14.54– Fall 2024

Final Examination

Important instructions: [1] This is a closed-book examination. Put away your books, handouts, notes, calculators, palmtops, cellular phones, ... now. [2] Print your name clearly on the front cover of each blue book. Write your answers clearly. We won't grade unreadable answers.

Question 1 — Multiple Choices (30 points)

Pick the letter that best completes the sentence.

1. (3 points) Consider a Ricardian trade model with two goods, Wine and Cheese, and many countries. Suppose France requires less labor to produce Cheese than Italy. Then

   (a) France might import Cheese from Italy.

   (b) France might import Cheese from the rest of the world, but cannot import from Italy.

   (c) France must export Cheese to country Italy.

   (d) France must export Cheese to the rest of the world, but not necessarily to Italy.

2. (3 points) Consider a world economy with two countries, A and B, and three goods, X, Y and Z. The goods are produced with labor alone, with constant returns to scale. Let a_{IJ} be the labor requirement to produce a unit of good I in country J. Suppose $a_{XA}/a_{XB} > a_{YA}/a_{YB} > a_{ZA}/a_{ZB}$. Concerning the pattern of trade

   (a) A might import goods X and Z.

   (b) A might export goods X and Z.

   (c) A might export goods Y and Z.

   (d) A might import goods Y and Z.

3. (3 points) Suppose that a small open economy produces Food with Land and Labor and it produces Manufactures with Capital and Labor. The country imports Manufactures and exports Food at a fixed relative world price p_M^*/p_F^*. Then an improvement in its terms of trade (i.e., a fall in p_M^*/p_F^* that makes imports relatively cheaper) results in

   (a) A fall in the real income of both capital owners and land owner.

   (b) An increase in the real income of both capital owners and land owners.

   (c) An increase in the real income of land owners but a fall in the real income of capital owners.

   (d) An increase in the real income of capital owners but a fall in the real income of land owners.

4. (3 points) Two countries, A and B, produce and trade two goods, X and Y, with capital and labor using the same technology. Good X is capital intensive. Country A has twice as much capital as country B and exactly as much labor as country B. Households in Country A demand relatively more of good Y compared to their counterparts in B at any common price. Concerning the pattern of trade in a free trade equilibrium

   (a) Country A will export good X.

   (b) Country B will export good X.

   (c) The countries will not trade.

   (d) There is not enough information to determine the pattern of trade.

5. (3 points) The country Rich is relatively well endowed with skilled labor whereas its trade partner, Poor, is relatively well endowed with unskilled labor. The two countries produce and freely trade two goods using the same constant-returns-to-scale technologies. The countries have identical and homothetic preferences. In this setting, when trade opens

   (a) The real wage of skilled workers in Rich must rise, the real wage of unskilled workers in Rich must fall, and the income rise for skilled workers need not exceed the income fall for unskilled workers.

   (b) The real wage of unskilled workers in Rich must rise, the real wage of skilled workers in Rich must fall, and the income rise for unskilled workers need not exceed the income fall for skilled workers.

   (c) The real wage of unskilled workers in Rich must rise, the real wage of skilled workers in Rich must fall, and the income rise for unskilled workers must exceed the income fall for skilled workers.

   (d) The real wage of skilled workers in Rich must rise, the real wage of unskilled workers in Rich must fall, and the income rise for skilled workers must exceed the income fall for unskilled workers.

6. (3 points) A country is more likely to benefit if

   (a) It is large and taxes imports.

   (b) It is small and subsidizes exports.

   (c) It is large and subsidizes exports.

   (d) It is small and taxes imports.

7. (3 points) A country imports chocolate. Imposing an import tariff on chocolate is more likely to be better than imposing an import quota if

   (a) The country is large.

   (b) The country is auctioning export licenses to foreigners.

   (c) The country has a single producer of chocolate.

   (d) None of the above.

8. (3 points) A small open economy exports bicycles. If it introduces a subsidy on exports of bicycles, this will

   (a) Decrease exports of bicycles.

   (b) Decrease domestic consumption of bicycles.

   (c) Decrease domestic production of bicycles.

   (d) None of the above.

9. (3 points) There are two large countries, the United States and China, and two goods, solar panels and soy bean. The United exports soy beans and imports solar panels. If the United States imposes a small import tariff on solar panels, whereas China imposes a small import tariff on soy beans, then

   (a) Both countries are better off than under free trade.

   (b) Both countries are worse off than under free trade.

   (c) The United States is better off than under free trade, but China is worse off.

   (d) China is better off than under free trade, but the United States is worse off.

10. (3 points) The production of beef generates negative externalities caused by carbon emissions. If a small open economy exports beef, it will benefit from

    (a) A small tax on beef consumption.

    (b) A small subsidy on beef exports.

    (c) Neither of the above.

    (d) Both of the above.

Question 2 — True, False, Uncertain (20 points)

State whether the following statements are true, false, or uncertain, and briefly give the reason for your answers. The explanation is more important than the correct classification.

(a) (3.33 points) In a Ricardian model, workers employed in import-competing sectors are more likely to oppose trade.

(b) (3.33 points) Specific factors are more likely to favor trade protection than mobile factors.

(c) (3.33 points) Factor prices are more likely to be equalized across countries if countries are completely specialized.

(d) (3.33 points) The European Common Agricultural Policy is a boon for countries outside Europe specialized in the agricultural sector.

(e) (3.33 points) Immigration necessarily lowers wages.

(f) (3.33 points) Offshoring cannot raise the real wage of the workers whose jobs are being offshored.

Question 3 — Theoretical Question (20 points + 5 bonus points)

Consider the specific-factors model (2 goods, 3 factors, where labor is the flexible factor) for a given country, call it Mexico, with the following Cobb-Douglas production technologies:

$$\begin{aligned} Q_C &= \sqrt{K}\sqrt{L_C} \text{ (Car production)} \\ Q_W &= \sqrt{T}\sqrt{L_W} \text{ (Wheat production)} \end{aligned}$$

where $L = L_C + L_W$ is the aggregate endowment of labor (as usual, K and T are the aggregate endowments of capital and land). Further assume that Mexico is a small open economy facing fixed world prices $p_C = 2$ and $p_W = 1$.

(a) (6 points) Suppose that the initial endowments of the three factors are given by $L = 200$, $K = 10$, and $T = 10$. Derive the equilibrium allocation of labor to the two sectors, L_C and L_W.

(b) (4 points) Using your answer in (a), compute the equilibrium factor prices, w, r_K, and r_T.

(c) (6 points) Suppose that because of Foreign Direct Investment (FDI), the stock of capital in Mexico increases by 500% (to $K' = 60$). Compute the new equilibrium factor prices, w', r'_K, and r'_T.

(d) (4 points) Which of these three groups—workers, capitalists, and landlords—will oppose FDI?

(e) (+ 5 bonus points) Now suppose that Mexico does not trade goods with the rest of the world (both before and after the 500% increase in the stock of capital). Further assume that all Mexican consumers have Leontief preferences over cars and wheat—2 cars are consumed with every unit of wheat. Which groups will now oppose FDI? [Hint: you should still use wheat as the numeraire $p_W = 1$]

Question 4 — Theoretical Question (20 points)

Consider a country, call it Home, that produces computers (C) and tee-shirts (T) using skilled labor (S) and unskilled labor (L). The techniques of production in each industry are Leontief, and hence unit factor requirements (in terms of man hours) are fixed and are given by:

$$\begin{aligned} a_{SC} &= 200;\ a_{ST} = 1; \\ a_{LC} &= 100;\ a_{LT} = 2. \end{aligned}$$

Hence, for instance, producing a computer requires 200 hours of skilled work and 100 hours of unskilled work.

(a) (4 points) What do the isoquants look like for each industry? How does the ratio of skilled to unskilled labor (hours) depend on the relative wage $\frac{w_S}{w_L}$? Which industry is skill intensive?

(b) (3 points) Suppose that demand conditions are such that the autarky price of a computer is \$1,000 and the autarky price of a tee-shirt is \$8. Assume that the Home country produces both goods. What are the autarky hourly wage levels w_S and w_L?

(c) (3 points) Suppose that the economy is endowed with 10,000 hours of skilled work and 10,000 hours of unskilled work. How many computers and tee-shirts will the economy produce under autarky?

(d) (4 points) Suppose that this economy opens up to trade with another economy that is relatively abundant in unskilled labor and as a result the world price of tee-shirts falls to \$6. Suppose that the price of computers remains at \$1,000. Assume that the Home country continues to produce both goods. What are the new values of w_S and w_L? How have they changed? What theorem could you have used to predict this result?

(e) (2 points) Suppose again that Home is endowed with 10,000 hours of skilled work and 10,000 hours of unskilled work. How many computers and tee-shirts will the economy produce under free trade?

(f) (2 points) Compare your answer to your answer in (c). Will there be any trade in equilibrium?

(g) (2 points) You are a skilled worker at Home. Do you favor an import quota on tee-shirts?

Question 5 — Theoretical Question (10 points)

The United States faces a perfectly elastic foreign export supply curve for EVs. Its supply curve of EVs is $p = 5 + q$, while its demand curve for EVs is $p = 25 - q$. The international price is 10.

(a) (2 points) What are total US imports under free trade?

(b) Starting from a situation of free trade, the US President of decides that he wants to double the domestic production of EVs.

(i) (3 points) What is the welfare loss of doing this through an import tariff?

(ii) (3 points) What is the welfare loss of doing this through a production subsidy?

(iii) (2 points) Explain the difference between (i) and (ii).