International Trade-ECON4415
Final Exam, Fall 2009

Outline of answers

The exam consists of 100 points. Please allocate your time to each problem accordingly.

Problem 1. (20 points)

a. Explain the concept of home market effect. (6 points)

Answer: See lecture 5, section 3.
Basically, I expect two parts in their answer. First, to state that large markets will export relatively more. Then, elaborate on how transportation cost affects the band of non-specialization. The conclusion of the graph should be that when transportation cost fall, the band shrinks and it becomes more lilkely to concentrate production in the large country.

b. Explain the source of gains from trade in the monopolistic model of trade. (7 points)

Answer: See lecture 5,
Explain the basic assumptions of the model under autarky and trade. The basic ingredients are consumers love varieties and increasing returns in technology.

c. State and explain the Stoper-Samuelson theorem and its implications. (7 points)

Answer: Lecture 4. Theorem 4 in section 2.1.3.
I also expect an illustration as in Figure 2.

Problem 2. (20 points)

a. Explain the border puzzle of McCallum. In particular, describe the data, empirical model and main result. (10 points)

Answer: Difference sources. My lectures, equation 1 in AvW paper (posted in my web also) and Feenstra eq 5.20
Describe variables and main result, ie too much intra province trade among Canadian provinces.

b. Explain how Anderson and Van Wincoop derive a more convenient gravity equation. State the gravity equation derived by the authors and explain why it may help to solve the McCallum puzzle. (10 points)

Answer: This question can be answer in many ways. A basic outline is the following Even a moderate barrier between Canada and the rest of the world has a large effect on multilateral resistance of the provinces because Canada it is a small openeconomy that trades a lot with the rest of the world (particularly the United States).
This significantly raises interprovincial trade, by a factor 6 based on our estimated model. In contrast, the multilateral resistance of U.S. states is much less affected by a border barrier since it does not affect the barrier between a state and the rest of the large U.S. economy. Therefore trade between the states is not much increased by border barriers.
They can use equation 13 in the paper of AvW, and describe how the multilateral resistant term $(P_i P_j)^{\sigma-1}$ is different for Canada and US. They could also try to tell the story using the "switching in expenditure" argument, that is a small country (as Canada) which has large proportion of imported varieties has to shift more expenditure when trade barriers increase there increasing domestic trade by more.

Problem 3 (30 points)

Suppose consumers in two countries home and foreign have the same preference for food and machines given by the following utility function

$$U = c_F^{1/2} c_M^{1/2}$$

In the home country, to produce one ton of food 1 workers is needed whereas to produce one machine requires 1 worker. In the foreign country, 3 workers produce one ton of food and 2 workers produce one machine. Home has 50 workers and foreign has 120 workers. Finally, let the price of machines be the numeraire in the economy.

a. Solve for the equilibrium prices and quantities when countries are not allowed to trade. Which country has the higher autarky price for food? (8 points)

$$\begin{aligned} p_H &= 1 \\ Q_H^F &= 25 \\ Q_H^W &= 25 \end{aligned}$$

and

$$\begin{aligned} p_F &= 3/2 \\ Q_H^F &= 20 \\ Q_H^W &= 30 \end{aligned}$$

b. Now suppose that countries are allowed to trade. Compute the world relative price of food and wages in both countries. (7 points)

$$p = 6/5 = 1.2$$

$$\begin{aligned} w_F &= \frac{1}{2} \\ w_H &= \frac{6}{5} \end{aligned}$$

c. Explain the pattern of trade using the production possibility frontier for both countries. (7 points)

d. Show that both countries benefit from trade. (8 points)

Answer: As problem set 1 or lecture notes 2.

Problem 4 (30 points)

Consider an economy producing two goods 1 and 2. There are three factors of production, land T, capital K and labor L. The national economy is endowed with fixed supplies T, K, and L of these factors.

Assume that technologies are of the Cobb Douglas type, that is

$$\begin{aligned} y_1 &= z_1 K^{1/2} L_1^{1/2} \\ y_2 &= T^{1/2} L_2^{1/2} \end{aligned}$$

where z_1 is the productivity in sector 1. Assume that labor can move between sectors, but the other factors are specific to each sector. Suppose that consumers in this economy consume goods 1 and 2 in the same proportion, that is for each unit of good 1 they will also consumer one unit of good 2. For simplicity suppose that $z_1 = 1, T = 50$ and $K = 100$.

a. Derive the equation for the relative supply curve of good 1. What are the factors that affect the shape of this curve? Explain. (6 points)

b. Determine the autarky relative price of good 1. (6 points)

c. Assume that this economy opens up to trade at fixed international prices $p_1 = p_2 = 1$. Describe the pattern of trade for this economy. (6 points)

d. Explain how an increase in the productivity in sector 1 affects the pattern of trade and labor allocation between sectors. Find the lower bound in productivity so that the country continue to export good 1. (6 points)

e. Explain the effect of an increase of productivity in sector 1 on the return to the factors (w, r_K, r_T). (6 points)

Answer: As problem set 2. Some specific comments

a. This is only te supply equation, and not mixed with demand yet.

Supply eq

$$\frac{y_1}{y_2} = \frac{p_1}{p_2} z_1^2 \frac{K}{T}$$

and plugging the information given

$$\frac{y_1}{y_2} = 2\frac{p_1}{p_2}$$

b. Here they should use demand and come up with the autarky price.

Use leontief preferences property

$$\frac{c_1}{c_2} = 1$$

and supply equal demand implies

$$\frac{p_1}{p_2} = \frac{1}{2}\frac{K}{T}$$

or with numbers

$$\left(\frac{p_1}{p_2}\right)_{Autarky} = \frac{1}{2}$$

Here it is important to see this number

c. given international prices, they should conclude that the small economy will export good 1.

Given the international price given qwe have

$$\left(\frac{p_1}{p_2}\right)_{Autarky} = \frac{1}{2} < 1 = \left(\frac{p_1}{p_2}\right)_{Trade}$$

and therefore the small country will export good 1.

d. They could use a graph or equations. The lower bound is the min productivity such that the small economy continue exporting.

$$z_1 > \sqrt{\frac{1}{2}}$$

is the lower bound for z_1.

e. They could decide to solve for wages, but it is much easier to use the FOC and use a graph to see how the labor allocation changes.

Real wages increase

Return to capital goes up.

Return to land goes down