Problem Set 1 Solutions: Tools of Analysis for International Trade Models, The Ricardian Model of Trade

1. Suppose that country A produces two goods, X and Y, under conditions of constant opportunity costs. Given its resources, the maximum X it can make is 500 units and the opportunity cost of making Y is 2. What is the maximum amount of Y that it can produce? Draw a graph and explain.

Answer: Since the opportunity cost of producing an additional unit of T requires 2 units of S foregone, then the slope of the PPF is -1/2. If all resources were devoted towards production of T, then reduction of S by 500 units would yield 250 units of T. Thus, the equation for the PPF is: $T = 250 - \frac{1}{2}S$ **and the graph can be drawn as:**

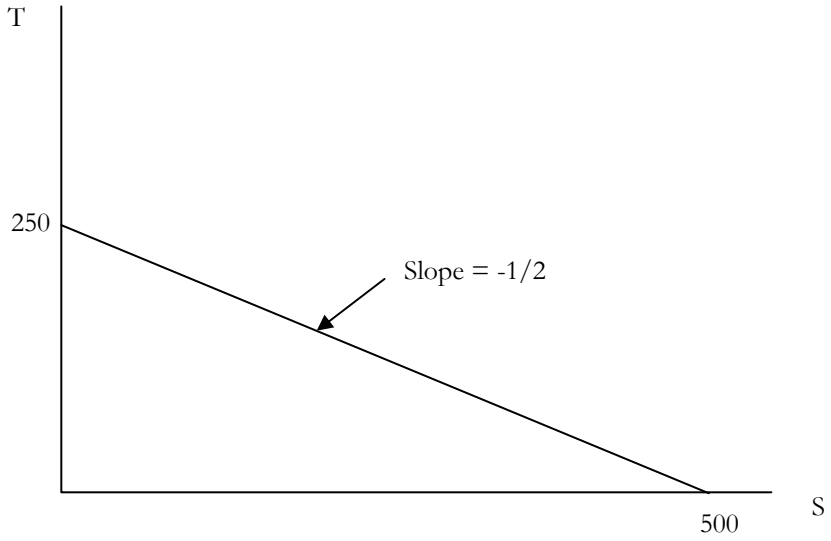


Figure 1

2. For each of the following cases in the table below, determine the following:
   (a) the direction of absolute advantage;
   (b) the pre-trade relative prices;
   (c) the direction of comparative advantage;
   (d) the limits to the relative wage rate

Hours of Labor Required to Produce S or T

Case 1

	A	B
S	6	15
T	2	12

Case 2

	A	B
S	10	5
T	4	5

Case 3

	A	B
S	10	8
T	20	4

Case 4

	A	B
S	4	9
T	2	3

Table 1: Unit labor costs

Answer:

Case 1:

(a) A has an absolute advantage in S and T

(b) $\left(\frac{P_S}{P_T}\right)_A = 3; \left(\frac{P_S}{P_T}\right)_B = \frac{5}{4}$

(c) A has a comparative advantage in T; B has a comparative advantage in S

(d) $2.5 < \frac{W_A}{EW_B} < 6$

Case 2:

(a) A has an absolute advantage in T; B has an absolute advantage in S

(b) $\left(\frac{P_S}{P_T}\right)_A = 2.5; \left(\frac{P_S}{P_T}\right)_B = 1$

(c) A has a comparative advantage in T; B has a comparative advantage in S

(d) $\frac{1}{2} < \frac{W_A}{EW_B} < \frac{5}{4}$

Case 3:

(a) B has an absolute advantage in S and T

(b) $\left(\frac{P_S}{P_T}\right)_A = 0.5; \left(\frac{P_S}{P_T}\right)_B = 2$

(c) A has a comparative advantage in S; B has a comparative advantage in T

(d) $\frac{1}{5} < \frac{W_A}{EW_B} < \frac{4}{5}$

Case 4:

(a) A has an absolute advantage in S and T

(b) $\left(\frac{P_S}{P_T}\right)_A = 2; \left(\frac{P_S}{P_T}\right)_B = 3$

(c) A has a comparative advantage in S; B has a comparative advantage in T

(d) $\frac{3}{2} < \frac{W_A}{EW_B} < \frac{9}{4}$

3. Suppose that there are 20000 hours of labor available in country A. Five hours of labor are required to produce one unit of good S, whilst 4 hours of labor are required to produce one unit of good T. Find the shape and dimensions of A's PPF.

Answer: The unit labor requirements for goods S and T are 5 and 4 respectively. Hence, if 20000 hours of labor were devoted purely to:

(i) S, we could produce 20000/5 = 4000 units of S

(ii) T, we could produce 20000/4 = 5000 units of T

Hence, the slope of the PPF is -1.25 and the PPF looks like:

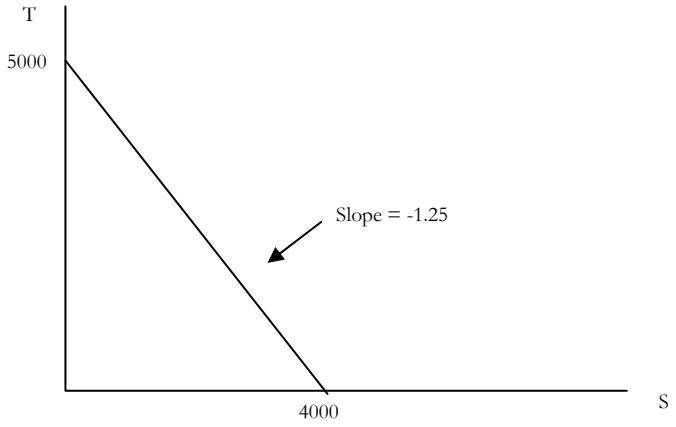
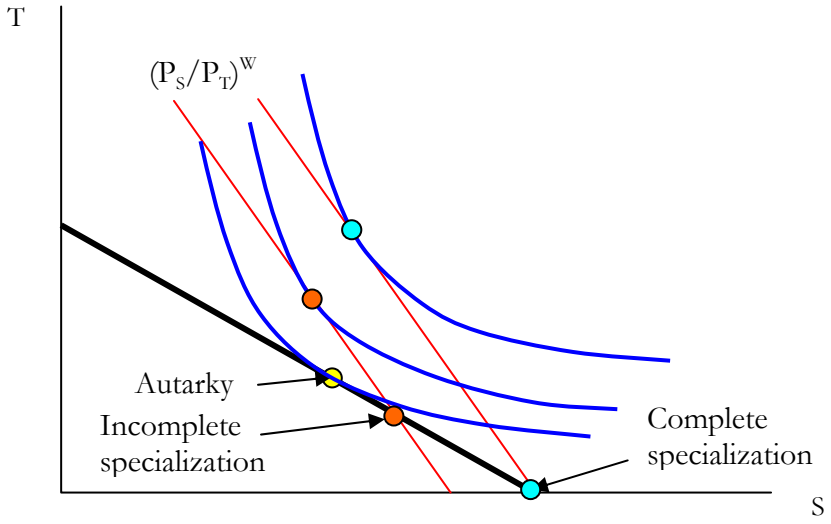


Figure 2

4. Show that less than complete specialization in the classical model leads to a lower level of welfare than complete specialization.

Answer: Assume WLOG that this country has a comparative advantage in the production of good S, and faces a world relative price of $(P_S/P_T)^W$. From the diagram below, we can see that if a country did not specialize completely, they would end up on a lower indifference curve than they could have achieved through complete specialization.



5. Consider two countries, A and B, with technologies given by case 3 in table 1 above. Suppose that the wage rate in A, W_A, equals \$10 per hour; then for mutually beneficial trade to occur, the wage rate in B, when measured in dollars, ExW_B, must lie in the range \$X to \$Y. Calculate X and Y and explain your answer.

Answer: From question (2) Case 3: part d, $\frac{1}{5} < \frac{W_A}{EW_B} < \frac{4}{5}$. Splitting these two equations up, yields: $\frac{1}{5} < \frac{W_A}{EW_B}$ and $\frac{W_A}{EW_B} < \frac{4}{5}$. Since W_A=\$10, we can rearrange both these equations to yield: $E*W_B < 5*\$10=\$50$ and $\$10 < 0.8*E*W_B$. Thus Y = \$50 and X = \$12.50.

6. Suppose that country A had 20000 hours of labor available and that country B had 15000 hours of labor available. Using the information for unit labor costs from Case 2 in table 1 above

a. Draw a graph of the World PPF

Answer:

In country A: with 20000 hours of labor, we could produce 2000 units of S and 5000 units of T.

In country B: with 15000 hours of labor, we could produce 3000 units of S and 3000 units of T.

Adding together the PPFs yields:

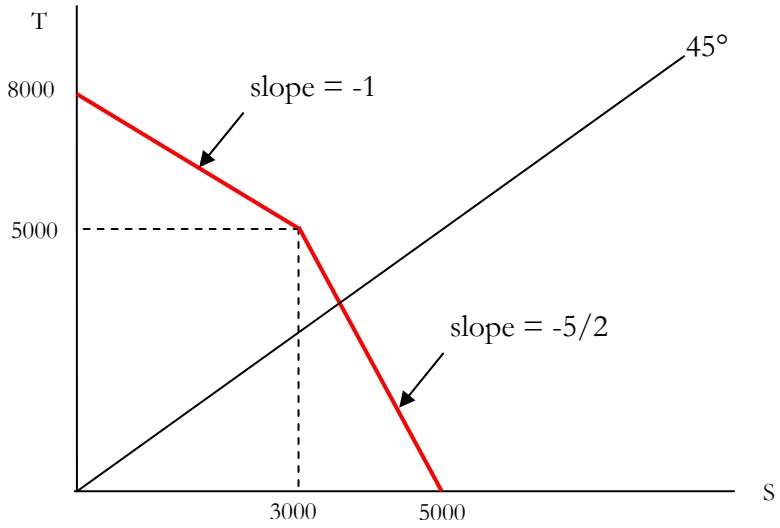


Figure 4

b. Suppose that the world price ratio $(P_S/P_T)^W = 2$. Which country would produce which good(s)?

Answer: A price line with a slope of -2 would be tangential to the world PPF at the kink. Thus it would mean that country A would specialize purely in the production of good T, whilst country B would specialize purely in the production of good S.