, the net present value of a bachelor's degree is $405,000. The ratio of the present value of the earnings differential to the present value of costs is 4.07. This is down from the ratio of 4.64 estimated for the 2000-through-2002 period. As would be expected given a fall in this ratio, the internal rate of return decreases from a value of 14.2 percent in the 2000-through-2002 period to 13.0 percent in the 2010-through-2012 period. These results confirm the suspicion that a combination of rising tuition and a declining college earnings premium have lowered the financial return on a college education. However, after working carefully through the numbers, the impacts are seen to be fairly modest —

lowering the return by a little more than 1 percentage point. A real annualized return of 13.0 percent is extremely high. For perspective, the average real return realized on U.S. equities over the past 100 years is on the order of 7 percent.

Tuition rates at public four-year degree-granting institutions doubled from 2001 to 2011. So it may seem surprising that the real return on a college education would have dropped by only 1 percentage point. The thing to remember, however, is that tuition rates at public universities are only one factor in determining the cost of attending college, and not even the most important one. Many students attend private schools, and tuition rates at private colleges and universities have risen more slowly, by about 47 percent over the past 10 years. Growth in financial aid has caused net tuition rates to rise even more slowly. Most importantly, however, tuition represents only one-quarter to one-third of the total cost of going to college. The larger component is the earnings foregone while the student is in school. Foregone earnings rose only 10 percent from 2000 through 2002 to 2010 through 2012, a consequence of a weak job market for very young workers with only a high school education. Combining tuition and opportunity cost, the total cost of attending college (either undiscounted or discounted) increased only 22 percent over the period. The present value of the earnings differential increased from $502,600 to $537,200, or 7 percent. Comparing the percentage changes in costs and benefits, it is easy to see that the ratio of the present value of benefits to costs would have declined, but would still be very high.

ENDNOTES

[1] There are two new sources of information on the earnings of college graduates. PayScale.com collects information from online surveys filled out by college graduates who may be interested in finding a new job and want to learn about the salaries others are receiving. Payscale has collected and now reports data for almost every institution in the country. Because the information is supplied by individuals who sign on to PayScale, there may be significant self-selection bias in the survey results. For example, it is likely that a relatively high percentage of those who sign up have been disappointed so far in their job market experiences.

Another new avenue for assembling earnings information on college graduates has been followed by several state governments including Arkansas, Colorado, Tennessee, Texas and Virginia. These states have taken the social security numbers of the graduates of their two- and four-year colleges and matched them to the earnings records in their state unemployment-insurance programs. For graduates who are working in state, it is possible to obtain a census of very reliable data on earnings by quarter. The data reported by these states reflect only the first-year earnings experiences of graduates. But the data are available for almost every major and certificate program in the state.

[2] The term "ability bias" refers to the possibility that the earnings premium observed for college graduates is partly a reflection of the fact that people who are successful in school are often those with high innate abilities and that these abilities also help them to be successful in the job market. In a lengthy survey titled "The Causal Effect of Education of Earnings," noted labor economist David Card concludes that the true average return on education is below, but not much below, the estimate suggested by simple education-earnings correlations. Evidence from studies of identical twins suggests an upward bias on the order of 10 percent in simple OLS (ordinary least squares) estimates.

As a sensitivity exercise, the calculations in Table 1 were reworked after reducing the college earnings premium in each period by 10 percent and assuming that the student takes five years to complete a bachelor's program while working 10 hours a week. With these modifications, the estimated internal rate of return drops from 14.2 percent to 12.4 percent, for the period from 2000 through 2002.

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THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH
L. WILLIAM SEIDMAN RESEARCH INSTITUTE
W. P. CAREY SCHOOL OF BUSINESS
AT ARIZONA STATE UNIVERITY

P. O. Box 874011 – Tempe, AZ 85287-4011
Phone (480) 965-5362 – FAX (480) 965-5458
wpcarey.asu.edu/research/competitiveness-prosperity-research