



When the cost of college stops going up

Findings:

- **A four-year college degree will no longer be worth its cost in the year 2086 at a price of \$181,000 per year**
- **Today, a college degree remains one of the best investments there is**
- **Innovations in the educational sector are likely to continue and to further disrupt the status quo**

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Will there ever be a time when a college education just isn't worth the cost? Rising tuition and increasing student debt, matched with comparatively stagnant income growth, has caused people to question the possibility.

Put differently, the basic question posed above is: at what point does the increasing cost of tuition outweigh the benefit of a degree in terms of higher earnings? For simplicity, say you would earn \$40,000 per year for the next 30 years without a college degree, or \$60,000 per year for the next 30 years with a college degree. Setting aside the fact that a dollar today is worth more than a dollar tomorrow (the time value of money), the total sum of earnings without a degree would be \$1.2 million. The total sum of earnings with a degree would be higher, totaling \$1.8 million. Thus the premium for a college degree in this example would be the difference between the two, or \$600,000. So in our example case, if you could obtain a college degree for \$400,000, you would still be better off by \$200,000 over your lifetime.

A sticker price of \$400,000 for college is far above anything people pay today, but this simple example illustrates the strong economic benefits of obtaining a degree and why sustained demand has been able to drive up tuition. There are a host of considerations to think about when exploring this problem, including students' ability to borrow against future wages, the signal a degree gives to employers about applicants, the intrinsic value of an education in terms of increased productivity, and the attractiveness of plausible alternatives.

We found that a four-year college degree will no longer be worth its cost in the year 2086, when tuition would total approximately \$725,000 in today's dollars, or the bargain price of \$181,000 per year. This is based on the current lifetime earnings premium as estimated by the Census and adjusted for the net present value. It also assumes the status quo is maintained in higher education, which seems unlikely given the lengthy time horizon between now and 2086 and the wide array of alternatives to a traditional college degree already available in the education sector.

Methodology

We approached solving this question in three steps. First, we evaluated the present economic benefit

(the premium) of a college education. Second, by using historical tuition data, we were able to calculate an approximate average growth rate for college costs. Third, by looking for the point in the future where

benefits exceed costs, we were able to answer the question: will there be a time when a college education is not worth the cost?

We calculated the benefit of a four-year degree by comparing the net present value (NPV) of work-life earnings data of college graduates with the NPV of work-life earnings of high school graduates, using Census data. To calculate the NPV of work-life earnings, the annual expected earnings were discounted at a rate equal to the current 10-year Treasury yield, 2.94%. This rate was chosen as it is the basis for determining the Stafford student loan rate and it also represents a risk free rate commonly used in discounting.

To examine the cost side, we projected future increases in tuition costs based on historic growth rates. Using National Center For Education Statistics (NCES) data collected over the past 40 years measuring average tuition, fees, room, and board in 2011 dollars, we calculated the compound annual

growth rate (CAGR) over the past 10 years. This growth rate was then applied to current costs to project tuition cost increases into the future.

The considerable time between now and when a college degree is no longer profitable speaks to how valuable higher education is in today's economy.

After establishing the benefit and the cost, we then mapped the intersection of marginal cost and marginal benefit to determine when a four-year degree no longer makes sense as an investment.

Findings

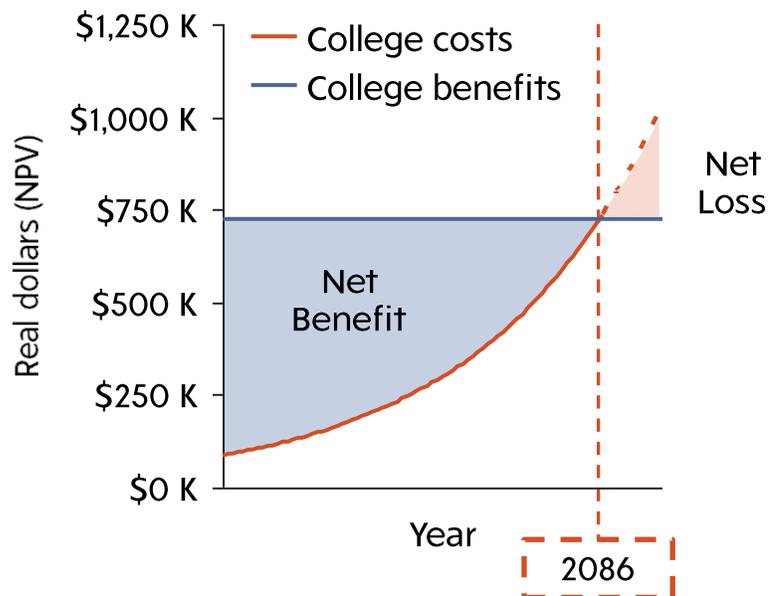
Using this approach, we found that the present benefit of a college degree over a high school diploma was equal to approximately \$725,000 in 2011. This marginal benefit was calculated by comparing the NPV of lifetime earnings of high school graduates and

college graduates. We applied this same method and found that the premium of earning a bachelor's degree over an associate's degree amounted to approximately \$340,000 in 2011. We assume that these premiums do not shift over time, though this may change in the future.

Using historical NCES college tuition data, the 10-year CAGR for tuition cost increases was found to be equal to 2.85%. This CAGR was applied to the 2010-2011 average annual tuition cost of approximately \$23,000, and projected annually until 2100. We were able to determine the cost-benefit intersection point by modeling these projections against the previously calculated earnings benefit of attending a college over only receiving a high school diploma (approximately \$725,000).

This intersection would occur in 2086 (see Figure 1), when attending college would no

Fig. 1: Growth In Real College Costs



longer be a worthwhile investment. The same model projected it would be more attractive to get an associate's degree, rather than a bachelor's degree, in 2065. The considerable time between now and when a college degree is no longer profitable speaks to how valuable higher education is in today's economy. College remains one of the best investments there is.

The Sheepskin Effect

Education itself cannot entirely account for the higher earnings potential of college graduates. Beyond the skills a student learns while attending college, other factors help reinforce the higher earnings potential a college graduate receives. The Sheepskin Effect, also known as the signaling effect, accounts for the marginal benefit received by a college graduate over an equally capable candidate who does not hold a degree.

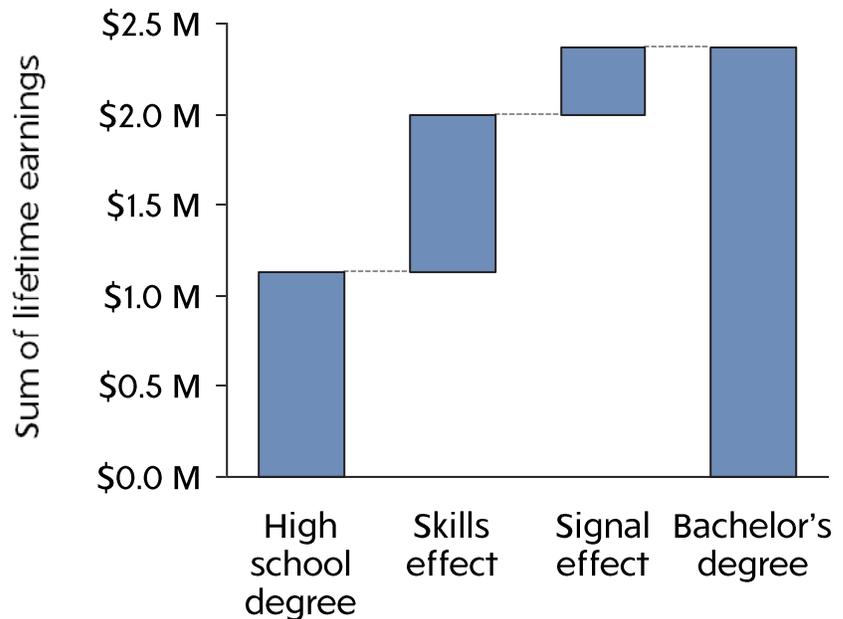
Without the help of signals, employers would have a difficult time recruiting and hiring the candidates they

are seeking. Qualities employers look for include intelligence, productivity, and motivation. For college graduates, a degree can serve as a signal to employers that they possess these desired qualifications.

Although the impact of the Sheepskin Effect can account for a significant portion of a college graduate's marginal benefit, it is difficult to calculate the exact degree to which signaling affects a graduate's

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Fig. 2: Magnitude Of The Sheepskin Effect



lifetime earnings. A variety of studies measure the effect of signaling on educational returns, using similar approaches; however, results vary significantly. Of the studies examined, including studies by David

Jaeger and Marianne Page, Jim Kjelland, and James Albrecht, findings estimated that signaling accounted for between 10 and 50 percent of the benefit

gained through higher education. By applying the median of these estimates to our projections, one could assume that approximately 30 percent of the lifetime earnings of a college graduate can be attributed to signaling (see Figure 2).

Implications

If you're looking for tuition costs to moderate in the near future, don't hold your breath. There is still plenty of room for

costs to rise, and considerable value to getting a degree. Of course, assuming that students should willingly pay tuition costs of \$725,000 is an unrealistic conclusion. But the dynamics outlined in this paper do help explain why there is such high demand from students, and a surge of lower cost alternatives and innovations to a 4-year degree; such as online education, for-profit education, skills testing, school ratings systems, start-ups, and others.

It is the economic returns to college that is driving tuition higher, and this will continue. Those who are hoping for moderation in cost would do well to encourage further addition of alternatives to the "traditional" 4-year degree. In the end, it is innovation in educational delivery that has the highest potential to impact cost. []