

I looked at how being a college graduate enhances one's earnings over being a high school graduate in order to assess the possible impact of the proposed tuition raise on students over their lifetimes. While there are some conceptual ambiguities with the simple approach I use, I think it does present reasonable estimates about the monetary benefits of a college degree. It provides estimates quite in line with most of the literature. Even if I were off by 50%, most of the statements I make below would still be in the ballpark of being pertinent. I tried to keep this discussion from being too technical, but I do think it is important that people know precisely what I did so that they can criticize it cogently.

Here's what I did. I looked at the March 1999 Current Population Survey (CPS) and selected (1) people with high school degrees and no additional education and (2) people with BA or BS degrees and no additional education. The earnings data refer to calendar year 1998. For each year of age (from 19-65) I constructed the average annual total earnings for those making more than \$5,000 per year. I chose \$5,000 as a cutoff, as it was quite unlikely that someone making less than \$5,000 could have been working full time (Note: 35 hours per week times 40 weeks times \$4.00 per hour = \$5600). I then set college earnings to zero for ages 19-22 to reflect the fact that there are low earnings while in college. There are roughly 200-350 people per age/education cell in this data set. Contact tom_mroz@unc.edu if you would like the computer programs that generated the data set.

I assume that the college-high school earning differences that we observe in 1998 would continue to hold true over the next 40 years. This is clearly a crucial assumption. If the experiences of the past 30 years in trends in earnings continue, I would expect this approach to understate significantly the higher earnings of college graduates relative to high school graduates. There has been a widening gap between the earnings of college graduates and high school graduates at least since the early 1970s, and continued international competition would most likely expand this earnings gap.

Here's the bottom line (Sorry about the excess precision in these numbers, but I thought one should be able to replicate exactly these results):

1) On average, from age 19 to age 65, college graduates earn \$16,426 PER YEAR more than high school graduates, or a total of \$772,011 more than high school graduates from age 19 to retirement at age 65. Note that these figures are based on an assumption that college attendees make zero earnings while comparably aged high school graduates are making about \$17,000 per year at college attendance ages (see table below for exact numbers from the CPS). These gains from college assume that there is no discounting of future earnings, which is equivalent to assuming an interest rate of 0%. The results are obviously quite sensitive to the choice of interest rate, but since the mid 1940s real interest rates have almost always fluctuated between 0 to 4 percent.

2) If one uses a high 7% real interest rate to discount future earnings, then the college gain is \$110,758. This means that at a real interest rate of 7%, being able to attend and finish college is equivalent to a gift of over \$110,000 at age 19 to those who go on to attend and finish college.

Another way of phrasing this it is that if someone could borrow money at 7%, then they should be willing to pay (at age 19) over \$110,000 to obtain the pecuniary benefits of a college education (even after giving up four years of income from age 19 to 22). Lower interest rates would imply a larger gain, while higher interest rates would imply a lower gain. Even at a real interest rate of 9%, paying \$20,000 in tuition over four years(\$5,000 per year or 20% higher tuition than proposed) would be a fantastic investment (the present discounted value of the college degree as of age 19 is \$62,384 at 9%). At the end of this note I present the present discounted value of the gain (at age 19) for a variety of interest rates. Do note that the real 7% and 9% interest rates discussed here are extreme; the lower real interest rates, about 3%, are probably the more appropriate ones to consider.

3) UNC students are clearly above average, yet this analysis assumes that they will earn just the average earnings of college graduates. It also ignore the fact that those who might be UNC students, if they chose to not attend college, would probably be among the higher earning high school graduates. In this simple analysis, it is not possible to say whether this shortcoming either overstates or understates the gain from college completion. An informed guess suggests that this limitation probably understates the gain, as there is somewhat more salary compression among individuals with less education.

Discussion:

1) The pecuniary advantages from attending college appear to be tremendous. Is it unreasonable to ask someone to give up 15% or even 20% of their expected future gain (in present value) in order to reap the pecuniary benefits of a college education? The state does not provide a similar lifetime income enhancement to people who don't or can't go to school beyond high school. Why should only the (soon to be) wealthy college students benefit from the low tuition financed by all residents of the state?

2) There is clearly a lot of personal, private gain to individuals obtaining a college education. Tuition at UNC, and even if it were to be triple the amount proposed, is a great, private investment opportunity given what students would gain on average. Not to mention that it is a bargain compared to what most other public universities charge. In this study I've only looked at pecuniary benefits. There are certainly personal benefits beyond income that individuals receive from going to college. This further increases the personal gain

3) Most UNC students, because of the education they are receiving, are going to become part of the financial elite in this state. Tuition increases are only asking them to pay a small fraction of this potential gain instead of asking the less fortunate in the state to pay. College graduates, according to the data examined here, on average earn about \$16,000 more per year than high school graduates (\$26,477 versus \$42,903) from age 19 to age 65. The average earnings for college graduates is 62% higher than high school graduates.

4) This analysis has not even looked at the potential for the UNC education to give students

access to graduate and professional schools. This failure to recognize colleges as stepping stones to graduate and professional schools could lead to an additional underestimate of the gain from college.

5) This clearly is an incomplete analysis. However, it appears that no matter which way you look at the earnings summarized below, a college degree provides enormous gains to most students. The question that needs to be asked is how much should the state expect UNC students to pay for this substantial monetary gain. The state clearly benefits, but so do the students.

6) It is key that any tuition increases be accompanied by more financial aid. If it is the case that some students from poor families are going to pass on applying to UNC-CH because of the higher tuition, then it is imperative to provide them information about the increased availability of financial aid. It might be useful for current UNC students, when they go home on breaks, to visit their high schools and assure students about the increased availability of financial aid. Encouraging promising high school students to apply to UNC and reassuring them about the availability of financial aid is an important function that current students can undertake to assure the continued excellence of the student body.

Here are the “raw” numbers from the Current Population Survey and some imputed present discounted benefits from a college degree under a variety of assumptions about the real interest rate.

Age	Mean High School Graduate Full-Time Earnings by Age	Mean College Graduate Full-Time Earnings by Age (0's by assumption)	Annual Gain (loss) from Attending College by Age
19	12993.61	0.00	-12993.61
20	18051.04	0.00	-18051.04
21	17307.06	0.00	-17307.06
22	17523.26	0.00	-17523.26
23	17517.53	21339.54	3822.01
24	20370.63	22149.48	1778.85
25	21247.30	30099.83	8852.52
26	22689.25	33380.65	10691.39
27	22492.25	33431.04	10938.79
28	24324.26	34773.57	10449.30
29	23819.84	39733.22	15913.38
30	24810.10	37029.60	12219.50
31	26735.54	38815.37	12079.83
32	26756.16	43012.57	16256.41
33	25267.55	43145.70	17878.15
34	25014.95	43848.77	18833.82
35	26618.00	48300.98	21682.97
36	27372.71	47355.00	19982.29
37	28402.25	49790.31	21388.06

38	27933.06	46203.77	18270.71
39	28339.97	48946.97	20607.00
40	28905.28	55302.63	26397.35
41	31101.59	51647.73	20546.13
42	29321.98	52565.19	23243.21
43	28219.93	51912.93	23693.00
44	29589.41	52656.25	23066.84
45	28212.15	50129.21	21917.05
46	29938.32	57480.06	27541.74
47	29012.36	50982.36	21970.00
48	28774.43	50908.47	22134.04
49	28496.98	48651.03	20154.05
50	30425.44	55575.74	25150.30
51	28740.20	54130.29	25390.09
52	30188.42	53965.61	23777.19
53	29571.13	53844.64	24273.51
54	30583.33	57097.96	26514.63
55	33251.11	53079.55	19828.45
56	34571.98	52877.08	18305.10
57	27474.85	58444.60	30969.75
58	29913.31	53459.86	23546.55
59	28201.78	54297.50	26095.71
60	28817.59	52989.42	24171.83
61	29877.81	51230.91	21353.10
62	25299.73	40446.30	15146.57
63	29993.75	50019.50	20025.75
64	25098.28	52730.25	27631.96
65	25257.04	38653.93	13396.89

Total Earnings Gain			772010.81
Average gain, ages 19-65			16425.76

Discounted Gain, @	0.00%		772010.81
Discounted Gain, @	1.00%		575490.69
Discounted Gain, @	2.00%		432689.77
Discounted Gain, @	3.00%		327634.96
Discounted Gain, @	4.00%		249397.38
Discounted Gain, @	5.00%		190425.77
Discounted Gain, @	6.00%		145450.67
Discounted Gain, @	7.00%		110757.91
Discounted Gain, @	8.00%		83703.06
Discounted Gain, @	9.00%		62384.22
Discounted Gain, @	10.00%		45419.59