Brigham Young University Department of Economics

Economics 458 - International Trade

Dr. Phillips (section 1) Winter Semester 2006

Midterm Exam Key
Feb. 24 - 25

This exam is closed book and closed notes, though you may use a calculator. Read all questions carefully before answering. Write your answers legibly in the space provided. Keep your answers concise and correct. Points will be deducted for answers which are irrelevant to the question.

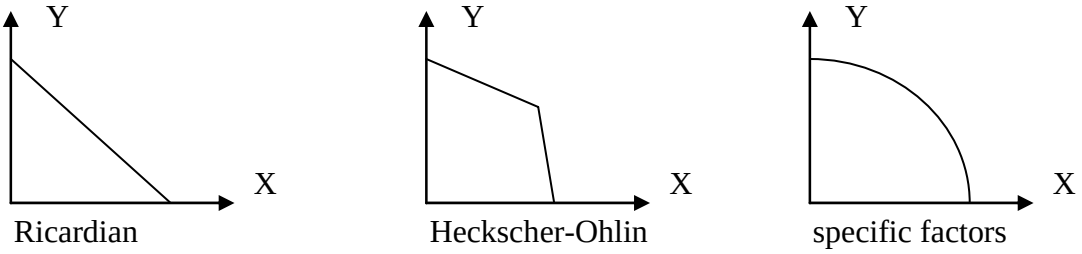
Section I – Short Answer (10 pts. each)

1. Restate the Factor Price Equalization Theorem. Does it hold in the specific factors model? Why or why not?

Equalization of good prices (as through free trade) will result in equalization of factor prices as well. This does not hold in the specific factors model. The reason is that, unlike the Heckscher-Ohlin model, there is a mismatch between the number of goods and the number of factors. Zero profit conditions are not sufficient to uniquely solve for factor prices as functions of goods prices.

2. What is the shape of a country's PFF in the Ricardian model? In the fixed-coefficients Heckscher-Ohlin model? In the specific factors model?

The Ricardian PPF is a straight line
The fixed-coefficients Heckscher-Ohlin PPF is piecewise linear
The specific factors PPF is bowed out



3. What are the differences between the assumptions upon which the Heckscher-Ohlin model and the specific factors models are based?

The Heckscher-Ohlin model assumes two factors, both of which are usable in production of both goods. The specific factors model assumes a single factor usable by both goods, and two specific factors which can be uses only in the production of one of the two goods. All other model assumptions are the same.

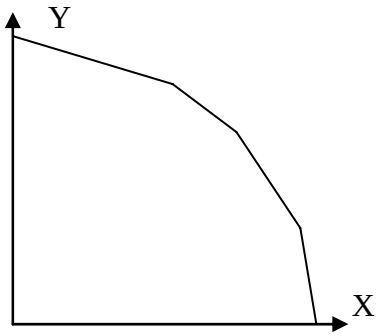
4. What is an Edgeworth-Bowley box? How is it related to production efficiency?

It is a box with quantities on two axes corresponding (in our case) to the total endowment of two factors. A set of isoquants for each good are drawn, on with the origin in the lower left and the other in the upper right. A point in the box corresponds to an allocation of the two factors across the two goods and the quantities produced can be read from the two isoquants passing through that point. Production efficiency is found where two isoquants touch with a tangency, that is where it is impossible to produce more of one good without producing less of the other. The collection of all such points is called the efficiency locus.

Section II – Essay (20 pts. each)

5. Consider an N-country, 2-good version of the Ricardian model. What would a world PPF look like? Given identical preferences across all countries, predict which of the two goods each country will produce and export under free trade.

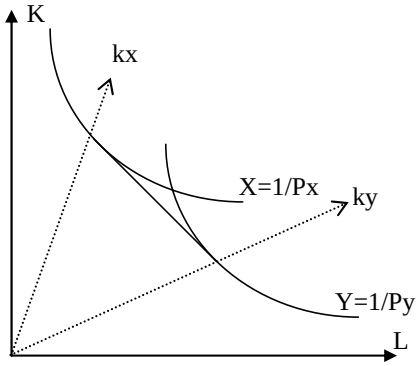
To find the world PPF we order countries according to the ratio of labor productivities. When we move from producing only one good and begin to produce the other good as well, we will first alter production in the country with the lowest opportunity cost of the new good. Thus, the PPF has the shape below where each linear segment of the PPF corresponds to a different country. If we draw in a set of indifference curves and find a tangency we can determine which countries produce which goods. At most one country will produce both goods and all others will be completely specialized (if the indifference curve is tangent on a flat segment of the PPF). It is also possible that all countries are completely specialized (if the indifference curve touches on a kink in the PPF).



6. In the variable coefficients Heckscher-Ohlin model countries can specialize completely in producing one good, or they can produce both goods. Using unit value isoquants illustrate & explain how this decision is related to the ratio of capital to labor endowments.

Consider the figure nearby. It illustrates unit value isoquants both goods (with X being capital intensive). The least cost method of producing one unit of value (i.e. $1) depends on the wage and rental rates. Since Cost=wL+rK, isocost lines will have a slope of –w/r. There is a unique w/r which gives an isocost line tangent to both isoquants. Call this (w/r)*. If w/r>(w/r)*, then it is optimal to produce only X with a capital labor ratio (k) greater than kx. If w/r<(w/r)*, then it is optimal to produce only Y with k<ky. If w/r=(w/r)*, then it is optimal to produce both goods using kx for X and ky for Y.

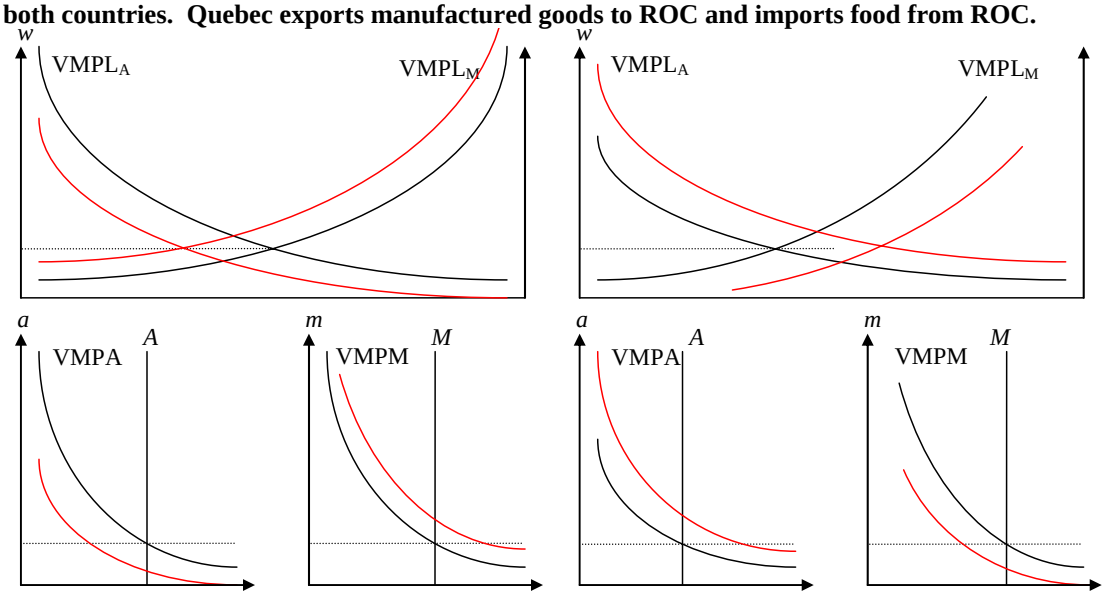
Since the endowment of factors must match the demand derived above, if the endowment K/L>kx, produce only X and w/r>(w/r)*. If the endowment K/L<ky, produce only Y and w/r<(w/r)*. If kx>K/L>ky, we lie in the cone of diversification, produce both X & Y, and w/r=(w/r)*.



7.Consider a specific factors model of trade in manufactured goods and agricultural products between the Quebec and the rest of Canada. Assume constant returns to scale production of both goods. Assume Quebec has a substantially lower labor endowment. Assume both regions have equal amounts of total capital per worker, but that Quebec has more manufacturing capital per worker and the rest of Canada has more agricultural capital per worker. For simplicity, assume that labor cannot move across regions. Using appropriate mathematic or graphic analysis consider the effects of Quebec independence where substantial trade barriers are raised between Quebec and the rest of Canada. Comment on changes in relative prices, production patterns and factor prices in both regions

This is a specific factors model with labor as the mobile factor.

Consider the diagrams below. Let *A* be agricultural capital and *M* be manufacturing capital. Let their prices be *a* & *m*. The first set illustrates ROC (rest of Canada). Since ratio of labor to total capital endowments is the same in Quebec as ROC and we are assuming constant returns to scale, we can rescale the graphs for Quebec so that labor has the same horizontal distance. A will be smaller, lowering $VMPL_A$ and M will be bigger raising $VMPL_M$. This gives a greater percentage of total labor in the manufacturing sector in Quebec, which in turn means that VMPA is lower and VMPM is higher. However *A* is smaller and *M* is larger. So with trade, *w*, a and m are roughly the same in both countries. Quebec exports manufactured goods to ROC and imports food from ROC.



From this initial condition the effects of trade restrictions would be to lower the price of manufactured goods in Quebec and raise the price of agricultural goods there. This would shift the VMPLA curve up and the VMPLM curve down, it would also shift the VMPA curve up and the VMPM curve down. Labor is reallocated from production of manufactured goods to food. This labor reallocation magnifies the shifts in the VMPA and VMPM curves. *w* remains roughly unchanged, *a* rises and *m* falls.

Similar reasoning for ROC gives *w* roughly unchanged, *a* falling and *m* rising. ROC produces less food and more manufactured goods.