

**Lecture 6: Do our regression estimates overestimate the impact of education on earnings? The Case of Ability Bias**

**From last lecture:**

Freeman discusses wages in two ways: the college-HS wage gap and the real wage. He was responding to the drop in both the college-HS wage gap and the real wage in the 1970s.

Why do people have more purchasing power now than in 1850? There have been increases in TFP and productivity (output/hour) over time: from 1947-1973, productivity growth average 3% per year while it averaged only 1.2% per year from 1973-1975.

*Question from last lecture:*

How do we reconcile the human capital model with Freeman's short-term view of the labor market for college graduates?

*Answer:*

In the human capital model, people evaluate their projected earnings from ages 18-65 when considering college. Freeman says, on the other hand, the people may make college decisions based upon their projected age 18-65 earnings but what they know at the time of making that decision is the current market conditions. Projecting the current college-HS wage gap is not a bad assumption to make until the market tells you otherwise.

If the wage to a college graduate is fluctuating and the supply of college graduates is inelastic in the short-run, then college graduates have little flexibility in the work and wages available to them. Once a student chooses to enter college, it is a 4-year endeavor and the job market can change greatly from when a student enters to when he graduates. In the long run, students can adjust to changes in the job market that last longer than a short-term change in wages.

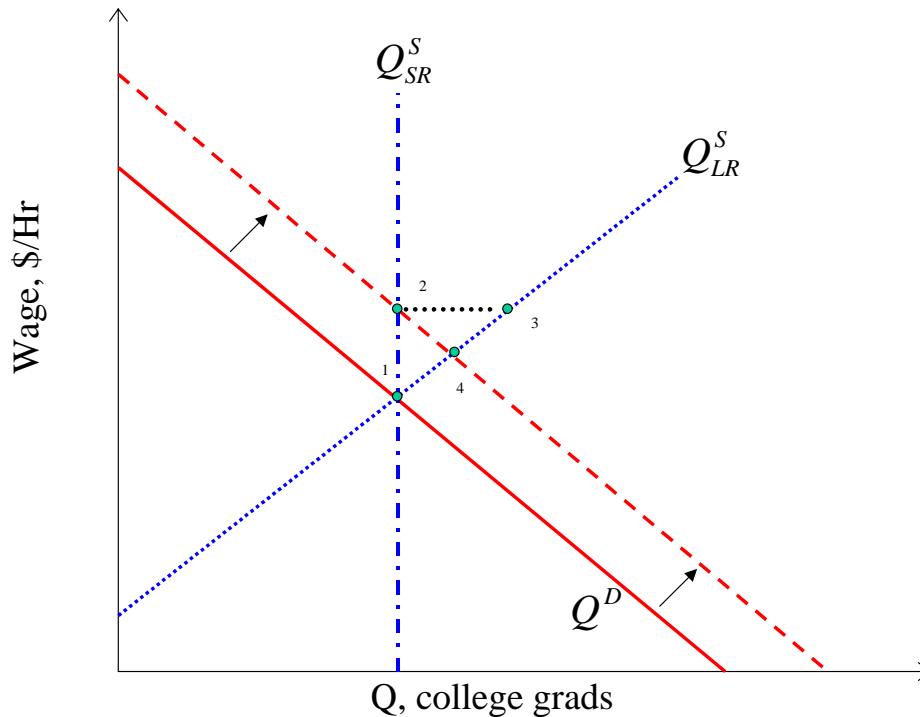
The cobweb model: Originally developed for agricultural economics, specifically the study of cattle raising, an industry in which you have to make production choices 2-3 years before you can sell the cattle on the market.

We know that the market for college graduates is cyclical because there isn't a mechanism for simultaneous real-time adjustment.

-When evaluating the market, we need both SR and LR supply curves. Demand for certain types of workers can change faster than people can change their skills.

For example, in the late 1980s and early 1990s, in the wake of the collapse of the Soviet Union, there was a huge decline in US defense spending and the demand for defense industry workers. The result was a significant decrease in the employment of defense industry workers.

Let's look at this graphically. Initially, the labor market is in equilibrium at point 1. When the demand curve shifts outwards, supply cannot respond in the SR so wages increase. The new equilibrium is labeled point 2. Laborers adjust their wage expectations upwards to the wage at point 2, increasing the quantity of laborers available, labeled point 3, which depressed wages. This cycle continues until the labor market reach equilibrium at point 4.



What about the market for anesthesiologists? Demand for them should be more stable considering the steadily increasing demand for health care in the US. However, the supply lag is very long considering anesthesiologists must attend college then medical school and then complete the rest of their medical training.

*Question from last lecture:*

What happened to reverse the convergence of college and High-school wages from 1980-1985?

*Answer:*

(Ratio of median 25-34 year old male BA's)/(Ratio of median 25-34 year old male HS):

- 1961- 1.37
- 1965- 1.37
- 1969- 1.47
- 1973- 1.30
- 1980- 1.30
- 1985- 1.48

Macroeconomic events in the 1970s:

- 1) 1971-1973: Significant inflation in food prices. In the US alone, food prices increased 33% in only 2 years. While there was downward pressure on the restaurant industry, the farming industry exploded along with an increase in demand for blue-collar agricultural workers.
- 2) 1974: The oil crises. Prices quadrupled in 3 months. There was an economic boom in Texas, Oklahoma, Louisiana and any other oil producing regions in the US. There was a subsequent increase in the demand for blue-collar oil industry workers.
- 3) 1971: Nixon abandoned fixed exchange rates and floated the dollar. The dollar fell in value, which helped export industries, especially manufacturing. There was a corresponding increase in demand for blue-collar manufacturing workers.
- 4) 1970s: There was a general bubble in demand for blue-collar labor in the US, which was much higher than any long-run trends.

So what happened? 1-3 were temporary shocks and there was an eventual decrease in demand for blue-collar workers in the late 1970s, early 1980s. Additionally, inflation was generally very high in the US in the 1970s. In fact, from 1970-1980, consumer prices doubled. In response, Jimmy Carter appointed Paul Volcker as Chairman of the Fed with instructions to break the cycle of high inflation. To do so, Volcker greatly decreased the US money supply, which increased US interest rates. A few years later, President Reagan passed a series of tax cuts without decreasing Federal spending. Markets began to worry about returning high inflation and a recession. From 1980-1985, inflation was still low but interest rates were still very high. The 10-year US Treasury bonds, which usually pay 2% per year adjusted for inflation, were paying 6-7% per year adjusted for inflation from 1982-1983. Not surprisingly, there was an increase in demand for US bonds and US\$ to buy those bonds. In response, the manufacturing industry collapses as does the oil industry in the US and farming perform nearly as well as it did in the 1970s. This quick collapse in industries that higher a lot of blue-collar workers allowed the college-HS wage ratio to quickly increase.

It is important to remember that Freeman was writing at a time of unique circumstances in the US economy.

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What are we measuring when we measure the return to education?

The Mincer equation:

$$\ln(w_i) = \alpha + \beta_1(\text{Age})_i + \beta_2(\text{Age})_i^2 + \beta_3(\text{Education})_i + \varepsilon_i$$

The rate of return to education:

$$\left( \frac{1}{w_i} \right) \frac{\partial w_i}{\partial (\text{Education})_i} = \beta_3$$

Estimates we've found for the rate of return to education: 7% in the 1970s, 9% in the 1990s. If we take these numbers as accurate, then we should use them as a basis for policy since education will increase someone's earnings.

What if we randomly give someone people an extra year of education?

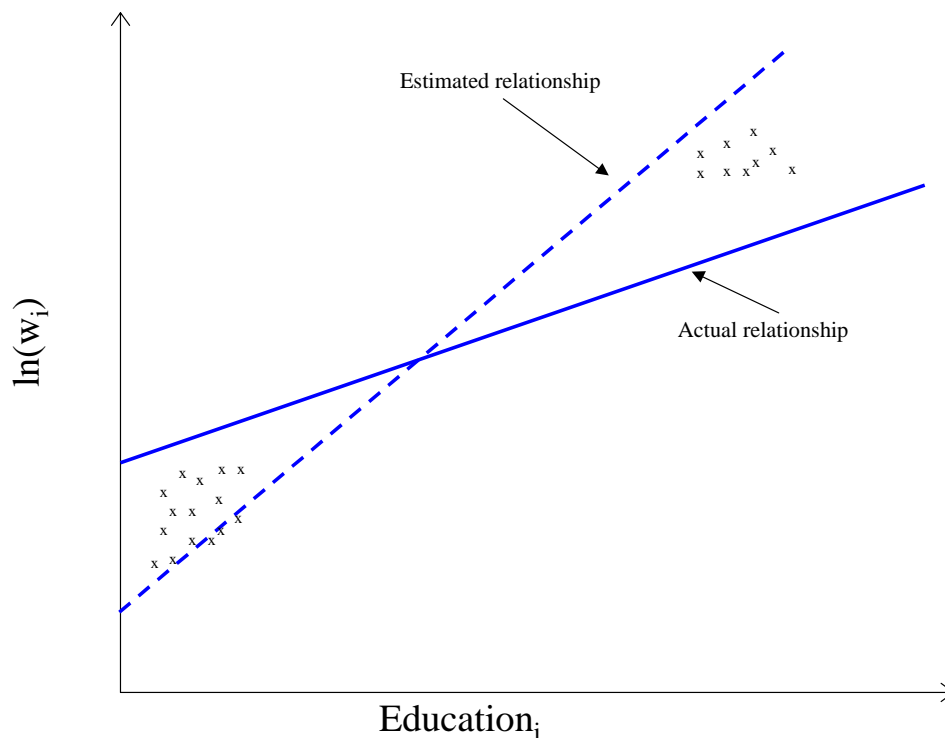
-That extra year of education will likely have a different effect on those who would have willingly gotten that extra year compared to those who would have gone without that year.

Someone with more ability should get more education than someone with less ability. Presumably, more ability it results in better job performance, which results in high salaries. When we measure the rate of return to education, are we really measuring the effects of ability on wages?

To use the rate of return to education to help determine education policies, we need to run an experiment like a medical experiment where you randomly assign different high school grads to more education or no more education and measure the results. However, this would be unethical.

$$Education_i = \delta_0 + \delta_1(FamilyIncome)_i + \delta_2(Mother'sEducation)_i + \delta_3(Father'sEducation)_i + \mu_i$$

With a higher level of ability, a child would get more education than the above model would predict. In this case, the error term would be positive. The wage you'd predict with the Mincer equation would also be less than his or her actual again. Again, the error term would be positive. In this case, both of the error terms  $\epsilon_i$  and  $\mu_i$  are correlated.



Because we can't measure ability, we may be giving education more credit than it deserves increasing wages.

Alternatively, we look for instrumental variables. In this case, we are looking for a surrogate for education that is correlated with education and not correlated with ability.

In the Card paper, the instrument is the geographical proximity to a 4-year college.