

**Second Problem Set**  
**Economics 433: Advanced International Trade**

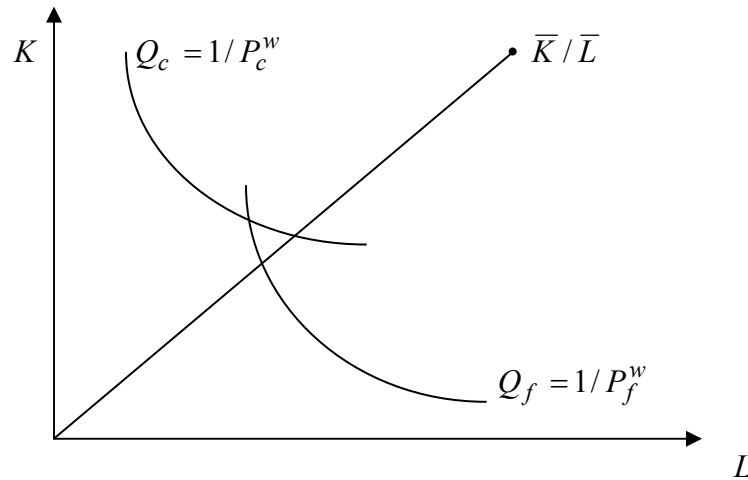
Due October 24, 2006  
Prof. Tybout

Please print this problem set out and work directly on it. Show your calculations. If necessary, you may attach extra sheets. All work on this problem set must be done on an individual basis.

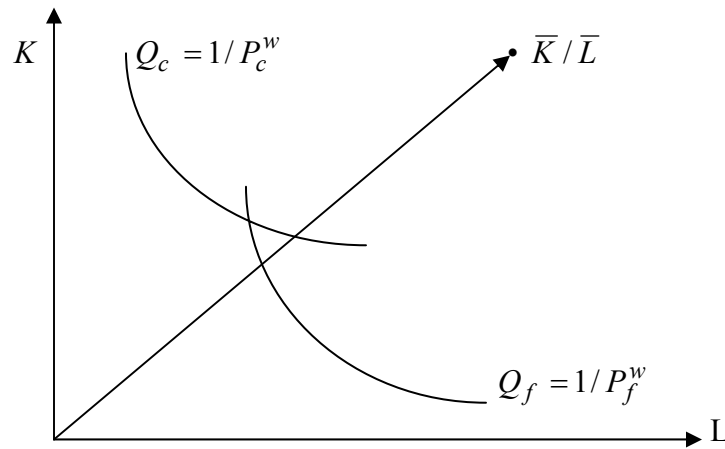
Name \_\_\_\_\_

Student ID \_\_\_\_\_

1. The Lerner diagram below characterizes a *small* open economy that produces capital-intensive cloth ( $C$ ) and labor-intensive food ( $F$ ). This economy faces world prices for cloth and food given by  $P_c^w$  and  $P_f^w$ , and it is endowed with  $\bar{K}$  units of capital and  $\bar{L}$  units of labor:

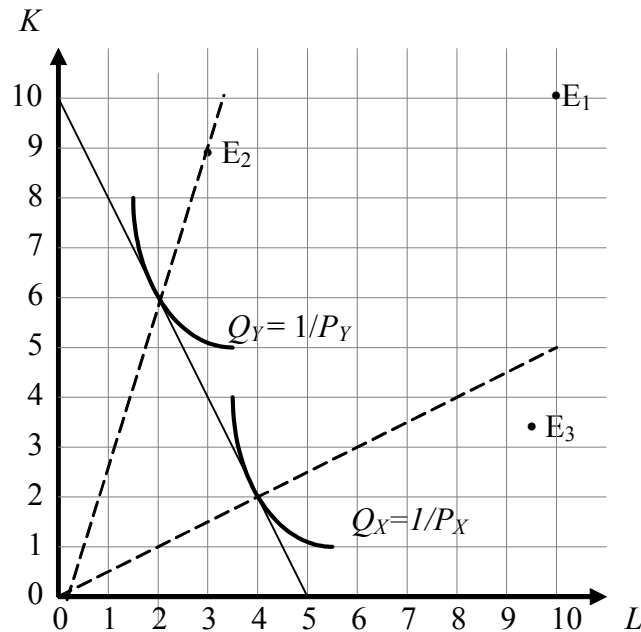


- a. If the labor force increases, what happens to the wage rate (increases, decreases, doesn't change) \_\_\_\_ To the return on capital? (increases, decreases, doesn't change) \_\_\_\_ To domestic food production? (increases, decreases, doesn't change) \_\_\_\_ Modify the diagram above to depict your answer.



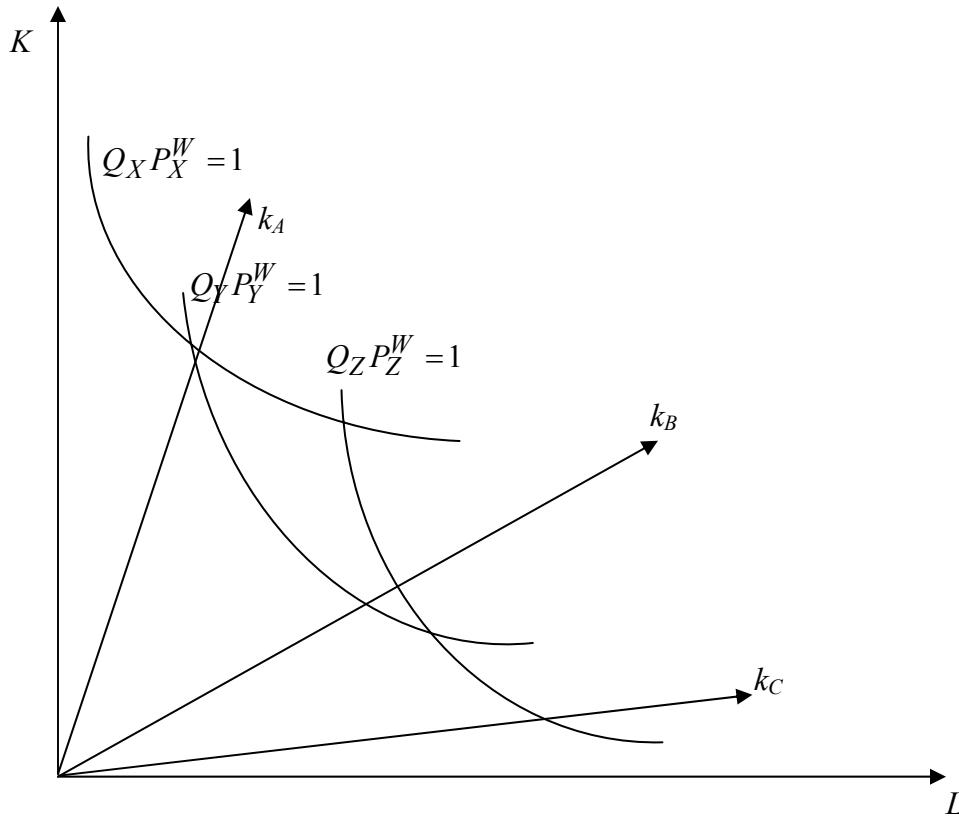
- b. If the world price of cloth rises while the price of food remains unchanged, what happens to the ratio of wages to rental costs for capital? (increases, decreases, doesn't change) \_\_\_\_ What happens to the capital-intensity of food production? (increases, decreases, doesn't change) \_\_\_\_ . Modify the diagram above to depict your answer.

2. Consider the Lerner diagram below, which depicts unit revenue isoquants for two traded goods—shirts ( $X$ ) and steel ( $Y$ ). Each good is produced with capital ( $K$ ) and labor ( $L$ ) using a constant returns production technology, but shirts are less capital-intensive than steel. The line that is tangent to these unit revenue isoquants is a unit isocost line: it represents all bundles of capital and labor that can be purchased for \$1 at the prevailing factor prices.



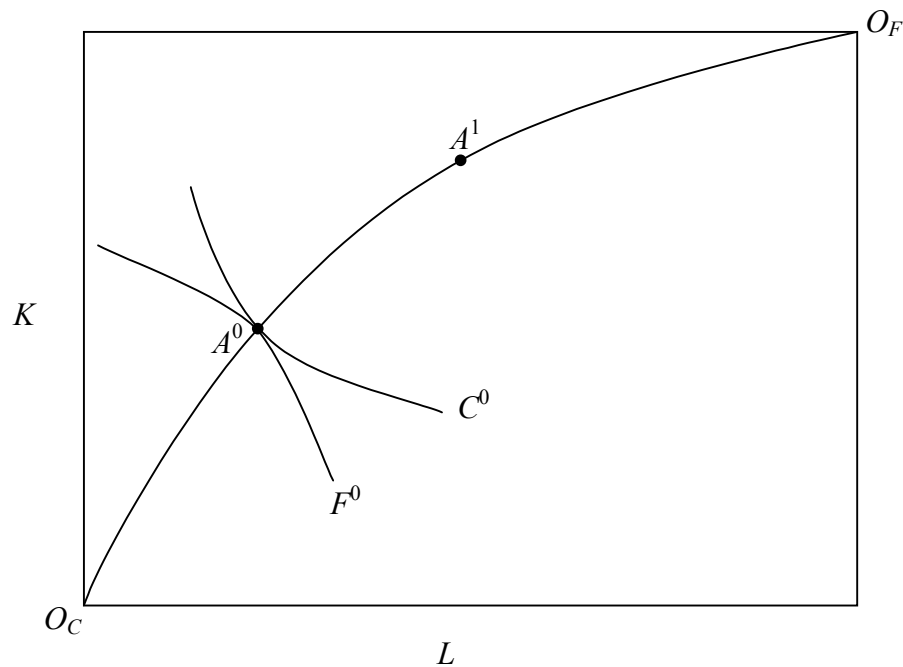
- If both goods are being produced, what are the prices of capital and labor?  
 $r = \underline{\hspace{2cm}}$  ,  $w = \underline{\hspace{2cm}}$
- Continue to assume that both goods are produced, and suppose the price of a shirt is  $P_X = \$0.25$  and the price of a unit of steel is  $P_Y = \$0.50$ . If the steel sector were to employ 3 units of capital and 1 unit of labor, how many units of steel would it produce?  $Q_Y = \underline{\hspace{2cm}}$  If the shirt sector were to employ 4 units of capital and 8 units of labor, how many shirts would it produce?  $Q_X = \underline{\hspace{2cm}}$ .
- Suppose the economy's overall endowment of capital and labor is at the point  $E_1$ . What total amount of each good will the economy produce?  $Q_X = \underline{\hspace{2cm}}$  ,  $Q_Y = \underline{\hspace{2cm}}$ . Briefly explain why the economy will produce this particular combination.
- If the economy's endowment point had been  $E_2$  , what would your answer to part c have been?  $Q_X = \underline{\hspace{2cm}}$  ,  $Q_Y = \underline{\hspace{2cm}}$ . If it had been point  $E_3$ , which good or goods would be produced? (shirts, steel, both)  $\underline{\hspace{2cm}}$ . If the endowment were to move from  $E_1$  to  $E_3$ , then  $w/r$  would (rise, fall, remain the same)  $\underline{\hspace{2cm}}$ . Briefly explain why.

3. The graph below shows unit value isoquants for three goods,  $X$ ,  $Y$  and  $Z$ , based on prices that are assumed to prevail throughout a world of many countries with free trade. Also shown are rays representing the capital intensities of three countries,  $A$ ,  $B$ , and  $C$ . Answer the following questions:



- In equilibrium, will all three countries produce all three goods? Explain. For any country that you predict will *not* produce all three goods, identify the goods it will produce.
- In which country or countries will the wage rental ratio,  $w/r$ , be highest? Why?
- Suppose a new technology is developed for the production of good  $Y$ . It allows all three countries to produce the same amount of output with less of each input. How will this affect the wage rental ratio,  $w/r$ , in each country? How will it affect the capital intensity of production, good by good, in each country? (For this question you may assume that the global price of good  $Y$  remains constant, perhaps because the technology has not diffused to other countries.)

4. The Edgeworth Box below shows the efficiency locus of a country as well as a particular allocation,  $A^0$ , along that contract curve at which the country would produce, given certain prices,  $p_C^0$  and  $p_F^0$ , for clothing and food. Its outputs at  $A^0$  are  $C^0$  and  $F^0$ .



- Identify the wage-rental ratio,  $w^0/r^0$ , on the graph in this initial equilibrium. Are you able to determine the factor prices,  $w^0$  and  $r^0$ , individually from this diagram?
- Identify in the figure the allocations of labor and capital to each of the industries,  $K_C^0$ ,  $L_C^0$ ,  $K_F^0$ , and  $L_F^0$ , as well as their ratios,  $k_C^0 = K_C^0 / L_C^0$  and  $k_F^0 = K_F^0 / L_F^0$ .
- Now consider a different allocation on the efficiency locus,  $A^1$ . In order for the country to produce there, how would relative prices have to differ from  $p_C^0 / p_F^0$ ?
- How do the factor allocations you looked at in part (b), and their ratios, differ at  $A^1$  from what they were at  $A^0$ ?
- Draw isoquants for both industries through point  $A^1$ . Now identify the wage-rental ratio,  $w^1/r^1$ , as you did in part (a). How does it compare to  $w^0/r^0$ ?