Econ 415
Labor Economics
Final Exam
7/11/01

Part I: Do 6 out of 7 questions (90 points)

1) A firm’s production function is

\[ Q = f(L + K) \]

where \( L \) is the amount of labor hired and \( K \) is the amount of capital. Let \( w \) be the wage paid to a worker and \( r \) be the cost of a unit of capital. Assume \( w > r \).

a) What is the firm’s demand for labor in the short run?

b) What is its demand for labor in the long run?

c) Provide intuition for your answers in parts (a) and (b).

2) Draw a picture describing the tradeoff between leisure and potato consumption for Sally. Show where her optimal choice is. Show what happens when she marries Joe. Show what happens when she and Joe have children.

3) Draw a picture describing the tradeoff between leisure and potato consumption for Sally. For each of the following scenarios, draw the change in choice and decompose it into an income and substitution effect:

a) Sally gets a significant inheritance from her grandmother.

b) The price of potatoes rises.

4) Sally is 18 and deciding how much more schooling to get and where to go to school. There are three choices: a) she can not go to college, get a job, and receive a wage of \( w_{hs} \); b) she can go to Virginia Tech (mediocre school) where every year of attendance costs \( c_m \) and raises wages by \( 100r_m \% \); or c) she can go to UVa (good school) where every year of attendance costs \( c_g \) and raises wages by \( 100r_g \% \). Assume \( c_g > c_m > 0 \) and \( r_g > r_m > 0 \).

a) How does Sally choose between her three options?

b) How much schooling does she get if she chooses to go to UVa [Show the relevant first order condition]?

c) What happens to her marginal product (wage) as \( r_g \) increases?

5) Some researchers have suggested that unions foster teamwork by negotiating for seniority based wage and promotion schedules. They further argue that this is good for the economy in that it raises productivity. Comment on why this is or is not a good argument.

6) Consider a world with two states: one can be in the labor force or not in the labor force (denoted respectively with \( L \) and \( N \)). Assume that \( L_t = 78 \) and \( N_t = 22 \), that \( p_{LL} = .8 \), and \( p_{NN} = .6 \).

a) Find the labor force participation rate at time \( t + 2 \).

b) Find an approximation for the labor force participation rate at time \( t + 20000 \).
7) Write down a model where both white employers and white customers discriminate against black workers and show that this leads to black workers being paid less than white workers.

Part II: Do 2 out of 3 questions (60 points)

1) Explain, using pictures and/or math, the effects of an OSHA regulation limiting the number of hours meatpackers can work without a break (assume breaks reduce accidents). Analyze the effect on workers, meat consumers, and meat packing company stockholders. How does your answer change if meat packing companies and their workers did not realize that breaks reduce accidents?

2) Consider an industry with $N$ identical firms, each with a production function,

\[ f(E) = AE^a \]

where $E$ is the number of workers working at the firm. The demand curve for output of the industry is

\[ Q = \exp\{ -ap \} \]

where $p$ is the industry output price and $Q$ is industry output. Assume $a > 0$.

a) Assume that there is a different union at each firm that gets to announce a wage. Each union has $L$ members. Once the wage is announced the firm chooses the profit maximizing number of workers $E$ given the wage. Any union members not working receive unemployment insurance of $u$. Write down the set of equations that determine the equilibrium level of $E$, $p$, and $Q$ in this industry.

b) How does your answer to part (a) change if there is instead just one union representing all of the workers in the industry; i.e. assume the union has $NL$ members.

3) Consider an economy where, every year, every worker’s earnings rise 10% and yet total wages paid to all workers rise only 2%. Explain how this can happen. Be as precise as possible.

Part III: Do 1 out of 2 questions (30 points)

1) Over the last 10 years, the unemployment rate in Europe has been significantly higher than it is in the United States. Explain why and what you would do to reduce it. Use a model to make your point.

2) Divorce rates have risen sharply in the United States over the last few decades. Explain why and what you would do to reduce it (if anything). Use a model to make your point.