Economics 750 Exam I

Octber 2011

John Kennan
Due: Monday, October 10 (11:59pm)

Note: Answer **three** questions. Some questions may be vague: sharpen them as you see fit. Write substantive answers, in whatever style you consider most effective: do not try to fill space with aimless speculation. The grading function is symmetric and additively separable over questions, and it is convex.

---

1. Roy described the distribution of productive abilities as follows

   "The rabbits are plentiful and stupid and even the less skilled man can ensnare a fair number in a year's hunting while the exercise of a quite appreciable degree of skill does not enable the better hunters to catch many more. The trout, on the other hand, are particularly wily and fight hard, so that many men would undoubtedly starve if they had to eat only what they themselves caught; but nevertheless the real fisherman can obtain very big catches in a year's fishing, although such catches are pretty rare occurences."

   In this situation, is it possible that an increase in the price of fish would increase average measured productivity in both occupations?

2. Suppose a worker chooses consumption, C, and leisure, ℓ, to maximize the utility function

$$U(C,\ell) = \alpha\frac{(C-\gamma)^{\rho}-1}{\rho} + \frac{(\ell-\gamma_0)^{\rho_0}-1}{\rho_0}$$

   subject to the budget constraint $C = w(T-\ell)+\mu$, where T is the time endowment, w is the real wage and μ is real nonlabor income. The consumption set is $\{C \mid C > \gamma\} \cap \{\ell \mid \ell > \gamma_0\}$, and it is assumed that $\rho < 1$ and $\rho_0 < 1$.

   (a) For which wages does the worker supply positive hours?

   (b) Suppose $\rho = 0$. Derive the Marshallian labor supply curve (the supply price of labor as a function of hours worked).

   (c) Suppose (instead) that $\rho = -2$, with $\rho_0 = \frac{1}{2}$, $\alpha = 6$, $\gamma_0 = 96$, $T = 168$,$\mu = 0$ and $\gamma = 50$. Plot the labor supply curve, and comment on whether it has any chance of fitting long-run trends in real wages and hours worked.

3. In Ben-Porath's model of optimal human capital accumulation, there is generally an interval at the beginning of the life-cycle during which earnings are zero. How long does this last? Illustrate, using specific functional forms and parameter values.

4. Consider a simple economy in which there are just two occupations, coal mining and auto repair. The mining and auto repair industries are perfectly competitive, and they happen to have identical labor demand curves, given by $w = 400 - L$, where w is the daily wage (net of any training costs borne by workers), and L is the number of workers employed in the industry.

   There are 420 workers in the economy, 294 men and 126 women, all equally productive in both jobs. All workers prefer auto repair work to coal mining, but the extent of this preference varies from one worker to another. The distribution of equalizing differences over workers is uniform between 0 and \$42. Sex and occupational preferences are independently distributed.

   (a) Find the equilibrium wage differential and occupational distribution for this economy.

(b) Suppose Fred is an "average" worker, who considers the equalizing differential to be \$21 a day. Does Fred gain or lose from the diversity of preferences in the economy? That is, would Fred be better or worse off if everyone else in the economy had the same preferences as he does?

(c) Suppose that women are excluded from coal mining jobs. How will this affect the equilibrium? What will happen to the average wages of men and women? Who will gain under this restriction, and who will lose?

(d) Suppose that employers who have excluded women are found liable for damages. How would you compute the damages?

(e) Does it make sense to interpret the exclusion of women from mining jobs as rational exploitation of the minority by the majority?

5. Suppose that there are 50 million people in the labor force in Mexico and 150 million in the U.S. All workers prefer to work in their own country, but the extent of this preference varies across people. Assume that Mexican and U.S. workers are perfect substitutes (that is, they are equally productive when working in the same country), and assume that the same product is produced in both countries, and that the product price is 1.
The technology in each country is described by a Cobb-Douglas production function with constant returns:

$$Q_i = A_i K_i^{\alpha} L_i^{1-\alpha}$$

for $i \in \{1, 2\}$, with $\alpha \in (0, 1)$.

The total supply of capital in the two countries is a fixed amount K^0, and capital can be moved from one country to the other at no cost. The owners of the capital act so as to maximize income – the capital is rented to the highest bidder.

All markets are competitive, except that there may be restrictions on migration of labor from one country to the other.

(a) Suppose that immigration is not allowed, and it is observed that the equilibrium wage is \$30 per hour in the U.S., and \$10 per hour in Mexico. Does this imply that U.S. firms are more productive (i.e. that $A_1 > A_2$)? If $\alpha = \frac{1}{3}$, and $A_2 = 1$, do you have enough information to determine A_1?

(b) Now suppose that workers can freely migrate from one country to the other. The home country preference depends on the relative wage, $\omega = \frac{w_1}{w_2}$, and preferences are uniformly distributed. If $\omega = 5$, all Mexican workers would prefer to work in the U.S.; and if $\omega = 2$, 40% of Mexican workers would prefer to work in the U.S., and so on.

i. How many people will migrate, in the new equilibrium?

ii. What happens to wages in each country? Explain why.

iii. Does the relative wage rise or fall?

iv. What happens to output in each country? What happens to total output (the sum of the outputs in the two countries)?

v. Discuss the welfare implications of your results.