

Problem Set #1
Econ 2106H - John L. Turner - Fall 2003

1) Consider the following situation:

Two countries, the U.S. and Canada, each produce only two goods, good A and good B. The Production Possibilities Frontier for each of these countries are given by the following equations:

$$\text{PPF of U.S.: } .5A + .25B = 1$$

$$\text{PPF of Canada: } .25A + .5B = 1$$

- a) Graph of the Production Possibilities Frontier for each country on the same graph, with B on the vertical axis, and A on the horizontal.
- b) Imagine that the governments for both Canada and the United States decided that they each needed exactly two units of good B. If the two countries opted not to trade (so that they need to produce everything for themselves), how much of A and B could each country produce?
- c) What if the United States were to produce all of the necessary amount of good B, and then trade were to ensue? That is, if the U.S. produced 4 units of good B, and Canada used all of its resources on the production of good A, how much of goods A and B would each country produce? What would the total be? Are the countries better or worse off from trading?
- d) Define Comparative Advantage. Does Canada have a comparative advantage in any good in this example?

2) Now imagine that the production possibility frontiers for the U.S. and Canada were slightly different than the above situation. Consider the following PPFs:

$$\text{PPF of the U.S.: } .5A + .25B = 1$$

$$\text{PPF of Canada: } .25A + .5B = 2$$

- a) Graph of the Production Possibilities Frontier for each country on the same graph, with B on the vertical axis, and A on the horizontal.
- b) If the governments for both Canada and the United States still believe that they each needed exactly 2 units of good B, and the two countries opted not to trade, how much of A and B could each country produce?
- c) Again consider the trading situation. If the United States produced all of the required B, just as before, what would the total output be for each country, and so what would their combined output be? In this situation, are *both* countries better off trading?
- d) Define Absolute Advantage. Does the United States have a *comparative* advantage in any good in this example?

3) Two individuals, Tarzan and Jane, live on a deserted island, but are not initially aware of each other's presence. Each needs two units of food (F) to survive but otherwise

wishes only to consume luxury goods (L) such as clothing and shelter. Throughout this problem assume each produces efficiently, but bounded by the following production possibilities frontiers:

Jane: $F + 2L = 10$

Tarzan: $2F + L = 10$

- a) Graph Jane's PPF. Assuming there are no opportunities for trade, how much L will she consume? At this level what is her opportunity cost of L?
- b) Suppose instead that a trading vessel visits Jane's side of the island and, after production, she may trade at the following prices: $p(F) = 1$; $p(L) = 3$. If consumption follows trading, how much L will she produce? How will she trade? How much L will she consume?
- c) Repeat a) and b) for Tarzan.
- d) Now suppose that Tarzan and Jane find each other and can plan production together. Determine Tarzan's and Jane's contributions to an efficient production plan, and find the total quantity of L consumed.
- e) Construct the combined PPF. What is the opportunity cost of L when $L=8$? When $L=12$?

4) The Law of Comparative Advantage postulates that even if an agent is less efficient than (or has an absolute disadvantage with respect to) another agent in the production of both commodities, there is still a basis for mutually beneficial trade between them as long as the opportunity costs of production are different for the two agents.

- (a) Give an example of an agent having an absolute advantage over another agent.
- (b) Suppose the following is true:

	United States	United Kingdom
Wheat (bushels per man hour)	6	1
Cloth (yards per man hour)	3.5	3

- (i) Which nation has an absolute advantage in the production of both goods?
- (ii) If we allow for trade, what should the nations do according to The Law of Comparative Advantage?
- (iii) Calculate the opportunity costs of producing the commodities for each nation.
- (iv) Assuming each country has 20 hours of labor available, what is the output of each product for each country if:
 - Each country uses 10 hours of labor to produce each good, or
 - In the U.S. 16 hours are devoted to wheat and 4 hours to cloth, while in the U.K. all 20 hours are devoted to cloth.

Compare the total output of both countries for each good.

C. Determine the range of relative prices of wheat to corn such that the two nations will specialize and there are mutually beneficial gains to trade.