

Note to fall 2006 students: This exam covers some material that has not yet been introduced this year, including the Heckscher-Ohlin model and unit revenue isoquants. Obviously you are not yet responsible for it.

**Economics 433: Advanced International Trade**

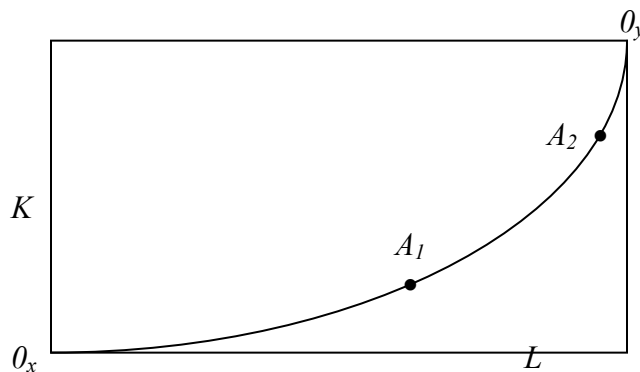
**First Midterm Exam**

October 4, 2005

**Answer Key**

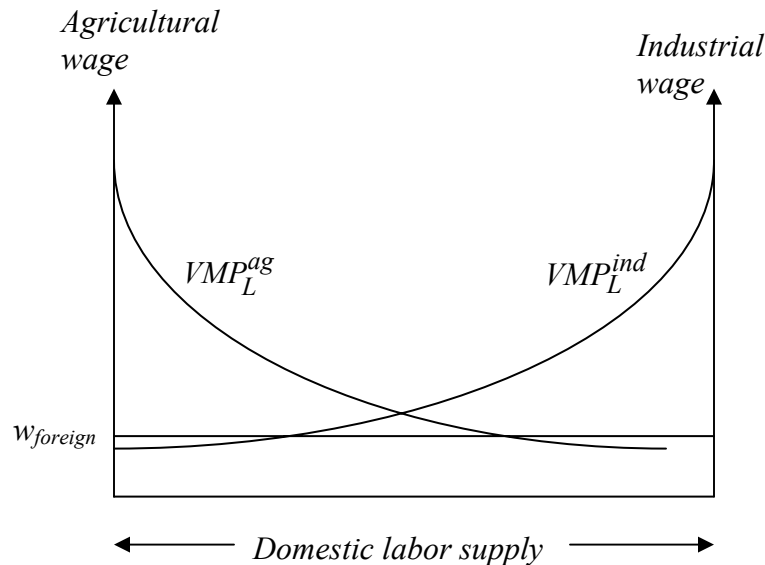
**Part I: Multiple Choice (30 minutes)**

1. Which of the following statements regarding rates of growth in world trade and foreign direct investment (FDI) since 1970 is correct?
  - a. Relative to global production, FDI has been stable, while trade has been shrinking.
  - b. Relative to global production, trade has been stable, while FDI has been shrinking.
  - c. Both trade and FDI have been shrinking relative to global production.
  - d. **Both trade and FDI have been growing relative to global production.**
  
2. Which of the following statements concerning the United States current account deficit is not correct?
  - a. The current account deficit reflects the fact that the United States is purchasing more goods and services than it is producing.
  - b. **The current account deficit could be eliminated with a modest depreciation in the Chinese yuan.**
  - c. The current account deficit has grown rapidly since 2000, largely because the United States fiscal deficit has grown.
  - d. The current account deficit could be improved if the private sector could be induced to increase its savings rate.



3. Referring to the Edgeworth box above, which of the following statements is correct?
  - a. Good  $X$  is more capital-intensive than good  $Y$ .
  - b. **Production of good  $Y$  is higher at point  $A_1$  than at point  $A_2$ .**
  - c. Point  $A_1$  corresponds to a point inside the production possibility frontier, while point  $A_2$  corresponds to a point *on* the frontier.
  - d. The wage-rental ratio,  $\frac{w}{r}$ , is higher at point  $A_1$  than at point  $A_2$ .
  
4. When President Jefferson imposed a trade embargo during the Napoleonic wars,
  - a. **the prices of commodities imported by the U.S. rapidly rose.**
  - b. the prices of U.S. export commodities rose in response.
  - c. the volume of exports fell off, but imports remained stable.
  - d. the damage to the U.S. economy amounted to roughly 30 percent of GDP.

The next two multiple choice questions concern the diagram below. It depicts the labor market for a small open economy with two sectors—agriculture and industry. Agriculture uses land and labor, while industry uses capital and labor. Land and capital are specific to their respective sectors, while labor is mobile across sectors.

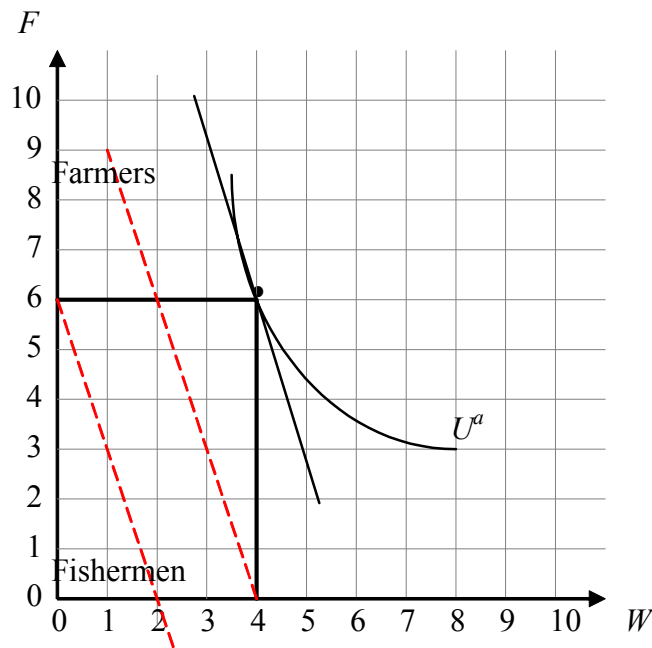


5. Ignore the foreign wage ( $w_{foreign}$ ) for this question. Which of the following is a likely consequence of an increase in the world price of industrial goods?
  - a. an increase in the ratio of wages to the price of industrial goods.
  - b. a reduction in the ratio of wages to the price of agricultural goods.
  - c. an increase in the price of land relative to the price of agricultural goods.
  - d. **an increase in the price of capital ( $r$ ) relative to the price of industrial goods.**
  
6. Holding world prices constant, suppose that migrant labor becomes available from a neighboring country at the wage rate  $w_{foreign}$ . If the government allows domestic employers to hire these migrant workers, which of the following is not a likely consequence?
  - a. **an increase in the total income of domestic (non-migrant) workers.**
  - b. an increase in the total income of capitalists.
  - c. an increase in the total value of domestic output.
  - d. an increase in the total income of land owners.
  
7. Under the assumptions of the Heckscher-Ohlin model, if a small, open economy manages to accumulate more capital,
  - a. it will expand production of both goods.
  - b. **it will expand production of the capital-intensive good and reduce production of the other good.**
  - c. it will experience a reduction in the return on capital.
  - d. it will experience immiserizing growth.

8. The textbook version of the Heckscher-Ohlin theorem concerns two countries (A and B) that produce two goods (X and Y) using two factors (K and L). It states that, if country A has less capital per worker than country B, and if X production is less capital intensive than Y production:
- Country A will export X to B in exchange for Y.**
  - Country A will produce more X than Y.
  - Country B will export X to A in exchange for Y.
  - Country B will produce more X than Y.
9. Under the assumptions of the Ricardian model with increasing returns to scale in one sector, going from autarky to free trade:
- will always increase national welfare
  - will always reduce national welfare
  - can hurt national welfare if a country reduces, but does not shut down, production in the increasing returns sector.**
  - can hurt national welfare if a country increases production in the increasing returns sector.
10. Consider a competitive economy that produces two goods (X and Y) and a production possibility frontier that is concave toward the origin (i.e., bowed outward). If consumers are at a point on their indifference curves where the slope exceeds  $\frac{P_x}{P_y}$ , and producers are at a point on the production possibility frontier where  $\frac{P_x}{P_y}$  exceeds the slope:
- producers will want to shift out of X production into Y production, and consumers will want to increase the ratio of their X consumption to their Y consumption.
  - producers will want to shift out of X production into Y production, and consumers will want to reduce the ratio of their X consumption to their Y consumption.
  - producers will want to shift into X production out of Y production, and consumers will want to increase the ratio of their X consumption to their Y consumption.**
  - producers will want to shift into X production out of Y production, and consumers will want to reduce the ratio of their X consumption to their Y consumption.

**Part II: Problems and Short Answers (45 minutes)**

1. **(12 minutes)** Consider a small country in which the population consists of two groups: farmers, who produce a fixed amount of wheat ( $W_p=4$ ), and fishermen, who produce a fixed amount of fish ( $F_p=6$ ). Given that there are no substitution possibilities between these two goods, the production possibility frontier is as drawn below. Also depicted is the community indifference curve that passes through the production point, labeled  $U^a$ , and line that is tangent to this indifference curve at the production point.



- a. What is the autarky price ratio?  $p^a = P_W^a / P_F^a = 3$  Draw in the associated autarky budget lines for farmers and fishermen. If the number of fishermen is the same as the number of farmers, which group is better off in autarky (fisherman, **farmers**)?
- b. Given a world price ratio of  $p^{world} \equiv P_W^{world} / P_F^{world} = 1$ , do farmers and fisherman both gain when the economy goes from autarky to free trade? Explain.

**Answer:** No. Farmers lose because the relative price of the wheat is lower after the price change and they can not move to the other sector of the economy.

- c. To the extent that gains from trade occur at the world price ratio  $p^{world} = 1$ , are they due to specialization, to exchange, or to some combination? (specialization, **exchange**, combination).

**Briefly explain:** By the properties of the PPF - there are no substitution possibilities between these two goods in production. Hence, country can not specialize in production of any good.

2. (12 minutes) Consider a Ricardian model in which two countries (Northland and Southland) produce two goods (food and clothes) using only labor. The marginal product of labor in each type of production is given by the chart below.

	Labor need per unit output		Total Labor supply
	food (f)	clothes (c)	
Northland	2	1	20
Southland	4	5	20

- a. List the goods in which Northland has an absolute advantage. **BOTH**  
 List the goods in which Southland has an absolute advantage. **NONE**  
 List the goods in which Northland has a comparative advantage. **CLOTHES.**  
 List the goods in which Southland has a comparative advantage. **FOOD**

- b. In autarky, what is the relative price of food in Northland?  $(P_f^a / P_c^a)_{Northland} = 2$ . In Southland?  $(P_f^a / P_c^a)_{Southland} = 4/5$

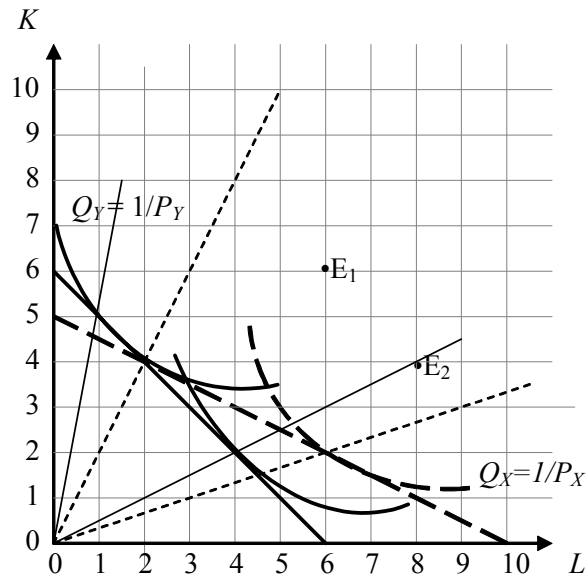
- c. Suppose demand conditions ensure that if trade were to occur between these two countries, the world price ratio would be  $(P_f^{world} / P_c^{world}) = 1$ . Are there gains from trade for *both* countries? **YES** (yes, no, ambiguous).

**Briefly explain:** There is an improvement in the terms of trade for both countries. (i.e. clothing becomes more expensive for Northland and food for Southland)

- d. In a trading equilibrium with world prices at  $(P_f^{world} / P_c^{world}) = 1$ , how much of each good would each country produce? Fill in the table below.

	Output when $(P_f^{world} / P_c^{world}) = 1$	
	Food (f)	Clothes (c)
Northland	<b>0</b>	<b>20</b>
Southland	<b>5</b>	<b>0</b>

3. (12 minutes) Consider the Lerner diagram below, which depicts unit revenue isoquants for two traded goods—shirts ( $X$ ) and cell phones ( $Y$ ). Each good is produced with capital ( $K$ ) and labor ( $L$ ), using a constant returns production technology, but shirts are less capital-intensive than cell phones. The line that is tangent to the solid 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. (Ignore the dotted isoquant and isocost line for now.)



- a. Prevailing technologies and output prices imply the solid line unit revenue isoquants depicted. If the economy is endowed with 6 units of capital and 6 units of labor ( $E_1$ ), does it produce both goods, just shirts or just cell phones? **BOTH** Given this endowment, what are the prices of capital and labor?  $r = 1/6, w = 1/6$ . (You may express your answer as a fraction.) If instead, the endowment had been 4 units of capital and 8 units of labor ( $E_2$ ), what would the economy have produced? (both goods, just shirts, or just cell phones)?

**JUST SHIRTS** What would factor prices have been?  $r = 1/6, w = 1/6$ . What is the

capital-labor ratio in shirts?  $\frac{K_x}{L_x} = 1/2$  In cell phones?  $\frac{K_y}{L_y} = 5/1$

- b. Now imagine that the unit revenue isoquant for shirts outward to the dotted line. What kind of change in global prices would induce this shift? Briefly defend your answer.

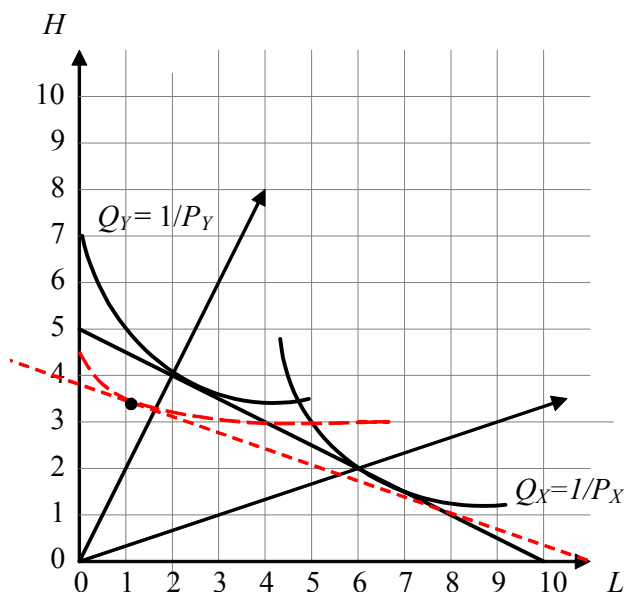
**Answer:** The fall in the price for the shirts caused this shift. This is so, because the fall in price of  $X$  will make it necessary to produce more  $X$  to get the same \$1 revenue.

What are the effects of this shift on the wage-rental ratio (increases, decreases, doesn't change) **decrease**, and on the capital intensity of production in each sector (increases, decreases, doesn't change) **decrease**.

- c. Briefly explain the economic forces that induce the changes in wage-rentals and capital intensities you indicated in part b above. (If you answered that no changes occur in these variables, explain why not.) Finally, indicate whether you think the economy is better off after the change. You may assume that this economy exports cell phones and imports shirts.

**Answer:** 1) The change in the price of X makes it unprofitable to produce X at the old wage-rentals. Hence, the demand for the labor falls (production of X is labor intensive). The wage for labor falls and thus the ratio of wage to rentals decreases making labor relatively more expensive. Hence, produces of both goods substitute labor for capital decreasing the labor intensity of the production.  
 2) The country is better off after this change because it experiences improvement in terms of trade.

4. (9 minutes) The diagram below represent unit revenue isoquants for two sectors—X and Y. The former uses unskilled labor (L) intensively, and the latter uses skilled labor (H) intensively.



- a. Modify the diagram to show how technological change might result in:
- an increase in the ratio of skilled wages to unskilled wages, *and*
  - an increase in the skill-intensity of production in the skill-intensive sector.

Your modified diagram should involve a shift in the unit revenue isoquant for *one* of the goods, and it should involve an associated shift in the \$1 isocost line.

**Answer:** See the dashed lines on the picture. The new unit isorevenue line must be flatter than the original to induce an increase in the skill-intensity of production, and

the new tangency point must be at a point closer to the origin to induce the increase in the ratio of skilled to unskilled wages.

b. Briefly explain why your modification satisfies the two conditions listed above.

- i) The budget line became flatter and thus condition i) is satisfied. This flattening reflects skill-biased technological progress.
- ii) Since the new tangency point is to the left of the ray from the origin through the initial point of tangency between the unit isoquant for  $Q_Y$  and unit isocost, the condition ii) is satisfied ( i.e. the ratio of skilled to unskilled labor increases in the production of  $Y$ ).