

Is UNC Tuition Too High?

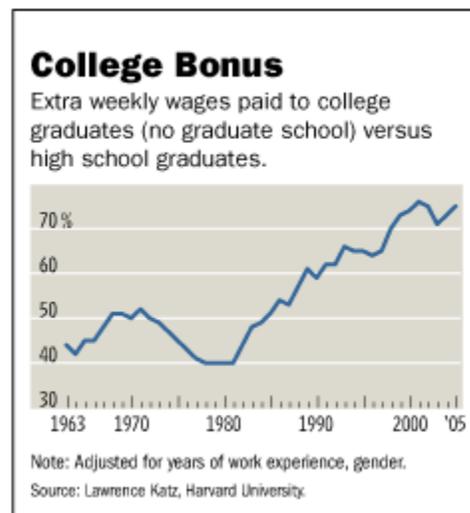
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A recent letter in the Charlotte Observer (“*Tuition hikes aren’t reality base; UNC system is bloated,*” July 19, 2010, p. 10a) by a 1978 NCSU graduate suggests UNC system tuition has increased too much relative to salaries of college graduates in the past thirty years. However, this ignores one critical fact: the gap between college and high school earnings has almost doubled in this period. Using the numbers provide by the UNC critic, along with data on the college earnings premium, the discounted value of the (inflation adjusted) dollar return to an engineering student (the example used by the UNC critic) is 2.5 to 3 times as large as it was in 1978.

The numbers used in the letter to the Observer are these: 1978: NCSU tuition was \$232 per semester, and the starting engineering salary was about \$16,000. For 2010: tuition is \$3400 per semester, and the starting engineering salary is about \$60,000. The college premium (see the figure below) was about 40% in 1978, and is about 75% today.



The gap is even larger between those with engineering degrees and high school graduates, but accounting for that would only strengthen my argument. Thus divide \$16,000 by 1.4 to get high school earnings in 1978 of \approx \$11,400, and divide \$60,000 by 1.75 to get high school earnings in 2010 of \approx \$34,300.

The cost of a year of college involves direct costs (tuition, books, etc.) and net foregone earnings: the difference between what would be earned if not in college and what is earned in college. I simply assume no work while in college, which assumption will not change the fundamental conclusion. Thus, for a year of schooling commenced in 1978, we have tuition (\$464 per year) and foregone earnings (\$11,400 per year) for \approx \$11,900 per year. The present value of a dollar per year for 4 years (each amount treated as spent or received at the end of the year to avoid using integral calculus) is $\frac{1 - \frac{1}{(1+r)^4}}{r}$, where r is the interest rate. Using $r = .04$,

$\frac{1 - \frac{1}{(1+r)^4}}{r} = 3.63$. The present value (PV) of the schooling cost in 1978 is $3.63[\$11,900]$:

$$\mathbf{PV_{\text{cost, 1978}} \approx \$43,200.}$$

For, 2010, we have annual schooling cost of \$6,800 (tuition) plus \$34,300, so we have $3.63[\$41,100]$:

$$\mathbf{PV_{\text{cost, 2010}} \approx \$149,200.}$$

Indeed, the PV of the cost of schooling has more than tripled. However, consider the benefit. The PV of \$1 per year for N years is $\frac{1 - \frac{1}{(1+r)^N}}{r}$. Suppose the individual works for 40 years. Since work begins after 4 years of school (the first payment assumed received after 5 years), we must multiply $\frac{1 - \frac{1}{(1+r)^N}}{r}$ by $\frac{1}{(1+r)^4}$ to get the PV at the start of schooling. With $r = .04$ and $N = 40$, we have:

$$\frac{1}{(1.04)^4} \frac{1 - \frac{1}{(1.04)^{40}}}{r} \approx 16.9.$$

In 1978, an engineering graduate earned \$16,000 compared to \$11,400 for the average high school graduate.¹ The PV of the return to the engineering degree in 1978 is then $16.9[\$4,600] \approx \$77,700$. Subtracting the PV of the cost from the benefit for 1978 yields \$34,500. Before comparing this to the net return for 2010, we must adjust the 1978 figure to account for inflation. The most accurate measure of inflation, the GDP Deflator, suggests prices are about 2.58 times what they were in 1978. The Consumer Price Index (CPI) suggests prices are 3.37 times as high today as in 1978. Multiply either measure of inflation times \$34,500 to get the PV of the net return in 1978 in today's dollars:

PV net return_{|1978|2010 \$s|GDP} ≈ \$89,000

PV net return_{|1978|2010 \$s|CPI} ≈ \$116,300.

To find the PV of the benefit from an engineering degree in 2010, multiply 16.9 times the college/high school earnings gap of $\$60,000 - \$34,300 = \$25,700$, and get $\approx \$434,300$.

Subtracting the PV of the cost, we have:

PV net return_{|2010|} ≈ \$285,100.

¹ Recall we use a 40% college premium for 1978 and a 75% premium for 2010 over high school earnings, and an engineering graduate at either date would earn an even larger premium.

Thus, using the GDP Deflator, the current net dollar return to the NCSU engineering degree is more than triple what it was in 1978. Using the CPI, the current dollar return is 2.5 times what it was in 1978. Thus, an engineering degree today is much more valuable than in 1978 despite the relatively large tuition increase in the past thirty years.