ECO 352 – International Trade – Spring Term 2010

SAMPLE FINAL EXAMINATION

IMPORTANT INSTRUCTIONS:

1. No electronic equipment – computers, calculators, cell phones etc. – can be used.
2. Any material on paper – books, notes, etc. – can be used.
3. This exam has FOUR pages. Make sure you have them all.
4. Write your name clearly in uppercase letters on each answer book you use.
5. Write out and sign the honor pledge on the cover of your first answer book: "I pledge my honor that I have not violated the Honor Code during this examination."
6. The total time available is 3 hours = 180 minutes. Allocate your time carefully. We suggest using the first 10 minutes to read the exam carefully, and the final 15 minutes to read your answers and make any corrections or editorial changes, leaving 155 minutes for actually writing your answers. The number of minutes indicated on individual questions are only suggestions; your allocation should depend on your skills in answering the different types of questions.
7. Extra time can be "purchased" at the rate of FOUR points per MINUTE or part thereof.

QUESTION 1: 20 points (4 for each part), 30 minutes

For each of the statements below, say whether it is clearly true, clearly false, or uncertain (true in some circumstances not specified in the statement and false in others), and justify your answer in two or three sentences.

(a) If all consumers have the same preferences (same utility function), and there are aggregate gains from trade for the country, then all consumers gain from trade.

(b) "Each nation is like a big corporation competing in the global marketplace." – William Jefferson Clinton.

(c) Increasing returns to scale will lead to monopolies in world trade and therefore consumers will lose from trade.

(d) A tariff and a quota that generate the same volume of imports will have identical effects on prices and welfare.

(e) Over the last 50 years, countries that maintained an overvalued real exchange rate have grown faster than those that adopted the opposite strategy, because an overvalued real exchange rate favored their domestic producers.

QUESTION 2: 30 points (10 for each part), 45 minutes

(a) "If there were free migration and truly open borders, workers from the lower-wage countries would stream into the higher-wage countries. These new arrivals would compete for jobs, accept work for lower pay, and force the existing jobholders to accept either lower wages or unemployment. Precisely for this reason, no one accepts or supports the notion of free immigration.

"We do, however, accept and support the notion of free trade, which has the same effect. Instead of exporting workers to the United States, lower-wage countries simply import our jobs and industries to their workers. As the higher-wage nation suffers cutbacks in production, failures of companies, and losses of jobs, the market dictates that workers accept lower wages and a reduced standard of living to match the lower-wage foreign competition."

– Professor John Culbertson, University of Wisconsin, writing in the *Harvard Business Review,* September-October 1986.

Explain the economic reasoning in this argument and assess its validity.

(b) "Consider two countries producing the same good with the same constant returns to scale production function, relating output to homogeneous capital and labor inputs. ... the Law of Diminishing Returns implies that the marginal product of capital is higher in the less productive (i.e., in the poorer) economy. If so, then if trade in capital good is free and competitive, new investment will occur only in the poorer economy, and this will continue to be true until capital-labor ratios, and hence wages and capital returns, are equalized." – Robert E. Lucas, *American Economic Review,* 1990.

Within the set-up of Lucas' statement – output produced by capital and labor with constant returns to scale and the same technology being accessible to all countries – how can our models of international trade explain why capital flows do not occur the way Lucas argues they should?

(c) When NAFTA was being debated in the U.S. Congress, Representative Jerry Lewis of California said: "Bill Johnson owns the largest Caterpillar distributorship in the West. There is currently a 20% tariff on his products sold in Mexico. Caterpillar has a 50 percent share of the Mexican market. The other half is dominated by Komatsu Company of Japan. Bill says, 'Imagine what will happen when the 20 percent tariff comes off our tractors and it remains on the ones from Japan.' "

Under what circumstances will this effect of NAFTA be beneficial, and when will it be harmful, to (i) the U.S., (ii) Mexico, and (iii) Japan?

QUESTION 3: 25 points, 40 minutes

Assume that all Netbooks are identical goods, and that the market is competitive. The demand for Netbooks from users in the US is given by the demand curve

$$Q = 9 - P ,$$

and the supply of Netbooks from US manufacturers is given by the supply curve

$$Q = P - 2 ,$$

where the price P is measured in hundreds of dollars and the quantities Q are measured in millions. The market for Netbooks in the US is large enough to influence the world price. The export supply curve of foreign manufacturers selling in the US market is given by

$$Q = 2 P - 1.$$

QUESTION 3 CONTINUED

(a) (2 points) What would be the price of a Netbook in the US if imports were banned?

(b) If Netbooks can be imported freely into the US:
(i) (2 points) What is the equilibrium price of Netbooks in the US market?
(ii) (2 points) What are the quantities consumed, produced, and imported in the US market?
(iii) (2 points) What are the resulting consumer, producer, and total social surpluses in the US?

(c) If the US imposes a tariff t (in hundreds of dollars) on each Netbook imported,
(i) (3 points) Find the equilibrium prices of Netbooks in the US corresponding to t = 2, 4, 6.
(ii) (3 points) For each of these tariff levels, find the equilibrium quantities consumed, produced, and imported in the US market.
(iii) (3 points) For the cases of t = 2 and t = 4 only, calculate the consumer, producer, and total social surpluses in the US.
(iv) (3 points) Compare the social surpluses attained for each of these two tariff levels to the total social surplus under free trade. In each case, give the economic intuition for the difference.

(d) (5 points) Find the tariff that maximizes US welfare (total social surplus).

QUESTION 4: 25 points, 45 minutes

Note: [1] Show clearly and readably all the steps of your calculations. [2] You are not allowed to use calculators. Almost all the numerical calculations in this question can be done using paper and pencil. You are given the following information for the few exceptions; they will also serve as hints as to whether your answers are correct: 400 – 192 – 96 = 112, 112 * 112 = 12544, 110 * 110 = 12100, and 120 * 105 = 12600. [3] You can also use the following result: For any constants a and b, the function f(x) = (x-a)(b-x) is maximized when x = (a+b) / 2.

For the purpose of this question, suppose that all computer hardware is produced by Denovo, a 100% Chinese-owned company, and all software is produced by Programagica, a 100% Indian-owned company. They compete in world markets as price-setting duopolists. For the purpose of this question you should ignore the market for these goods/services within China and India, and focus only on the export market in the rest of the world. The demand functions for the two in that market are given by

$$Q_H = 400 - P_H - \tfrac{1}{2} P_S \quad \text{and} \quad Q_S = 400 - \tfrac{1}{2} P_H - P_S$$

where Q denotes quantity, P denotes price, H denotes hardware, and S denotes software. The average and marginal costs of producing each unit quantity, whether of hardware or of software, equal 80. The Indian government is contemplating a strategic trade policy.

QUESTION 4 CONTINUED

(a) Suppose the Indian government levies an export tax T_S on each unit quantity of software.

(i) (1 point) Write down expressions for the profits of Programagica and Denovo as functions of the prices and the tax rate.

(ii) (4 points) Calculate the best response functions giving each manufacturer's profit-maximizing price as a function of the other's price and the tax rate.

(iii) (2 points) Solve these functions to express the Bertrand-Nash equilibrium prices as functions of the tax rate.

(iv) (3 points) Find the resulting expressions for the quantities and the profits of each firm, also as functions of the tax rate.

(b) The Indian government wants to maximize the country's welfare or total surplus, which equals Programagica' profit plus the government's tax revenue. The Chinese government is not deploying any strategic trade policy; its total surplus is simply Denovo's profit.

(i) (2 points) What are the Indian and Chinese total surpluses in the absence of any policy, that is, when $T_S = 0$?

(ii) (5 points) What is Indian government's optimal choice of T_S ?

(iii) (2 points) What are the resulting Indian and Chinese total surpluses and how do they compare to the case when $T_S = 0$?

(iv) (6 points) How do these results differ from the Airbus-Boeing duopoly of Problem Set 5? Give an economic explanation for your findings.