

Problem Set 3

Due: Friday, November 20

**Labor Economics
Spring 2009**

**Joshua D. Angrist
Amanda Pallais**

A. Book problems

Borjas Chapter 3, problems 3-6, 3-7, 3-9, 3-12

Borjas Chapter 4, problems 4-5, 4-10

Borjas Chapter 6, problems 6-1, 6-2, 6-4, 6-8

B. Analytical problem on labor demand

Suppose that:

N small fast food establishments produce according to $f(L) = \ln(L)$, with fixed capital.

The product price is fixed at 1.

The aggregate labor supply is given by w^ϵ for positive ϵ .

1. Start by assuming firms are price-takers in the factor market (in other words, the labor market is competitive). Derive an individual firm's demand curve. Use this to derive the aggregate demand curve.
2. Derive the competitive equilibrium wage (w_c) and aggregate employment level ($N \cdot L_c$) as a function of the labor supply elasticity and the number of firms.
3. Now suppose that an evil monopsonist buys the N establishments and operates them as one firm. Assume that the retail fast food market remains competitive in spite of this. However, the monopsonist has market power in his factor market – in fact he is the sole employer of this type of labor. Derive the new equilibrium wage (w_m) and aggregate employment level ($N \cdot L_m$).
4. Explain how we can get competitive outcomes as a special case of the monopsony equilibrium in 3.
5. Explain how a wise and beneficent government can generate the competitive employment level as an equilibrium outcome in spite of the evil monopsonist's market power.

C. In class, we develop a model where market forces equalize the net present value (NPV) of every level of schooling. That is, according to this model, the NPV of 12 years of schooling is the same as that of 16 years of schooling, or 0 years of schooling. We assumed annual compounding of interest in class; in this problem, you are asked to develop a similar model where interest is compounded continuously.

A student who studies s years can earn $f(s)$ after entering the labor market. Students discount the future using continuously compounded interest rate r . Assume there are no tuition costs and no earnings while in school. Also, assume that people live forever!

1. What is the net present value of s years of schooling, measured at the start of life?
2. Assuming that market forces equalize the value of alternative schooling plans, derive an equation for $\ln f(s)$ in terms of $\ln f(0)$, r and s .
3. How does a change in the interest rate, r , affect the relationship between schooling and earnings? Why?

4. Suppose that smart people, i.e. those with big earnings potential, get paid a subsidy for each year they go to school. The subsidy is $s \cdot c \cdot f(0)$ for someone who goes s years, where c is a constant between 0 and 1. The subsidy is paid up front when you start school. Assuming that market forces equate the NPV of schooling plans, derive an equation for $\ln f(s)$ in terms of $\ln f(0)$, r , s , and c . How does the subsidy affect the relationship between schooling and earnings? Why?

D. Mandy will provide you with a CPS extract for this problem.

1. Estimate a human capital earnings function by regressing log hourly wages on education, potential experience and the square of potential experience. What is the return to education you have estimated with this model? Holding education constant, by how much do you predict wages increase when experience increases from 10 years to 11 years? At what level of potential experience are earnings highest?
2. Now run your regression (from C.1) separately for men and women. Do returns to education or experience vary for men and women? Why might that be so? Hint: think about how “experience” is defined in these data.
3. Estimate a pooled model for men and women. Include a dummy for sex, so the equation has 4 regressors: sex, education, experience, and experience-squared. Is the fact that the sex dummy is negative evidence for discrimination against women?
4. Also included in the data set is a 1-digit occupation code. Re-estimate the equation with a full set of occupation dummies. How does this affect the other coefficients? Which equation would you say provides a better estimate of the economic returns to schooling, the model in part 3 or the model in part 4?

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