14.54 – Fall 2024

Midterm Examination

Important instructions: [1] This is a closed-book examination. Put away your books, handouts, notes, calculators, 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 — True, False, or Uncertain — 40 points

State whether the following statements are true, false, or uncertain, and briefly give the reason for your answers.

(a) There is more trade between large countries. [**5 points**]

(b) The United States is a very open economy. [**5 points**]

(c) Opening up to international trade is a form of technological progress. [**5 points**]

(d) Trade between the US and China is more likely to benefit US high-tech workers and hurt US low-tech workers. [**5 points**]

(e) A country with higher demand for high-tech goods is more likely to have a comparative advantage in high-tech sectors. [**5 points**]

(f) Terms-of-trade improvements increase the volume of exports. [**5 points**]

(g) Growth is more likely to increase welfare if it is export-biased. [**5 points**]

(h) According to the Ricardian model, real income is only a function of relative productivity across sectors. [**5 points**]

Question 2 — Multiple Choices — 30 points

Pick the letter that best completes the sentence, and briefly give the reason for your answers.

1. [**10 points**] There are two goods, Toys and Cars, and two countries, Japan and China. People have identical homothetic preferences in both countries. Japan has an absolute advantage in producing both goods relative to China, but it has a comparative advantage in producing Cars. Then,

   (a) The autarky relative price of Cars must be lower in Japan than in China.

   (b) The autarky relative price of Cars must be higher in Japan than in China.

   (c) The autarky relative price of Cars may be higher or lower in Japan than in China.

   (d) The autarky relative prices of both goods will be lower in Japan than in China.

2. [**10 points**] Consider a world economy with two countries, France and Germany. There are two goods, Wine (W) and Beer (B), with prices p_W and p_B under free trade. There are $L_F = 100$ individuals in France, who can produce 1 bottle of Wine per person, whereas there are $L_G = 200$ individuals in Germany, who can produce 2 bottles of beer per person. Individuals in both countries spend 1/2 of their income on Wine and 1/2 on Beer. If the number of individuals in the Germany L_G grows by 10%,

   (a) Individuals in France are better off, but individuals in Germany are worse off.

   (b) Individuals in Germany are better off, but individuals in France are worse off.

   (c) Individuals in both countries are better off.

   (d) Individuals in France are better off, but individuals in the Germany are indifferent.

3. [**10 points**] Two countries, Big and Small, with identical homothetic preferences, produce two goods, Aircrafts and Computers, using only labor, with constant returns to scale. Big has a labor supply of 200, whereas Small has a labor supply of 30. In Big, the available technology requires 10 units of labor to produce one Aircraft and 4 units of labor to produce one Computer. In Small, the unit labor requirements for Aircraft and Computer are 3 and 1, respectively. Then

   (a) Only workers in Big are strictly better off with free trade than in autarky.

   (b) Only workers in Small are strictly better off with free trade than in autarky.

   (c) Workers in both countries are strictly better off with free trade than in autarky.

   (d) We need more information to determine which workers are strictly better off.

Question 3 — 30 points

Consider the standard two-good, two-country Ricardian model. Suppose that in the United States, 1 man-hours are required to produce one doughnut and 1 man-hours are required to produce one bagel. In Canada, 4 man-hours are required for each doughnut and 2 man-hours are required for each bagel. Assume that preferences are such that consumers worldwide spend one-half of their income on doughnuts and the other half on bagels. The United States is endowed with L man-hours, whereas Canada is endowed with 100 man-hours.

(a) Which country has an absolute advantage in each good? Which country has a comparative advantage in each good? [**5 points**]

(b) Graph the world relative supply of doughnuts (relative to bagels) for a given L and provide an upper bound and a lower bound for the world relative price of doughnuts (relative to bagels). [**5 points**]

(c) Find the range (or interval) of US endowments of man-hours for which free trade will strictly increase welfare in the US compared to autarky. [**5 points**]

(d) Find the range (or interval) of US endowments of man-hours for which free trade will strictly increase welfare in Canada compared to autarky. [**5 points**]

(e) Suppose that the US endowment of man-hours is equal to 25. Compute the ratio of wages in the two countries, that is $w_{\text{US}}/w_{\text{Canada}}$. [**5 points**]

(f) Suppose that the US endowment of man-hours is equal to 40. Compute the ratio of wages in the two countries, that is $w_{\text{US}}/w_{\text{Canada}}$. [**5 points**]