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Econ 496/895

Week 8-9: Who Cares If It's Signaling? The Selfish Return to Education

I. The Selfish Return to Education: A Primer
   A. Building blocks of returns: benefits, costs, and time pattern.
      1. Note: Anything can be monetized. Just use willingness to pay, and count everything people care about.
   B. One-year loan as the Rosetta Stone: Lend it out, and see how much extra comes back ("returns") to you.
      1. An arbitrarily complex investment with return of x% is as lucrative as earning x% on a series of one-year loans, reinvesting every penny of interest along the way.
   C. Estimating education's selfish (or "private") return the lazy way: assume one benefit and two costs:
      1. Benefit: education premium
      2. Costs: tuition and foregone earnings
      3. Further common simplification: Assume infinite life. Then annual return equals extra annual earnings/(annual foregone earnings + annual tuition).
      4. With infinite life and zero tuition, return is just coefficient on education in regression of ln earnings on constant and years of education. (Consol analogy).
      5. Note: Returns to education are already real returns. No further adjustment for inflation is appropriate.
   D. My rate-to-adjective glossary: inflation-adjusted return of x is… y.
      1. 10% - "excellent"
      2. 7% - "very good"
      3. 5% - "pretty good"
      4. 3% - "so-so"
      5. 2% - "poor"
      6. 1% or less – "awful"
   E. Counting Everything That Counts
      1. Step 1: Brainstorming – identifying every semiplausible benefit and cost of education. (Caveat: Avoid double-counting).
      2. Step 2: Literature review (Supplemented by explicit guesstimates when necessary).
   F. Key distinction: Annual Return versus Degree Return.
      1. Why the difference? Sheepskin effects! The further you go in a program, the higher your chance of earning the big payoff for crossing the finish line.
   G. How can returns ever be negative? Finite lifespans. (Contrast with consols).

II. Student Typology

A. My whole analysis builds on four student archetypes:
    1. "Excellent Student": Fits the profile of the average person with a master's degree.
    2. "Good Student": Fits the profile of the average B.A. who does *not* continue on to grad school.
    3. "Fair Student": Fits the profile of the average high school grad who does *not* continue on to college.
    4. "Poor Student": Fits the profile of the average high-school dropout.
B. "Fits the profile" is all-inclusive: On cognitive ability, character, background, and so on, the archetype is average for that education level.
    1. Cognitive ability by archetype: 82nd, 73rd, 41st, and 24th percentiles. (From GSS).
C. By construction, an archetype with the normal level of education for their type gets the *observed* outcomes.
    1. Ex: Good Student with a B.A. gets average outcomes for B.A.s
    2. If Good Student has more or less education, however, I adjust his outcomes based on estimated causal effects of education.
D. Analysis further assumes everyone is…
    1. Either a full-time student or full-time worker.
    2. Single and childless.
    3. Attends nearby public schools for all levels.
    4. Equally likely to be male or female.
    5. Note: Archetypes are slices, not partitions. Better-than-Excellent Students and worse-than-Poor Students definitely exist.

III. Summary of Benefits and Costs
A. Compensation: Analysis starts with Census figures for cash income plus CBO estimates of non-cash benefits. Next, it estimates education's causal effect by adjusting for 45% ability bias and sheepskin effects.
B. Employment: Analysis starts with standard numbers by education. Next, it estimates education's causal effect by adjusting for 45% ability bias and sheepskin effects.
C. Taxes: Applies 2011 tax code to mean earnings, with +10% flat state and local tax. (Progressivity implies a slight overestimate of education's return).
D. Transfers: Since analysis assumes everyone is a single, childless, full-time worker, he's only eligible for one important transfer: unemployment insurance. Calculations assume flat $300/week payment if unemployed.
E. Job satisfaction and happiness: Mixed results after holding income constant, so I assume no benefit.
F. Classroom experience: In the data, average person finds classroom experience boring and unpleasant. Same holds for work, but schools seems slightly worse. Calculations assume making your primary task a full step happier on a 0-6 scale is worse 5% of your full-time income, holding all else constant.
G. Health: Huge literature finds causal effects of education on health. My preferred estimates:

1. One year of education raises life expectancy by .1. Value assumption: A year of life is worth double your potential full-time income.
2. One year of education raises self-rated health by .01 on a four-step scale. Value assumption: One full step is worth 20% of your potential full-time income.
3. Tuition: Free for K-12. Net tuition of $3662 for public college and M.A.

H. Foregone earnings: Just recycle causal estimates for income as a function of education.

I. Experience: Assumes constant 2.5% annual return to experience. (More realistic quadratic variant doesn't much change the results).

J. Last but not least…

IV. Completion Probability

A. Standard return to education calculations look at people who successfully *completed* various levels of education.

B. This grossly inflates education's *expected* return. Analogy: Only counting repaid loans to measure a bank's profitability.

C. Technical Appendix estimates completion probabilities by type.

D. For K-12, I rely on Herrnstein and Murray's logistic model of high school completion and GED from *The Bell Curve*.

1. Since researchers find the GED has few benefits, I'm measuring probability of earning a regular high school diploma.

E. Why rely on such a controversial source for K-12 probabilities?

1. Lots of other estimates, but almost no one else reports enough info to allow the computation of a probability. (Problem? Omitting constants and/or coefficients on control variables).
2. *Bell Curve*'s estimates on this issue are very comparable to other estimates on same canonical data set.

F. For B.A., I use UCLA's Higher Education Research Institute's model, adjusting results up 14% to account for college switching. (National Student Clearinghouse finds 72% who start at a given college earn a B.A. there within six years, but 82% had a B.A. from *somewhere*).

G. For M.A., I give Excellent Students the observed mean of 50%, and make all other rates proportional to B.A. rates.

H. Results:

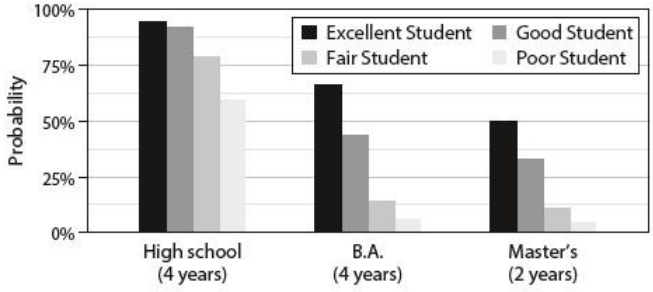

Figure 5.6: Degree Completion Probability by Student Ability
Source: See Technical Appendix.

V. Returns by Student Ability

A. Now we're ready to crunch the numbers. Results:

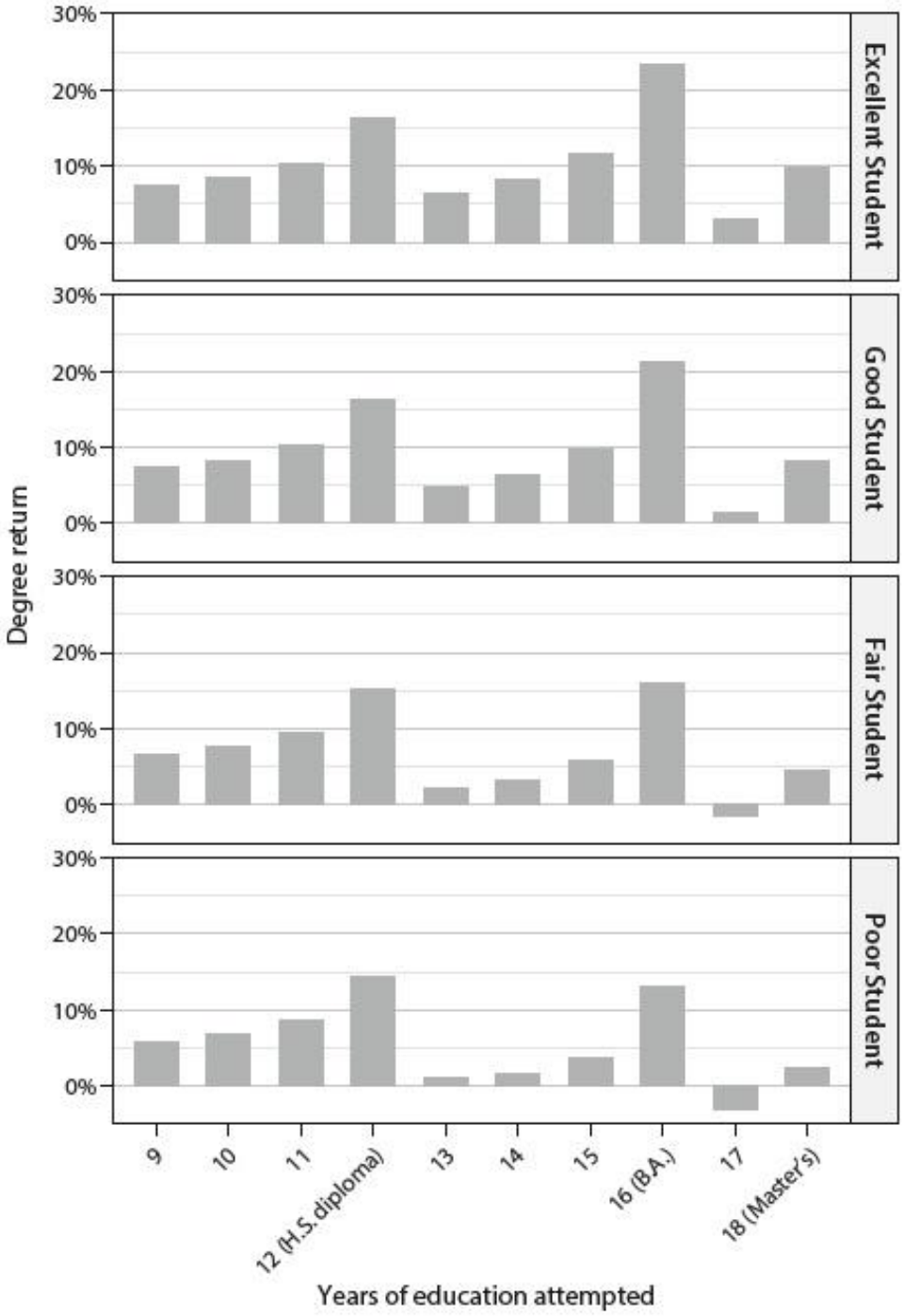

Figure 5.7: Selfish Degree Returns by Student Ability
Source: Figures 5.5 and 5.6 and text.

B. Do all the corrections really matter? Yes! Compare results for Good Students to Naïve estimates:

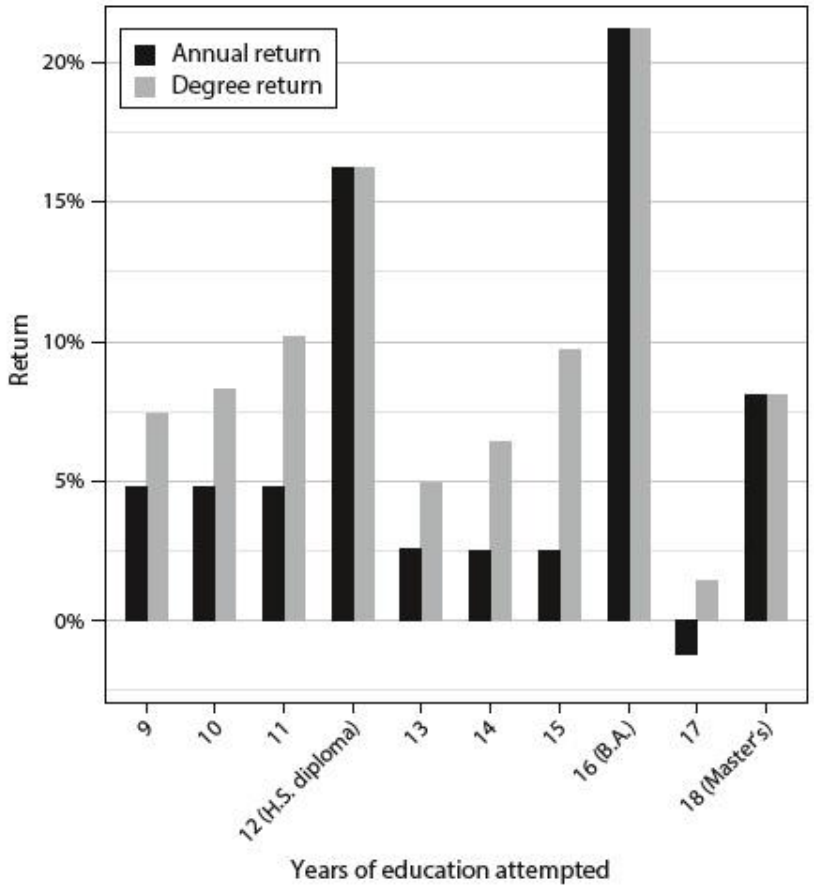

Figure 5.3: The Selfish Return to Education for Good Students
Source: Figures 5.1 and 5.2 and text.

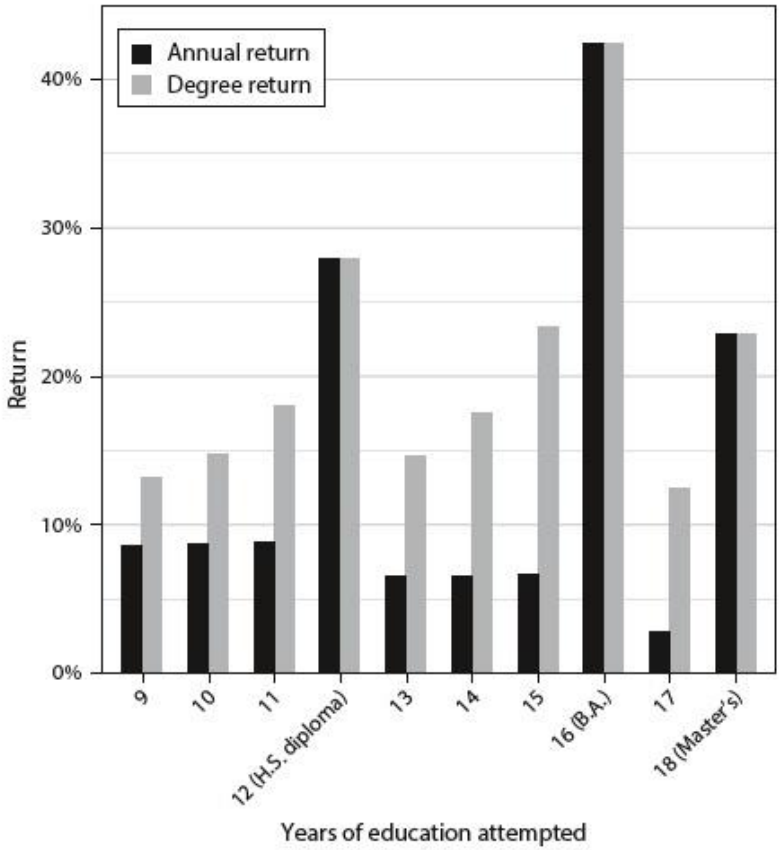

Figure 5.4: The Naive Selfish Return to Education for All Students
Source: Figures 5.1 and 5.2 and text.

C. Overall patterns:
   1. Higher ability students get higher *absolute* payoffs because completion gives similar percentage increase in larger base.
   2. Higher ability students get higher *expected return* because their completion probabilities are higher.

D. Patterns by education level:
   1. High school is a lucrative for all abilities.
   2. College is only a good investment for Excellent and Good Students.
   3. Master's are so-so for Excellent Students and bad deal for everyone else.

VI. Further Results

A. Returns by major. As expected, electrical engineers sharply outperform business majors, who sharply outperform Fine Artists.

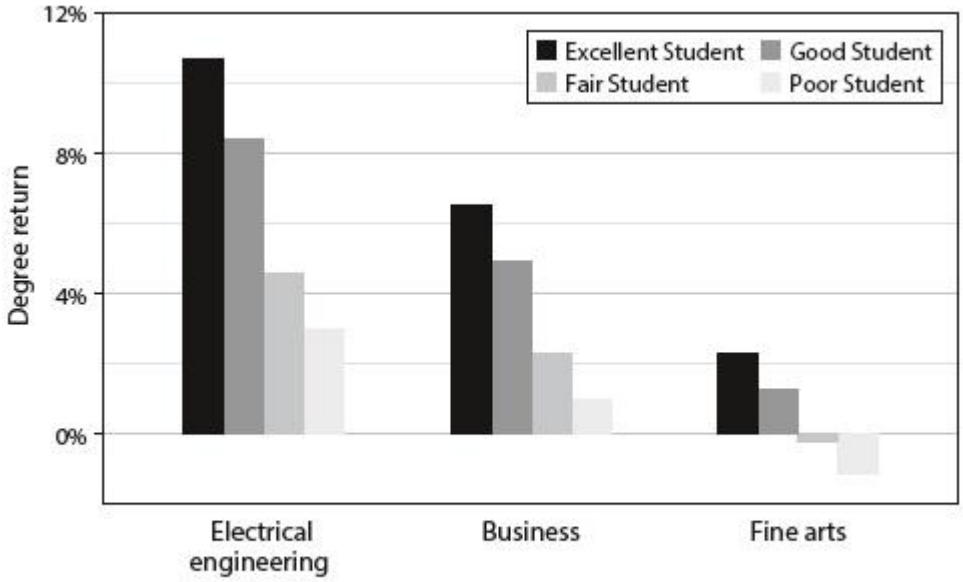

Figure 5.8: Freshmen's Selfish Degree Returns by Major
Source: Figure 5.7 and text.

B. Returns by college quality. Literature reaches a wide range of results (note especially Dale and Krueger), but all researchers conclude that much of the observed quality premium is *not* causal.
   1. Most researchers do *not* find that completion probability falls as quality rises, even after extensive ability controls.
   2. If this is right, disparity by ability rises further. Best places willing to accept weak students probably aren't worth attending.

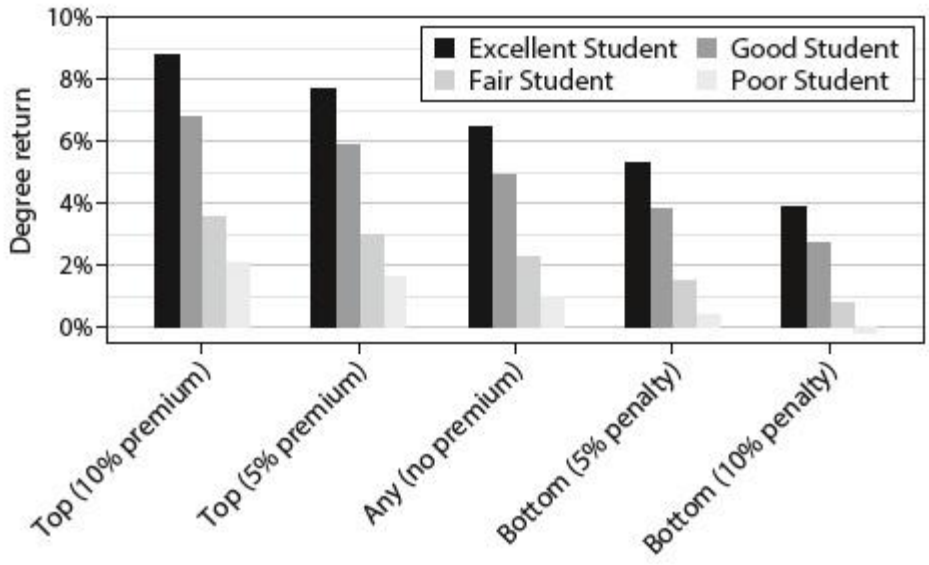

Figure 5.9: Freshmen Selfish Degree Returns by College Quality
Source: Figure 5.7 and text.

C. Returns by Out-of-Pocket Costs

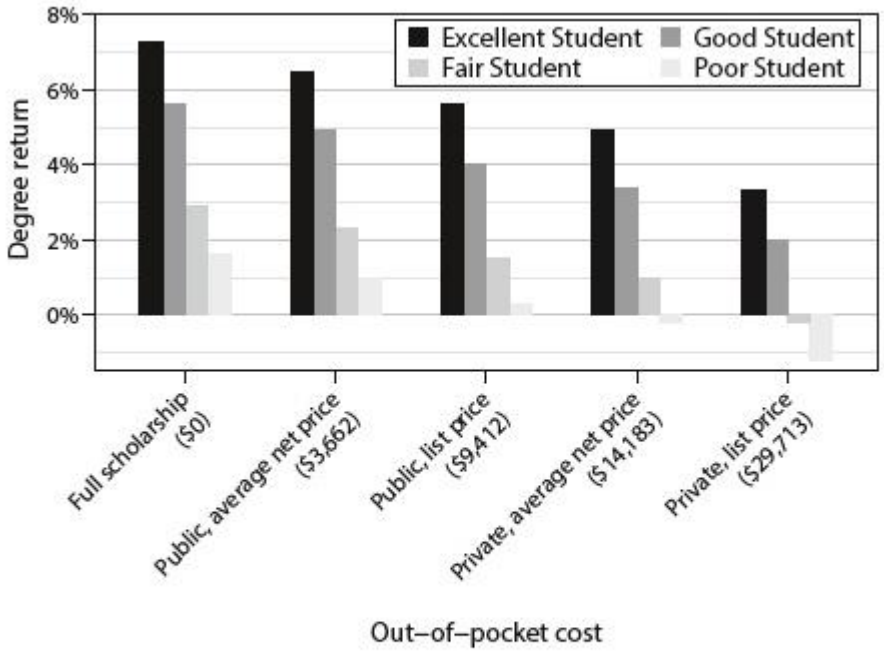

Figure 5.10: College Freshmen's Selfish Degree Returns by Out-of-Pocket Costs
Source: Figure 5.7, S. Baum and Ma 2011, and text. "List price" = "Tuition and Fees" + "Books and Supplies"; "Average Net Price" = "List price" – "Federal Grants and Tax Benefits" – "State Grants" – "Institutional Grants" – "Outside Grants" (S. Baum and Ma 2011, pp. 6, 15).

D. Returns by School Vs. Work Feelings: Extreme assumptions required to flip advice.

VII. Sex and Marriage

A. Returns by Sex: Women have higher completion probabilities but lower absolute payoffs at all levels. Net results favor women until the M.A. level.

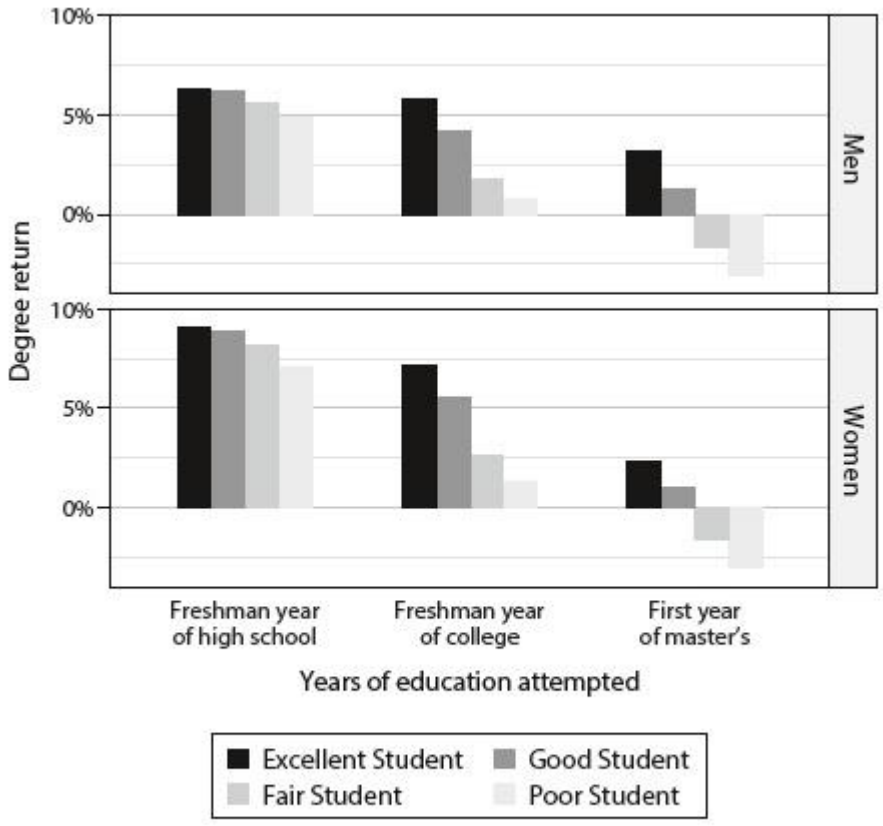

Figure 5.12: Men and Women's Selfish Degree Returns
Source: Figure 5.7 and text.

B. Education's biggest neglected benefit comes from marriage. The spousal education correlation is very high – if you have one more year of education, your spouse typically has an extra .5 or .6 years.
   1. About 80% of this estimated persists correcting for intelligence, age, year, race, sex, and religion.
   2. As you'd expect, there are big sheepskin effects.
   3. The M.R. degree versus the M.R.S. degree.

C. Upshot: When you get more education, the expected education of your spouse rises, too.
   1. Note: You don't have to actually meet your spouse in school. You get the benefit as long as your education puts you in a more selective dating pool.

D. If partners share equally and consume separately, marital effect must be zero-sum.

E. But on the realistic assumption that marital consumption is at least partly non-rival, both partners can gain.

1. Standard estimates: Two people who live together save 20-40%, with most credible estimates at 35%.

F. I re-estimate education return with these marital benefits, using GSS to measure causal effect of your education on your spouse's education.
   1. Key assumptions: People marry for life at 25, and both always work full-time.
   2. Result: Marriage raises return by about 1 percentage-point for men and 2 percentage-points for women.
   3. Marriage market is probably the best reason to pay for elite schools.

VIII. Participation

A. So far, the analysis assumes that everyone works full-time until retirement once they graduate.

B. The real world looks quite different:

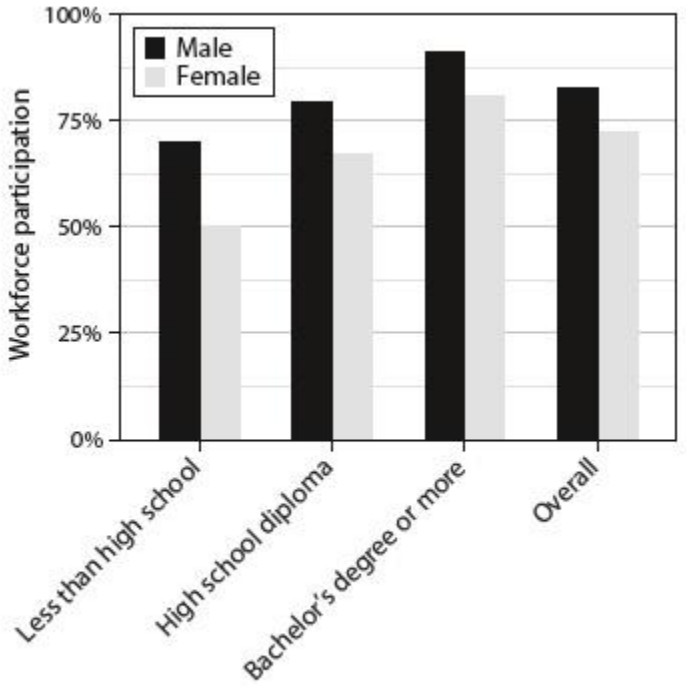

Figure 5.14: Workforce Participation for 25-to-64-Year-Olds, by Education (2011)
Source: Snyder and Dillow 2013, p. 620.

C. If we relax this assumption, how do returns change?
   1. As usual, I start with observed labor force participation (adjusted for part-time work), then adjust for ability bias and sheepskin effects.

D. Returns will clearly fall, because many people fail to squeeze the full potential earnings gain out of their educational investments.

E. The size of the gain is still surprising – and largely wipes out women's edge over men.

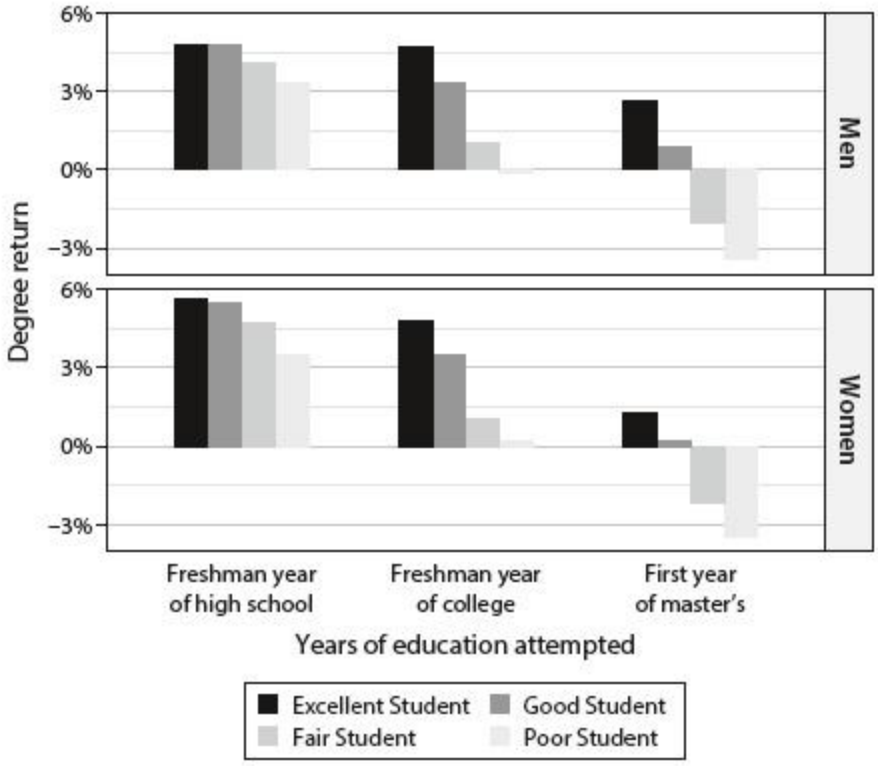

Figure 5.15: Selfish Degree Returns, Correcting for Workforce Participation
Source: Figures 5.12 and 5.14 and text.

F. Even high school is no longer a no-brainer for Poor Students. Degree Return for female Poor Students falls from 7.1% to 3.5%.

IX. Advice and Doubts

A. Practical guidance for prudent students.
   1. Go to high school unless you're a terrible student (or don't want a full-time job).
   2. Go to college only if you're a strong student or special case.
   3. Don't get a master's degree unless the stars align.
   4. Elitism versus candor.
   5. How I advise my kids.

B. Top doubts about my numbers.
   1. Completion probabilities.
   2. How work and school feel.
   3. Education and health.
   4. The neglected master's.