Econ 121 - Problem Set 2

May 23, 2017

- The answers must be turned in in class on Monday, June 5, at the beginning of the lecture.
- Please indicate whether each student in the group is enrolled in the 8:00 AM o 9:30 AM lecture (maximum 3 students per group).
- If some student in the group is enrolled in the 8:00 AM class, the problem set must be turned in at 8:00 AM.

1 (30 Points) Questions from the Textbook

Answer the following questions from Krugman et al.'s textbook (9th or 10th editions)

1. (15 points) From Chapter 4: Questions 5, 6, 7 (note: these questions are based on the Section on "International Labor Mobility" from that chapter)
2. (15 points) From Chapter 5: Questions 1, 3, 6

2 (25 Points) Short Questions

1. (5 points) Workers employed in production of wine strongly support free trade, whereas workers employed in production of cheese are strongly opposed to free trade. What model of trade, and under what assumptions, can be used to explain these preferences?
2. (5 points) In the Heckscher-Ohlin model studied in the slides, suppose that $\frac{K}{L} = \frac{K^*}{L^*}$ but preferences (as reflected in the relative demand RD) may be different between countries. Suppose that the home country has comparative advantages in food. In what country do consumers have stronger preferences for food?
3. (15 points) In the Heckscher-Ohlin model studied in the slides, where C is capital-intensive, Home is labor-abundant, there is no factor substitution, and both countries are incompletely specialized:

(a) Suppose the labor endowment at home increases. Discuss how this will impact the wage relative to the returns to capital at home when both countries are open to trade and when both countries are closed to trade.

(b) Suppose that labor migrates from Foreign to Home. How does the relative price under free trade change?

(c) Suppose that it costs $\tau\%$ of the price of a good to ship it between countries. Is $\frac{w}{r}$ larger, smaller, or the same as $\frac{w^*}{r^*}$? Why?

3 (20 Points) Heckscher-Ohlin Model (No Factor Substitution)

Consider the Heckscher-Ohlin model from the slides in the case of no factor substitution. The production technology of food and cloth are:

$$Q_F = \min\left[\frac{L_F}{3}, K_F\right]$$
$$Q_C = \min\left[\frac{K_C}{3}, L_C\right]$$

The home country has 100 units of labor and 80 units of capital, and the foreign country has 80 units of labor and 100 units of capital. The relative demand is $\frac{D_C}{D_F} = \frac{1}{P_C/P_F}$ in both countries.

1. (3 Points) What are the unit capital and labor requirements in each sector? What sector is capital intensive?

2. (4 Points) Assuming that all factors of production are employed, what are the quantities produced of C and F in each country?

3. (4 Points) What is the quantity exported or imported by each country in each sector under free trade?

4. (9 Points) Assume that $P_F = 1$ under both autarky and trade. Show what happens to the return to each factor (w and r) and to the wage relative to capital return ($\frac{w}{r}$) in each country as each country moves from autarky to free trade. Which factor gains and which factor looses?

4 (25 Points) Heckscher-Ohlin with Cobb-Douglas Technologies

Consider a model with 2 sectors, C and F and 2 factors, L and K. Output in each sector in the home country is:

$$Q_C = L_C^{\alpha} K_C^{1-\alpha},$$
$$Q_F = L_F^{\beta} K_F^{1-\beta},$$

where Q_C and Q_F are output of C and F, L_C and L_F are number of workers used in C and F, and K_C and K_F are units of capital used in C and F. Total endowments of capital and labor are K and L at home and K^* and L^* at foreign. Assume $\alpha < \beta$, where both α and β are between 0 and 1. It can be shown that in this model the unit factor requirements at Home depend on factor prices as follows:

$$a_{LC} = \left(\frac{w}{r}\frac{1-\alpha}{\alpha}\right)^{\alpha-1}$$
$$a_{KC} = \left(\frac{w}{r}\frac{1-\alpha}{\alpha}\right)^{\alpha}$$
$$a_{LF} = \left(\frac{w}{r}\frac{1-\beta}{\beta}\right)^{\beta-1}$$
$$a_{KF} = \left(\frac{w}{r}\frac{1-\beta}{\beta}\right)^{\beta}$$

1. (4 Points) What sector is capital intensive?

2. (8 Points) Assume that the home economy is incompletely specialized. Suppose that the price of F increases. Are capital-owners better off or worse off? Does the answer depend on what goods capital-owners like to consume?

3. (4 points) Suppose that $\frac{L}{K} > \frac{L^*}{K^*}$ and both economies are incompletely specialized under trade. In what direction will the capital-labor ratio change within each sector in the Home country as the economy opens up from autarky to free trade? Justify your answer.

4. Suppose that each economy is completely specialized in the good that is intensive in the economy's abundant factor.

   (a) (4 points) In what country is the wage-rental w/r higher? Justify your answer.

   (b) (5 points) Suppose that there is an increase in the amount of capital in the home country. How will this impact the wage-rental rate $\frac{w}{r}$ in each country?