Economics 433: Advanced International Trade

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Midterm Exam 1

ANSWER KEYS

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Please answer all questions in exam. Be sure to read the questions carefully, show your work where calculations are required, and provide concise explanations when then are solicited. The points for each question are based on an estimate of the time (minutes) necessary to answer them. The total number of points is 75.

GOOD LUCK!

PART I (TRUE/FALSE, 3 pts each)

State whether the claim is true or false. Explain your answer in one or two lines.

1) In monopolistic competition the firm that charges a price above its competitors' prices will lose all its customers to them.

   FALSE Since the products are differentiated the firm may lose some of its customers but not all of them. There still will be customers willing to pay higher price to buy products with characteristic this firm offers.

2) The outstanding feature of the Heckscher–Ohlin model is the *intra-industry* trade which is a consequence of the different resource endowments across countries.

   FALSE Intra-industry trade is a consequence of differentiated products which is a feature of monopolistic competition model. In fact, Heckscher–Ohlin model assumes homogenous products and thus rules out intra-industry trade.

3) The only source of gains from trade in a monopolistic competition model is the fall in prices that consumers face, which in turn is due to the increasing returns to scale.

   FALSE In monopolistic competition consumers also benefit from increased variety.

4) A large influx of capital (through FDI) will lead to an increase in output for all industries in the economy simply because there is more capital to use everywhere.

   FALSE The influx of capital will increase output in the capital intensive industry and reduce output in the labor intensive one.

5) In the long run the rental rate and the wage will change to accommodate an influx of workers from abroad.

   FALSE In the long run there will be no changes in the rental rate and wage.

PART II (SHORT QUESTIONS, 10 pts each)

QUESTION 1

Imagine that I observe that labor intensive sectors are shrinking in a fast-growing country. Explain how we can explain this through the Rybzcynski theorem.

ANSWER: Suppose that for some reasons there is large inflow of FDI in a country or local firms start to invest more in capital. Thus, capital becomes more abundant relative to labor. By Rybzcynski theorem there will be decline of the labor intensive sectors but at the same time the economy will be growing because the capital intensive industries will flourish.

QUESTION 2

Imagine a Hecksher-Ohlin model but instead of capital and labor, the two factors are skilled and unskilled labor. The ratio of the wage of skilled to the wage of unskilled workers is called the skill premium. Armed with the Stolper-Samuelson Theorem, explain how China's opening up to trade with the world is likely to affect the skill premium in the U.S. Explain the impact of such a shock on the real wage for skilled and unskilled workers, as well as the output of the two sectors (i.e., the skilled-labor intensive, and the unskilled labor intensive sectors).

ANSWER: China is abundant in unskilled labor. When China starts trading, it will specialize in the unskilled-labor intensive goods by the Hechscher-Ohlin theorem. Thus, the world relative price of the unskilled-labor intensive good will fall. By the Stolper-Samuelson Theorem the real wage of unskilled workers in the US will fall and the real wage of skilled workers will rise because the US is abundant in skilled labor. Moreover, the output of skilled-intensive industries will rise and that of unskilled-labor intensive industries will fall in the US. (The situation in China will be reverse) It is clear that the skill premium will rise in the US.

QUESTION 3

Imagine a country that produces two goods, X and Y, with two factors of production, K and L. The technology for producing goods X and Y is such that ***for any factor prices*** the capital-labor ratio used in X is 9 and in Y is 6. The endowment of K is 5600 and of L is 700. What is the allocation of labor and capital in these two sectors such that there is full employment of L and full utilization of K?

ANSWER: We know that $K_x/L_x=9$ and $K_y/L_y=6$. The corresponding equilibrium equation is now $9*(L_x/L) + 6*(1-L_x/L) = 8$, which yields a solution: $L_x=2/3*700=467$, $L_y=1/3*700=233$, $K_x=9*2/3*700=4200$ and $K_y=6*1/3*700=1400$.

QUESTION 4

Imagine two countries, Home and Foreign. Consumers in each country spend a total of $200 million on cars no matter what the price is. Each firm has a fixed cost of $20 million and a MC of $10,000.

a) The monopolistic competition equilibrium under autarky supports 5 types of cars (5 firms producing different varieties of cars) in each country. How many cars does each firm sell?

ANSWER: If each firm sells x, then their average cost is AC = $20 million/x+$10000, and this must be equal to the price, p. But if each firm sells x, then x = $200 million/np. Since n = 5, then p = $40 million/x. Hence we need that x satisfy: $20 million/x+$10000= $40 million/x. This implies x = 2000 cars. Each firm sells 2000 cars. The price is then p = $40 million/2000=$20000.

b) Now assume that there is free trade, and that in the new monopolistic competition equilibrium all 5 firms survive in each country. How many cars does each firm sell in the free trade equilibrium? Do consumers gain from trade?

ANSWER: Each firm sells the same number of cars - 2000 because the total income and the total number of firms doubled. However, consumers gain from trade because the variety increased from 5 to 10.

PART III (ANALYTICAL QUESTION, 20 pts)

QUESTION 5

Imagine a country producing two goods, X and Y using two factors, L and K. Y is capital intensive relative to X. p is the international relative price of Y. The factor prices are w and R. The relationship between p and w/R is depicted below:

p	w/R
1	11
2	9
3	7
4	5
5	1

Moreover, assume that technology choices in each industry are such that:

w/R	K/L in X	K/L in Y
11	8	12
9	5	10
7	3	9
5	2	8
1	1	7

a) Imagine that initially the world price p is equal to 2. Consider a country with K =1400 and L = 200. What is the equilibrium w/R? What is the allocation of labor between the two industries?

ANSWER: If p=2 then w/R=9 (in yellow). If w/R=9 then $K_x/L_x=5$ and $K_y/L_y=10$. We can get an equation where the weighted average of the capital labor ratios with weights given by the labor shares must equal the capital-labor ratio in the whole economy, namely $5*(L_x/L) + 10*(1-L_x/L) = 7$, which yields $L_x=3/5*200=120$ and $L_y=80$, and hence $K_x=5*120=600$ and $K_y==800$. The labor is allocated almost evenly.

b) Now imagine that p increases to 4. What happens to w/R? What happens to the capital intensity in the two industries? What happens to the allocation of labor between the two industries? Show that the real wage falls and the real rental to capital rises.

ANSWER: If p=4 then w/R=4 (in green). If w/R=4 then $K_x/L_x=2$ and $K_y/L_y=8$. The corresponding equilibrium equation is now $2*(L_x/L) + 8*(1-L_x/L) = 7$, which yields a solution: $L_x=1/6*200=33$, $L_y=5/6*200=167$, $K_x=67$ and $K_y=1333$. We see that the labor moves from labor intensive sector X to the capital intensive sector Y.

Since capital labor ratios change from $K_x/L_x=5$ and $K_y/L_y=10$ to $K_x/L_x=2$ and $K_y/L_y=8$ (i.e., both industries become more labor intensive as the wage to rental ratio falls) then the marginal product of

L falls in both industries and thus the real wage falls. On the other hand, the labor-capital ratio rises in both industries and the marginal product of capital increases. Hence, the real rental rate rises.

c) Now imagine that p remains at 4 but L increases to 280. What is the effect of this on the allocation of labor between the two industries? What happens to output in the two industries as compared to b)?

ANSWER: Now the equilibrium equation becomes $2*(L_x/L) + 8*(1-L_x/L) = 5$, so the new equilibrium has $L_x=1/2*280=140$, $L_y=140$, $K_x=280$ and $K_y=1120$.

Thus, the amount of labor allocated to the capital intensive sector falls. The total output of Y falls and the total output of X rises because the amounts of labor and capital allocated to Y sector fall. (Note: This is exactly the Rybcynzski effect).