Economics 58
Fall 2010

Problem Set # 8

Due 11/17/10

1.   Text Problem 13.5.

2.   The Trade Theorems

The construction of the production possibility curve shown in Figures 13.2 and 13.3 can be used to illustrate three important "theorems" in international trade theory. To get started, notice in Figure 13.2 that the efficiency line $0_x, 0_y$ is bowed above the main diagonal of the Edgeworth Box. This shows that the production of good x is always "capital intensive" relative to the production of good y. That is, when production is efficient, $\left(\dfrac{k}{l}\right)_x > \left(\dfrac{k}{l}\right)_y$ no matter how much of the goods are produced. Demonstration of the trade theorems assumes that the price ratio, $p = p_x / p_y$ is determined in international markets – the domestic economy must adjust to this ratio (in trade jargon the country under examination is assumed to be "a small country in a large world").

a. Factor Price Equalization Theorem: Use Figure 13.4 to show how the international price ratio, p, determines the point in the Edgeworth Box at which domestic production will take place.   Show how this determines the factor price ratio, w/v. If production functions are the same throughout the world, what will this imply about relative factor prices throughout the world?

b. Stolper Samuelson Theorem: An increase in p will cause the production to move clockwise along the production possibility frontier – x production will increase and y production will fall. Use the Edgeworth Box diagram to show that such a move will decrease k/l in the production of <u>both</u> goods. Explain why this will cause w/v to fall. What are the implications of this for the opening of trade relations (which typically increases the price of the good produced intensively with a country's most abundant input).

c. Rybczynski Theorem: Suppose again that p is set by external markets and does not change. Show that an increase in k will increase the output of x (the capital-intensive good) and reduce the output of y (the labor-intensive good).

3.   Exercises with the General Equilibrium Simulation

Here are three exercises to complete using the general equilibrium model described in the Nicholson/Westhoff paper.

Exercise 1

One important phase of any analysis using a mathematical model is called "calibration". In this phase the parameters of the model are adjusted so that the model's results more closely approximate data from the actual economy. Although it would probably be impossible to calibrate the N/W model in any realistic way, it should be possible to explore how the choices of parameters in the model matter. For that purpose you are to take the model specified in illustration 1 (without taxes) and describe how you would change one of its basic parameters in an interesting way. You are then to make this change and describe your results.

Exercise 2

Person 1 is the rich person in the base case simulations because he/she owns 80 percent of the capital. Suppose a government wishes to institute a tax on wages accompanied by a redistribution of the proceeds to person 2 with the end goal of equalizing the utility of these two people:

1. Is it possible to do this? Explain
2. Run a few more simulations to describe the "equity-efficiency tradeoff" in this model.

Exercise 3

Use your own imagination to extend one of the first three "illustrations" in the N/W paper in some interesting way.