

## Solved Problems

### COMPARATIVE ADVANTAGE AND OPPORTUNITY COSTS

- 3.1 (a) Compare the explanation of the law of comparative advantage given by Ricardo with that based on the opportunity cost theory. (b) Identify the three main groups of factors of production and some of the major subgroups. (c) Name some of the most important products in which the U.S. has a comparative cost or price advantage and some in which the U.S. has a comparative disadvantage.

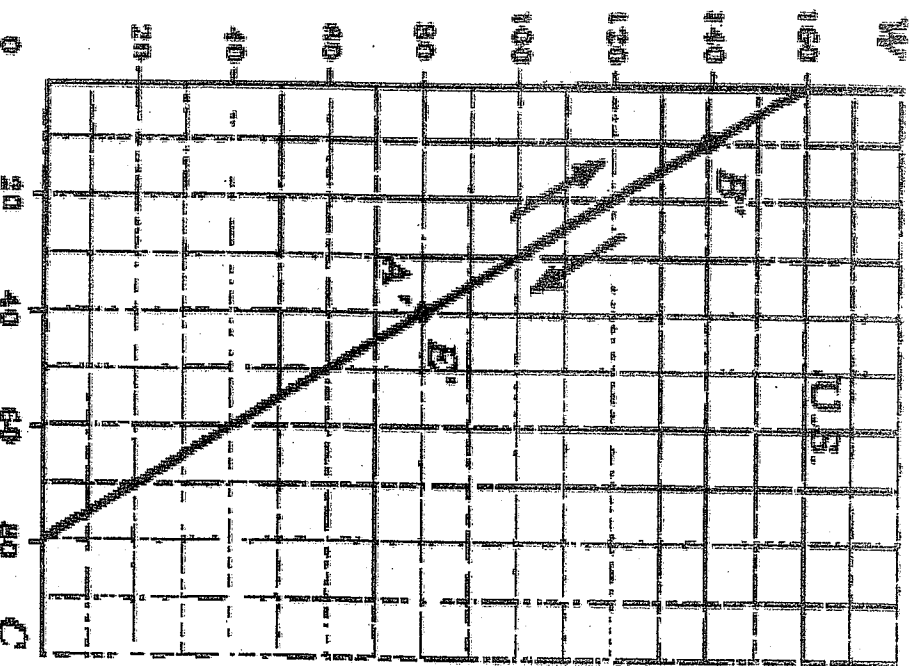
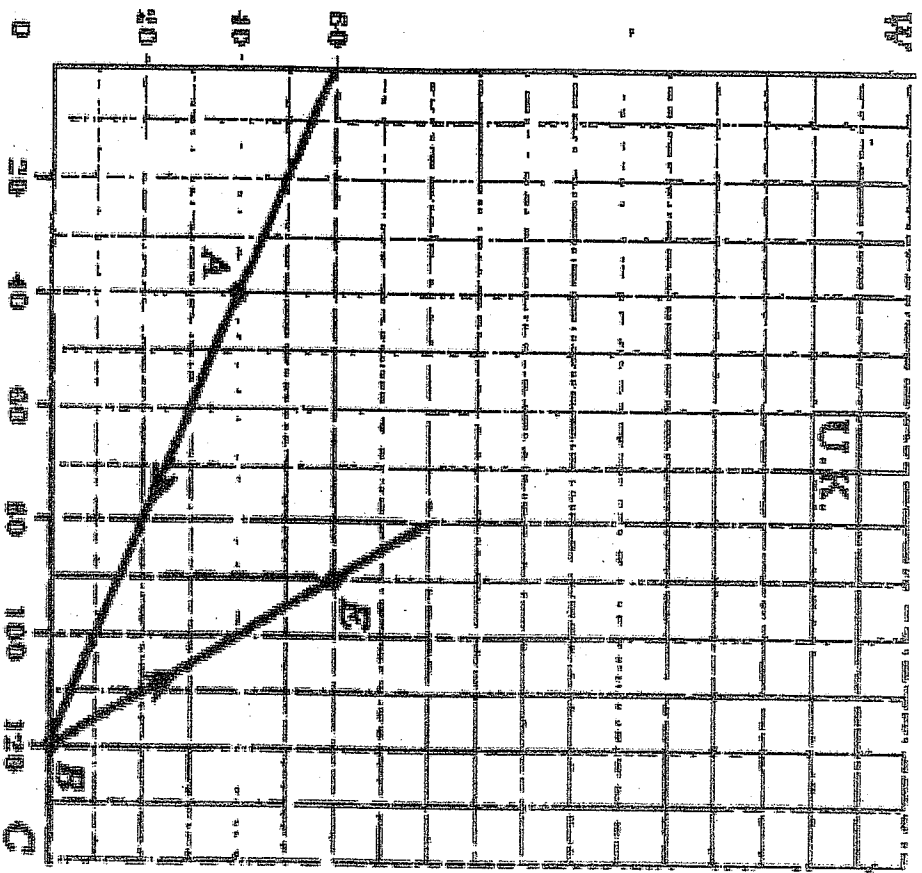


Fig. 2-9

## THE BASIS FOR TRADE AND THE GAINS FROM TRADE UNDER CONSTANT COSTS

3.2 Table 2.2 gives the maximum amount of wheat or cloth that the U.K. and U.S. could produce if they fully utilized all of the factors of production at their disposal with the best technology available to them.

Table 2.2

	U.K.	U.S.
Wheat (in millions of bushels/year)	50	120
Cloth (in millions of yards/year)	150	80

If, in addition, we are told that the (opportunity) cost of producing wheat and cloth is always constant in each nation. (a) draw the production possibilities curves of the U.K. and the U.S., (b) indicate some of the combinations of wheat and cloth that each nation can produce and (c) specify the consumption choices open to each nation in the absence of trade.

3.3 (a) With reference to Fig. 2-5, find  $MRT_{CW}$  for the U.K. and the U.S. Does  $MRT_{CW}$  vary as we move along each nation's production possibilities curve? Why? (b) Under what conditions will a nation face constant costs, constant  $MRT_{CW}$  or a straight-line production possibilities curve? (c) Find  $P_C/P_W$  and  $P_W/P_C$  for the U.K. and the U.S. from Fig. 2-5. What is the relationship between  $P_C/P_W$  and  $MRT_{CW}$  in each nation?

- 3.4 With reference to Problems 2.2 and 2.3, (a) indicate in which commodity the U.K. and the U.S. have a comparative advantage. (b) What are the limits within which mutually advantageous exchange can take place between the U.K. and the U.S.? (c) If  $P_C/P_W$  is stabilized at 1 with trade, explain why the U.K. and the U.S. gain. (d) How is this problem different from Problem 1.9?
- 3.5 Starting with Fig. 2-5 and assuming that the U.K. produces 60C and 30W and the U.S. 40C and 60W in the absence of trade, show the point of production and consumption for each nation with trade, if each nation specializes completely in the production of the commodity of its comparative advantage and then trade 50 units of it for 50 units of the commodity of its comparative disadvantage.
- 3.6 An alternative to Fig. 2-6 to illustrate the gains from trade under constant costs is obtained by rotating by 180° the U.S. production possibilities curve and superimposing it on the U.K. production possibilities curve in such a way that points B and B' coincide. (a) Draw such a figure and shade the area showing the total gains from trade. (b) What does line BE in your figure show?
- 3.7 With reference to Figs. 2-6 and 2-7, (a) indicate the quantity of wheat and cloth produced in the U.K., in the U.S. and in total before and after specialization in production, and the change in the production of each commodity in each nation and in total. (b) Indicate the quantity of wheat and cloth consumed in the U.K., in the U.S. and in total before and after trade, and the gain in the consumption of each commodity in each nation and in total.

- 3.8 With reference to Problem 2.7, (a) explain how the combined output of the U.K. and the U.S. for both wheat and cloth can increase without any increase in the quantity of the factors of production available to either the U.S. or the U.K. (b) Why didn't the U.K. and the U.S. want to specialize in production in the absence of trade? (c) What is the effect of trade on the relationship between production and consumption in each nation? (d) What is the ratio of exchange of cloth for wheat between the U.K. and the U.S.? (e) Why is this the equilibrium ratio of exchange? (f) What would happen if the exchange ratio was above or below the equilibrium one?
- 3.9 Draw a figure and explain what happens if, starting from points A and A' in Fig. 2-1, the U.K. and the U.S. specialize completely in the production of the commodity of their respective comparative advantage and then exchange 80C for 40W with each other.
- 3.10 (a) Draw a figure and explain what happens if, starting from points A and A' in Fig. 2-1, 30C are exchanged for 60W. (b) What generalization can you reach with regard to specialization in production and the distribution of the gains from trade between the two nations by looking at Example 3 and Problems 2.9 and 2.10(a)?

- 3.11 Starting at points A and A' in Fig. 2-1, suppose that the U.K. and the U.S. specialize in production and then exchange 60C for wheat at the equilibrium  $P_C/P_W$  of  $4/3$ . (a) How much wheat is traded? (b) Will specialization in production be complete in each nation? Why? (c) Draw a figure showing the pretrade point of production and consumption in each nation, the point of production with specialization, and the new consumption point with trade. (d) Which nation gains more from trade?
- 3.12 If one of the values in Table 2.1 were changed as indicated in Table 2.6 and we retained our assumption of constant (opportunity) costs in each nation, would mutually advantageous trade still be possible between the U.K. and the U.S.? Why?

Table 2.6

	U.K.	U.S.
Wheat (in millions of bushels/year)	60	160
Cloth (in millions of yards/year)	30	80

### THE BASIS FOR TRADE AND THE GAINS FROM TRADE UNDER INCREASING COSTS

3.13 Table 2.7 gives five alternative combinations of wheat and cloth (in millions of units/year) that the U.K. and the U.S. can produce by fully utilizing all of the factors of production at their disposal with the best technology available to them. (a) Sketch the production possibilities curve for the U.K. and the U.S. What is  $MRT_{CW}$  in the U.K. if it produces 60C and 50W? 130C and 20W? What is  $MRT_{CW}$  in the U.S. if it produces 80C and 20W? 40C and 90W? (b) Why is the production possibilities curve of the U.K. different from that of the U.S.?

Table 2.7

U.K.		U.S.	
W	C	W	C
52	0	120	0
50	60	90	40
35	110	60	65
20	130	20	80
0	143	0	81

3.14 (a) Redraw Fig. 2-3 and show on it that starting at point A, the U.K. must give up more and more wheat for each additional batch of 20C that it wants to produce. Also show that starting at point A', the U.S. must give up more and more cloth for each additional batch of 20W that it wants to produce. (b) What does the answer to part (a) imply for the  $MRT_{Cw}$  for a movement down the

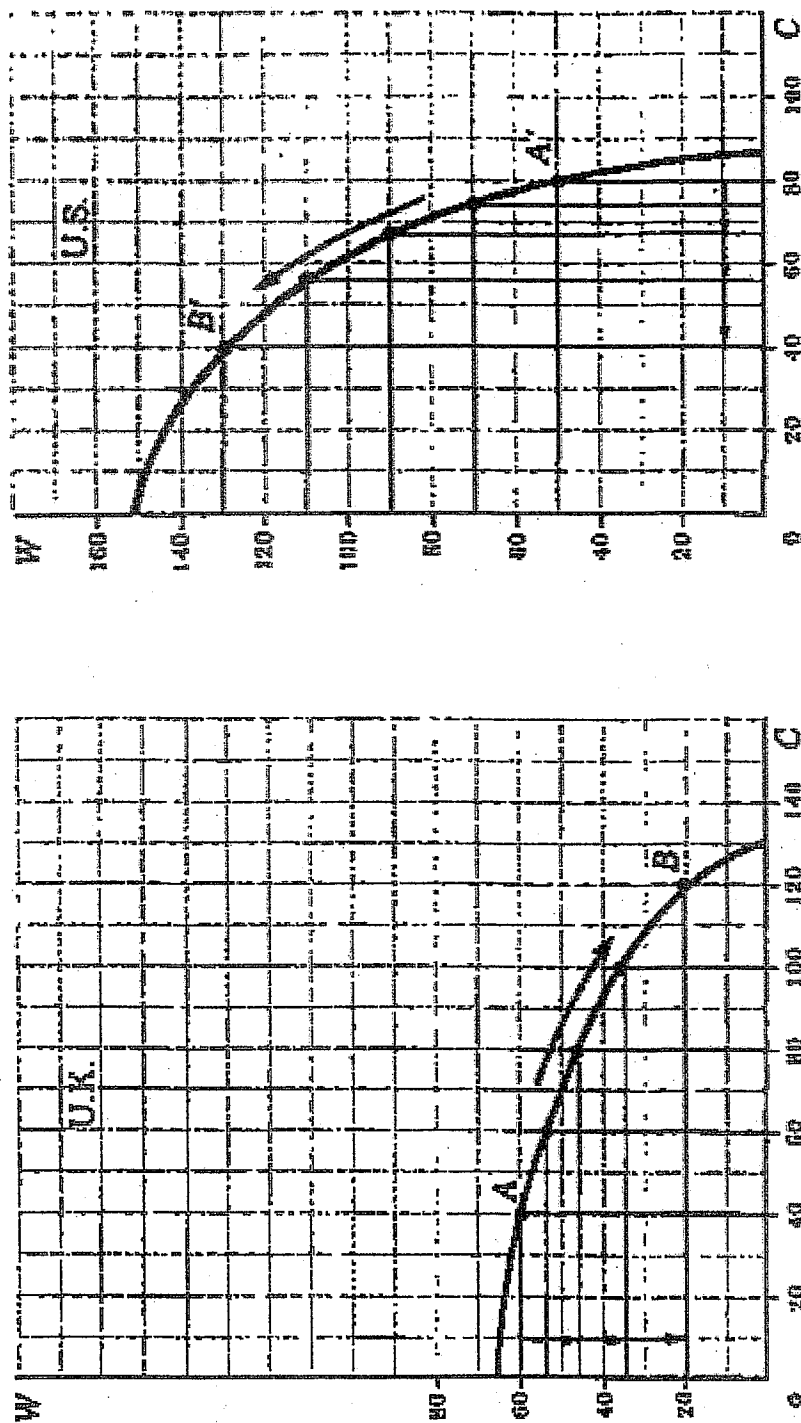


FIG. 2-13

production possibilities curve of the U.K.? For the  $MRT_{wc}$  for a movement up the production possibilities curve of the U.S.? (c) Explain the reason for the shape of the production possibilities curves of the U.K. and the U.S.



- 3.15 With reference to Fig. 2-3, answer the following questions for the U.S.: (a) What change in the production of cloth and wheat is indicated by a movement from point  $A'$  to point  $B'$ ? (b) What is  $MRT_{C/W}$  at point  $A'$ ? At  $B'$ ? (c) What is  $MRT_{W/C}$  at  $A'$ ? At  $B'$ ? (d) What does the change in  $MRT_{W/C}$  in moving from point  $A'$  to point  $B'$  mean for the U.S.? What is this change in  $MRT_{W/C}$  due to?
- 3.16 Starting with Fig. 2-12 and assuming that in the absence of trade, the internal equilibrium  $P_C/P_W = 1/6$  in the U.K. and 6 in the U.S., show (a) the point of production and consumption for each nation in the absence of trade, (b) the point of production and consumption for each nation with trade if the equilibrium  $P_C/P_W$  with trade is 1 and 50C are traded.
- 3.17 From Fig. 2-14, (a) explain why it does not pay for the U.K. to continue to specialize in the production of cloth past point  $B$ . (b) Construct a table similar to Table 2.4 in Problem 2.7(a).
- (c) Construct a table similar to Table 2.5 in Problem 2.7(b).
- 3.18 (a) What determines the internal equilibrium  $P_C/P_W$  in each nation in the absence of trade? (b) Starting with Fig. 2-12, explain what happens if the U.K. is in internal equilibrium in production and consumption at point  $B$  in the absence of trade, while the U.S. is in internal equilibrium in production and consumption at point  $B'$ . (c) What if the U.K. is in internal equilibrium in production and consumption to the right of  $B$  while the U.S. position is to the left of  $B'$ ?

- 3.19 With reference to Fig. 2-15, assume that nation A (with production possibilities curve AA) is in internal equilibrium in production and consumption at point C in isolation, while nation B (with production possibilities curve BB) is in internal equilibrium at point H in isolation. (a) Explain how with trade each nation ends up consuming at point H. (b) Explain how the equilibrium  $P_x/P_y$  and the equilibrium quantities traded are determined. (c) How long will this equilibrium condition persist?

### THE DETERMINANTS OF COMPARATIVE ADVANTAGE

- 3.20 (a) Why is the production possibilities curve of each nation usually different? (b) Is trade still possible between two nations if they have identical production possibilities curves? (c) Under what conditions can no trade take place between two nations with different production possibilities curves? (d) What happens if two nations are identical in every respect?
- 3.21 (a) Draw a figure showing that with increasing costs, even if two nations have identical factor endowments and technology, there is still a basis for mutually advantageous trade if they have different tastes. (b) What would happen if tastes also were identical in the two nations? (c) What would happen if we had constant costs in part (a)?