Kingdom in the production of wheat, whereas the United Kingdom is more efficient than, or has an absolute advantage over, the United States in the production of cloth. With trade, the United States would specialize in the production of wheat and exchange part of it for British cloth. The opposite is true for the United Kingdom.

If the United States exchanges six bushels of wheat (6W) for six yards of British cloth (6C), the United States gains 2C or saves ½ hour or 30 minutes of labor time (since the United States can only exchange 6W for 4C domestically). Similarly, the 6W that the United Kingdom receives from the United States is equivalent to or would require six hours of labor time to produce in the United Kingdom. These same six hours can produce 30C in the United Kingdom (6 hours times 5 yards of cloth per hour). By being able to exchange 6C (requiring a little over one hour to produce in the United Kingdom) for 6W with the United States, the United Kingdom gains 24C, or saves almost five labor - hours.

The fact that the United Kingdom gains much more than the United States is not important at this time. What is important is that *both* nations can gain from specialization in production and trade. (We will see in Section 2.6B how the rate at which commodities are exchanged for one another is determined, and we will also examine the closely related question of how the gains from trade are divided among the trading nations.)

Absolute advantage, however, can explain only a very small part of world trade today, such as some of the trade between developed and developing countries. Most of world trade, especially trade among developed countries, could not be explained by absolute advantage. It remained for David Ricardo, with the law of comparative advantage, to truly explain the basis for and the gains from trade. Indeed, absolute advantage will be seen to be only a special case of the more general theory of comparative advantage.

2.4 Trade Based on Comparative Advantage: David Ricardo

In 1817, Ricardo published his *Principles of Political Economy and Taxation*, in which he presented the law of comparative advantage. This is one of the most important and still unchallenged laws of economics, with many practical applications. In this section, we will first define the law of comparative advantage; then we will restate it with a simple numerical example; finally, we will prove it by demonstrating that both nations can indeed gain by each specializing in the production and exportation of the commodity of its comparative advantage. In Section 2.6A, we will prove the law *graphically*.

2.4A The Law of Comparative Advantage

According to the law of comparative advantage, even if one nation is less efficient than (has an absolute disadvantage with respect to) the other nation in the production of *both* commodities, there is still a basis for mutually beneficial trade. The first nation should specialize in the production and export of the commodity in which its absolute disadvantage is smaller (this is the commodity of its *comparative advantage*) and import the commodity in which its absolute disadvantage is greater (this is the commodity of its *comparative disadvantage*).

■ TABLE 2.2. Comparative Advantage

	U.S.	U.K.
Wheat (bushels/hour)	6	1
Cloth (yards/hour)	4	2

The statement of the law can be clarified by looking at Table 2.2. The only difference between Tables 2.2 and 2.1 is that the United Kingdom now produces only two yards of cloth per hour instead of five. Thus, the United Kingdom now has an absolute disadvantage in the production of *both* wheat and cloth with respect to the United States.

However, since U.K. labor is half as productive in cloth but six times less productive in wheat with respect to the United States, *the United Kingdom has a comparative advantage in cloth*. On the other hand, the United States has an absolute advantage in both wheat and cloth with respect to the United Kingdom, but since its absolute advantage is greater in wheat (6:1) than in cloth (4:2), *the United States has a comparative advantage in wheat*. To summarize, the U.S. absolute advantage is greater in wheat, so its comparative advantage lies in wheat. The United Kingdom's absolute disadvantage is smaller in cloth, so its comparative advantage lies in cloth. According to the law of comparative advantage, both nations can gain if the United States specializes in the production of wheat and exports some of it in exchange for British cloth. (At the same time, the United Kingdom is specializing in the production and exporting of cloth.)

Note that in a two-nation, two-commodity world, once it is determined that one nation has a comparative advantage in one commodity, then the other nation *must* necessarily have a comparative advantage in the other commodity.

2.4B The Gains from Trade

So far, we have stated the law of comparative advantage in words and then restated it with a simple numerical example. However, we have not yet proved the law. To do so, we must be able to show that the United States and the United Kingdom can both gain by each specializing in the production and exporting of the commodity of its comparative advantage.

To start with, we know that the United States would be indifferent to trade if it received only 4C from the United Kingdom in exchange for 6W, since the United States can produce exactly 4C domestically by utilizing the resources released in giving up 6W (see Table 2.2). And the United States would certainly not trade if it received less than 4C for 6W. Similarly, the United Kingdom would be indifferent to trade if it had to give up 2C for each 1W it received from the United States, and it certainly would not trade if it had to give up more than 2C for 1W.

To show that both nations can gain, suppose the United States could exchange 6W for 6C with the United Kingdom. The United States would then gain 2C (or save ½ hour of labor time) since the United States could only exchange 6W for 4C domestically. To see that the United Kingdom would also gain, note that the 6W that the United Kingdom receives from the United States would require six hours to produce in the United Kingdom. The United

Kingdom could instead use these six hours to produce 12C and give up only 6C for 6W from the United States. Thus, the United Kingdom would gain 6C or save three hours of labor time. Once again, the fact that the United Kingdom gains more from trade than the United States is not important at this point. What is important is that both nations can gain from trade even if one of them (in this case the United Kingdom) is less efficient than the other in the production of both commodities.

We can convince ourselves of this by considering a simple example from everyday life. Suppose a lawyer can type twice as fast as his secretary. The lawyer then has an absolute advantage over his secretary in both the practice of law and typing. However, since the secretary cannot practice law without a law degree, the lawyer has a greater absolute advantage or a comparative advantage in law, and the secretary has a comparative advantage in typing. According to the law of comparative advantage, the lawyer should spend all of his time practicing law and let his secretary do the typing. For example, if the lawyer earns $100 per hour practicing law and must pay his secretary $10 per hour to do the typing, he would actually lose $80 for each hour that he typed. The reason for this is that he would save $20 (since he can type twice as fast as his secretary) but forgo earning $100 in the practice of law.

Returning to the United States and the United Kingdom, we see that both nations would gain by exchanging 6W for 6C. However, this is not the only rate of exchange at which mutually beneficial trade can take place. Since the United States could exchange 6W for 4C domestically (in the sense that both require 1 hour to produce), the United States would gain if it could exchange 6W for more than 4C from the United Kingdom. On the other hand, in the United Kingdom 6W = 12C (in the sense that both require 6 hours to produce). Anything less than 12C that the United Kingdom must give up to obtain 6W from the United States represents a gain from trade for the United Kingdom. To summarize, the United States gains to the extent that it can exchange 6W for more than 4C from the United Kingdom. The United Kingdom gains to the extent that it can give up less than 12C for 6W from the United States. Thus, the range for mutually advantageous trade is

$$4C < 6W < 12C$$

The spread between 12C and 4C (i.e., 8C) represents the total gains from trade available to be shared by the two nations by trading 6W. For example, we have seen that when 6W are exchanged for 6C, the United States gains 2C and the United Kingdom 6C, making a total of 8C. The closer the rate of exchange is to 4C = 6W (the *domestic*, or *internal*, rate in the United States—see Table 2.2), the smaller is the share of the gain going to the United States and the larger is the share of the gain going to the United Kingdom. On the other hand, the closer the rate of exchange is to 6W = 12C (the domestic, or internal, rate in the United Kingdom), the greater is the gain of the United States relative to that of the United Kingdom.

For example, if the United States exchanged 6W for 8C with the United Kingdom, both nations would gain 4C, for a total gain of 8C. If the United States could exchange 6W for 10C, it would gain 6C and the United Kingdom only 2C. (Of course, the gains from trade are proportionately greater when more than 6W are traded.) In Section 2.6B, we will see how this rate of exchange is actually determined in the real world by demand as well as supply considerations. The rate of exchange will also determine how the total gains from trade are actually shared by the trading nations. Up to this point, all we have wanted to do

is to prove that mutually beneficial trade can take place even if one nation is less efficient than the other in the production of both commodities.

So far, the gains from specialization in production and trade have been measured in terms of cloth. However, the gains from trade could also be measured exclusively in terms of wheat or, more realistically, in terms of both wheat and cloth. This will be done in the graphical presentation of the law of comparative advantage in Section 2.6A.

2.4C The Case of No Comparative Advantage

There is one (not very common) case where there is *no comparative advantage*. This occurs when the absolute disadvantage that one nation has with respect to another nation is the *same* in both commodities. For example, if one hour produced 3W instead of 1W in the United Kingdom (see Table 2.2), the United Kingdom would be exactly half as productive as the United States in both wheat and cloth. The United Kingdom (and the United States) would then have a comparative advantage in neither commodity, and no mutually beneficial trade could take place.

The reason for this is that (as earlier) the United States will trade only if it can exchange 6W for more than 4C. However, now the United Kingdom is not willing to give up more than 4C to obtain 6W from the United States because the United Kingdom can produce either 6W or 4C with two hours domestically. Under these circumstances, no mutually beneficial trade can take place.

This requires slightly modifying the statement of the law of comparative advantage to read as follows: Even if one nation has an absolute disadvantage with respect to the other nation in the production of both commodities, there is still a basis for mutually beneficial trade, *unless the absolute disadvantage (that one nation has with respect to the other nation) is in the same proportion for the two commodities*. Although it is important to note this case, its occurrence is rare and a matter of coincidence, so the applicability of the law of comparative advantage is not greatly affected. Furthermore, natural trade barriers such as transport costs can preclude trade even when some comparative advantage exists. At this point, however, we assume that no such natural or artificial (such as tariffs) barriers exist.

2.4D Comparative Advantage with Money

According to the law of comparative advantage (and disregarding the exception noted earlier), even if one nation (the United Kingdom in this case) has an absolute disadvantage in the production of both commodities with respect to the other nation (the United States), there is still a basis for mutually beneficial trade. But how, you may ask, can the United Kingdom export anything to the United States if it is less efficient than the United States in the production of both commodities? The answer is that wages in the United Kingdom will be sufficiently lower than wages in the United States so as to make the price of cloth (the commodity in which the United Kingdom has a comparative advantage) lower in the United Kingdom, and the price of wheat lower in the United States *when both commodities are expressed in terms of the currency of either nation*. Let us see how this works.

Suppose that the wage rate in the United States is \$6 per hour. Since one hour produces 6W in the United States (see Table 2.2), the price of a bushel of wheat is $P_W = \$1$. On the other hand, since one hour produces 4C, $P_C = \$1.50$ (from \$ ¾C). Suppose that at the same

time the wage rate in England is £1 per hour (the symbol "£" stands for pound, the U.K. currency). Since one hour produces 1W in the United Kingdom (see Table 2.2), $P_W = £1$ in the United Kingdom. Similarly, since one hour produces 2C, $P_C = £0.5$. If the exchange rate between the pound and the dollar is £1 = $2, then $P_W = £1 = \$2$ and $P_C = £0.5 = \$1$ in the United Kingdom. Table 2.3 shows the dollar price of wheat and cloth in the United States and the United Kingdom at the exchange rate of £1 = $2.

From Table 2.3 we can see that the dollar price of wheat (the commodity in which the United States has a comparative advantage) is lower in the United States than in the United Kingdom. On the other hand, the dollar price of cloth (the commodity in which the United Kingdom has a comparative advantage) is lower in the United Kingdom. (The result would be the same if the price of both commodities had been expressed in pounds.)

With the dollar price of wheat lower in the United States, businesspeople would buy wheat there and sell it in the United Kingdom, where they would buy cloth to sell in the United States. Even though U.K. labor is half as productive as U.S. labor in cloth production (see Table 2.2), U.K. labor receives only one-third of the U.S. wage rate (£1 = $2 as opposed to $6 in the United States), so that the dollar price of cloth is lower in the United Kingdom. To put it differently, the inefficiency of U.K. labor relative to U.S. labor in cloth production is more than compensated for by the lower wages in the United Kingdom. As a result, the dollar price of cloth is less in the United Kingdom, so the United Kingdom can export cloth to the United States. This is always the case as long as the U.K. wage rate is between ⅙ and ½ of the U.S. wage rate (the same as the productivity difference between the United Kingdom and the United States in the production of wheat and cloth).

If the exchange rate between the dollar and the pound were instead £1 = $1 (so that the U.K. wage rate was exactly ⅙ the U.S. wage rate), then the dollar price of wheat in the United Kingdom would be $P_W = £1 = \$1$. Since this is the same price as in the United States (see Table 2.3), the United States could not export wheat to the United Kingdom at this exchange rate. At the same time, $P_C = £0.5 = \$0.50$ in the United Kingdom, and the United Kingdom would export even more cloth than before to the United States. Trade would be unbalanced in favor of the United Kingdom, and the exchange rate between the dollar and the pound (i.e., the dollar price of the pound) would have to rise.

On the other hand, if the exchange rate were £1 = $3 (so that the U.K. wage rate was exactly ½ the U.S. wage rate), the price of cloth in the United Kingdom would be $P_C = £0.5 = \$1.50$ (the same as in the United States—see Table 2.3). As a result, the United Kingdom could not export cloth to the United States. Trade would be unbalanced in favor of the United States, and the exchange rate would have to fall. The rate of exchange between the dollar and the pound will eventually settle at the level that will result in balanced trade (in the absence of any interferences or other international transactions). We will return to this point in the appendix to this chapter and in much greater detail in Parts Three and Four, which deal with international finance.

TABLE 2.3. Dollar Price of Wheat and Cloth in the United States and United Kingdom at £1 = $2

	U.S.	U.K.
Price of one bushel of wheat	$1.00	$2.00
Price of one yard of cloth	1.50	1.00

CASE STUDY 2-3 The Petition of the Candlemakers

Sometimes satire and ridicule are more effective than theory and logic in influencing public opinion. For example, exasperated by the spread of protectionism under the prevailing mercantilist philosophy of the time, French economist Frédéric Bastiat (1801–1851) overwhelmed the proponents of protectionism by satirically extending their arguments to their logical and absurd conclusions. Nowhere is this more brilliantly accomplished than in the fictitious petition of the French candlemakers, written by Bastiat in 1845, and excerpted here:

> *We are suffering from the intolerable competition of a foreign rival, placed, it would seem, in a condition so far superior to ours for the production of light, that he absolutely* inundates *our* national market *at a price fabulously reduced. The moment he shows himself, our trade leaves us—all of our consumers apply to him; and a branch of native industry, having countless ramifications, is all at once rendered completely stagnant. This rival . . . is not other than the sun.*
>
> *What we pray for is, that it may please you to pass a law ordering the shutting up of all windows, sky-lights, dormerwindows, curtains, blinds, bull's eyes; in a word all openings, holes, chinks, clefts, and fissures, by or through which the light of the sun has been in use to enter houses, to the prejudice of the meritorious manufactures with which we flatter ourselves we have accommodated our country,—a country which, in gratitude, ought not to abandon us now to a strife so unequal. . . .*
>
> *Does it not argue to the greatest inconsistency to check as you do the importation of coal, iron, cheese, and goods of foreign manufacture, merely because and even in proportion as their price approaches zero, while at the same time you freely admit, and without limitation, the light of the sun, whose price is during the whole day at* zero?
>
> *If you shut up as much as possible all access to natural light, and create a demand for artificial light, which of our French manufactures will not be encouraged by it? If more tallow is consumed, then there must be more oxen and sheep; and, consequently, we shall behold the multiplication of artificial meadows, meat, wool, hides, and above all, manure, which is the basis and foundation of all agricultural wealth.*

Source: Frédéric Bastiat, *Economic Sophisms* (Edinburgh: Oliver and Boyd, 1873), pp. 49–53, abridged.

Thus, the argument that could be advanced in the United States that it needs to protect the high wages and standard of living of its workers against cheap British labor is generally false. Similarly faulty is the opposing argument that could be advanced in the United Kingdom that its labor needs protection against more efficient U.S. labor. These arguments are certainly inconsistent, and both are basically false (see Case Study 2-3).

2.5 Comparative Advantage and Opportunity Costs

Ricardo based his law of comparative advantage on a number of simplifying assumptions: (1) only two nations and two commodities, (2) free trade, (3) perfect mobility of labor within each nation but immobility between the two nations, (4) constant costs of production, (5) no transportation costs, (6) no technical change, and (7) the labor theory of value. Although assumptions one through six can easily be relaxed, assumption seven (i.e., that the labor theory of value holds) is not valid and should not be used for *explaining* comparative advantage.

2.5A Comparative Advantage and the Labor Theory of Value

Under the labor theory of value, the value or price of a commodity depends exclusively on the amount of labor going into the production of the commodity. This implies (1) that either

labor is the only factor of production or labor is used in the *same* fixed proportion in the production of all commodities and (2) that labor is homogeneous (i.e., of only one type). Since neither of these assumptions is true, we cannot base the explanation of comparative advantage on the labor theory of value.

Specifically, labor is not the only factor of production, nor is it used in the same fixed proportion in the production of all commodities. For example, much more capital equipment per worker is required to produce some products (such as steel) than to produce other products (such as textiles). In addition, there is usually some possibility of substitution between labor, capital, and other factors in the production of most commodities. Furthermore, labor is obviously not homogeneous but varies greatly in training, productivity, and wages. At the very least, we should allow for different productivities of labor. Indeed, this is how the Ricardian theory of comparative advantage has been tested empirically (see Section 2.7). In any event, the theory of comparative advantage need not be based on the labor theory of value but can be explained on the basis of the opportunity cost theory (which is acceptable). To be noted is that Ricardo himself did not believe in the labor theory of value and used it only as a simple way to explain the law of comparative advantage.

2.5B The Opportunity Cost Theory

It was left for Haberler in 1936 to explain or base the theory of comparative advantage on the opportunity cost theory. In this form, the law of comparative advantage is sometimes referred to as the *law of comparative cost*.

According to the opportunity cost theory, the cost of a commodity is the amount of a second commodity that must be given up to release just enough resources to produce one additional unit of the first commodity. No assumption is made here that labor is the only factor of production or that labor is homogeneous. Nor is it assumed that the cost or price of a commodity depends on or can be inferred exclusively from its labor content. Consequently, the nation with the lower opportunity cost in the production of a commodity has a comparative advantage in that commodity (and a comparative disadvantage in the second commodity).

For example, if in the absence of trade the United States must give up two-thirds of a unit of cloth to release just enough resources to produce one additional unit of wheat domestically, then *the opportunity cost of wheat is two-thirds of a unit of cloth* (i.e., $1W = \frac{2}{3}C$ in the United States). If $1W = 2C$ in the United Kingdom, then the opportunity cost of wheat (in terms of the amount of cloth that must be given up) is lower in the United States than in the United Kingdom, and the United States would have a comparative (cost) advantage over the United Kingdom in wheat. In a two-nation, two-commodity world, the United Kingdom would then have a comparative advantage in cloth.

According to the law of comparative advantage, the United States should specialize in producing wheat and export some of it in exchange for British cloth. This is exactly what we concluded earlier with the law of comparative advantage based on the labor theory of value, but now our explanation is based on the opportunity cost theory.

2.5C The Production Possibility Frontier under Constant Costs

Opportunity costs can be illustrated with the production possibility frontier, or transformation curve. The production possibility frontier is a curve that shows the *alternative* combinations

■ TABLE 2.4. Production Possibility Schedules for Wheat and Cloth in the United States and the United Kingdom

United States		United Kingdom	
Wheat	Cloth	Wheat	Cloth
180	0	60	0
150	20	50	20
120	40	40	40
90	60	30	60
60	80	20	80
30	100	10	100
0	120	0	120

of the two commodities that a nation can produce by fully utilizing all of its resources with the best technology available to it.

Table 2.4 gives the (hypothetical) production possibility schedules of wheat (in million bushels/year) and cloth (in million yards/year) for the United States and the United Kingdom. We see that the United States can produce 180W and 0C, 150W and 20C, or 120W and 40C, down to 0W and 120C. For each 30W that the United States gives up, just enough resources are released to produce an additional 20C. That is, 30W = 20C (in the sense that both require the same amount of resources). Thus, the opportunity cost of one unit of wheat in the United States is 1W = $\frac{2}{3}$C (the same as in Table 2.2) and remains constant. On the other hand, the United Kingdom can produce 60W and 0C, 50W and 20C, or 40W and 40C, down to 0W and 120C. It can increase its output by 20C for each 10W it gives up. Thus, the opportunity cost of wheat in the United Kingdom is 1W = 2C and remains constant.

The United States and United Kingdom production possibility schedules given in Table 2.4 are graphed as production possibility frontiers in Figure 2.1. Each point on a frontier represents one combination of wheat and cloth that the nation can produce. For example, at point A, the United States produces 90W and 60C. At point A', the United Kingdom produces 40W and 40C.

Points inside, or below, the production possibility frontier are also possible but are inefficient, in the sense that the nation has some idle resources and/or is not using the best technology available to it. On the other hand, points above the production frontier cannot be achieved with the resources and technology currently available to the nation.

The downward, or negative, slope of the production possibility frontiers in Figure 2.1 indicates that if the United States and the United Kingdom want to produce more wheat, they must give up some of their cloth production. The fact that the production possibility frontiers of both nations are straight lines reflects the fact that their opportunity costs are constant. That is, for each additional 1W to be produced, the United States must give up $\frac{2}{3}$C and the United Kingdom must give up 2C, *no matter from which point on its production possibility frontier the nation starts*.

Constant opportunity costs arise when (1) resources or factors of production are either perfect substitutes for each other or used in fixed proportion in the production of both commodities and (2) all units of the same factor are homogeneous or of exactly the same quality. Then, as each nation transfers resources from the production of cloth to the production of wheat, it will not have to use resources that are less and less suited to wheat production, no

matter how much wheat it is already producing. The same is true for the production of more cloth. Thus, we have constant costs in the sense that the same amount of one commodity must be given up to produce each additional unit of the second commodity.

Although opportunity costs are constant in each nation, they differ among nations, providing the basis for trade. Constant costs are not realistic, however. They are discussed only because they serve as a convenient introduction to the more realistic case of increasing costs, discussed in the next chapter.

2.5D Opportunity Costs and Relative Commodity Prices

We have seen that the opportunity cost of wheat is equal to the amount of cloth that the nation must give up to release just enough resources to produce one additional unit of wheat. This is given by the (absolute) slope of the production possibility frontier, or transformation curve, and is sometimes referred to as the *marginal rate of transformation*.

Figure 2.1 shows that the (absolute) slope of the U.S. transformation curve is $^{120}/_{180} = {}^{2}/_{3}$ = opportunity cost of wheat in the United States and remains constant. The slope of the U.K. transformation curve is $^{120}/_{60} = 2$ = opportunity cost of wheat in the United Kingdom and remains constant. On the assumptions that prices equal costs of production and that the nation does produce both some wheat and some cloth, the opportunity cost of wheat is equal to the price of wheat relative to the price of cloth (P_W/P_C).

Thus, $P_W/P_C = {}^{2}/_{3}$ in the United States, and inversely $P_C/P_W = {}^{3}/_{2} = 1.5$. In the United Kingdom, $P_W/P_C = 2$, and $P_C/P_W = {}^{1}/_{2}$. The lower P_W/P_C in the United States ($^{2}/_{3}$ as opposed to 2) is a reflection of its comparative advantage in wheat. Similarly, the lower P_C/P_W in the United Kingdom ($^{1}/_{2}$ as opposed to $^{2}/_{3}$) reflects its comparative advantage in cloth. Note that under constant costs, P_W/P_C is determined exclusively by production, or supply, considerations in each nation. Demand considerations do not enter at all in the determination of relative commodity prices.

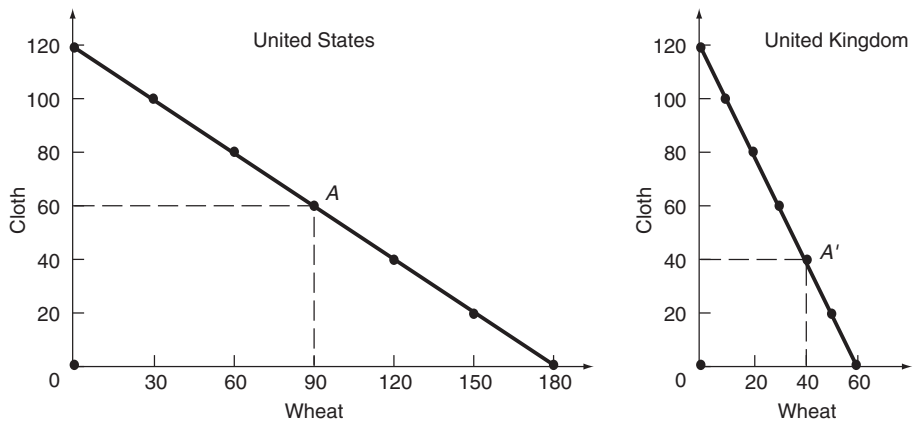

FIGURE 2.1. The Production Possibility Frontiers of the United States and the United Kingdom. The U.S. and U.K. production frontiers are obtained by plotting the values in Table 2.4. The frontiers are downward, or negatively sloped, indicating that as each nation produces more wheat, it must give up some cloth. Straight-line production possibility frontiers reflect constant opportunity costs.

To conclude, we can say that the difference in relative commodity prices between the two nations (given by the difference in the slope of their transformation curves) is a reflection of their comparative advantage and provides the basis for mutually beneficial trade.

2.6 The Basis for and the Gains from Trade under Constant Costs

In the absence of trade, a nation can only consume the commodities that it produces. As a result, the nation's production possibility frontier also represents its *consumption frontier*. Which combination of commodities the nation actually chooses to produce and consume depends on the people's tastes, or demand considerations.

2.6A Illustration of the Gains from Trade

In the absence of trade, the United States might choose to produce and consume combination A (90W and 60C) on its production possibility frontier (see Figure 2.2), and the United Kingdom might choose combination A' (40W and 40C).

With trade possible, the United States would specialize in the production of wheat (the commodity of its comparative advantage) and produce at point B (180W and 0C) on its production possibility frontier. Similarly, the United Kingdom would specialize in the production of cloth and produce at B' (0W and 120C). If the United States then exchanges 70W for 70C with the United Kingdom, it ends up consuming at point E (110W and 70C), and the United Kingdom ends up consuming at E' (70W and 50C). Thus, the United States gains 20W and 10C from trade (compare point E with point A in Figure 2.2), and the United Kingdom gains 30W and 10C (compare point A' with point E').

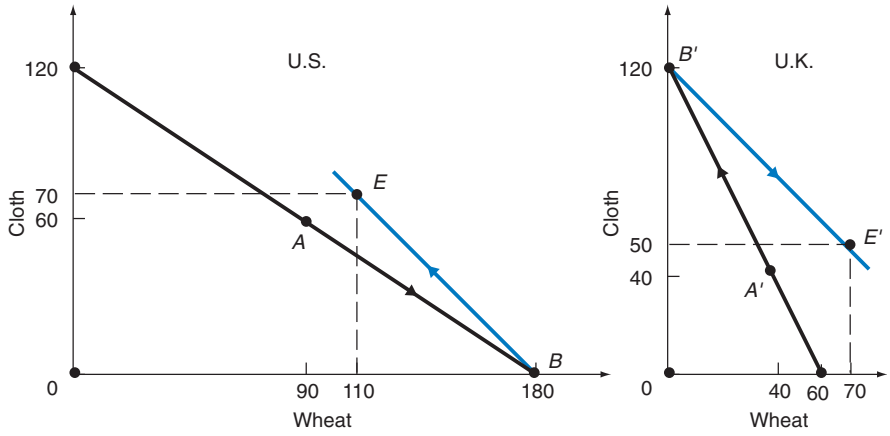

FIGURE 2.2. The Gains from Trade.
In the absence of trade, the United States produces and consumes at A, and the United Kingdom at A'. With trade, the United States specializes in the production of wheat and produces at B, while the United Kingdom specializes in the production of cloth and produces at B'. By exchanging 70W for 70C with the United Kingdom, the United States ends up consuming at E (and gains 20W and 10C), while the United Kingdom ends up consuming at E' (and gains 30W and 10C).

The increased consumption of both wheat and cloth in both nations was made possible by the increased output that resulted as each nation specialized in the production of the commodity of its comparative advantage. That is, in the absence of trade, the United States produced 90W and the United Kingdom 40W, for a total of 130W. With specialization in production and trade, 180W are produced (all in the United States). Similarly, in the absence of trade, the United States produced 60C and the United Kingdom 40C, for a total of 100C. With specialization in production and trade, 120C are produced (all in the United Kingdom).

It is this increase in output of 50W and 20C resulting from specialization in production that is shared by the United States and the United Kingdom and represents their gains from trade. Recall that in the absence of trade, the United States would not specialize in the production of wheat because it also wanted to consume some cloth. Similarly, the United Kingdom would not specialize in the production of cloth in the absence of trade because it also wanted to consume some wheat.

2.6B Relative Commodity Prices with Trade

We can gain a deeper understanding of our trade model by using the supply and demand curves for wheat and cloth shown in Figure 2.3. Figure 2.3 will also help us see how the equilibrium-relative commodity price with specialization in production and trade is determined.

In the left panel of Figure 2.3, $S_{W\,(US+UK)}$ is the combined supply curve of wheat of the United States and the United Kingdom if both countries used all of their resources to produce only wheat. Distance $0B = 180\text{W}$ represents the maximum quantity of wheat that the United States could produce with complete specialization in wheat production at the constant opportunity cost of $P_W/P_C = \frac{2}{3}$ (just as in the left panel of Figure 2.2). Distance

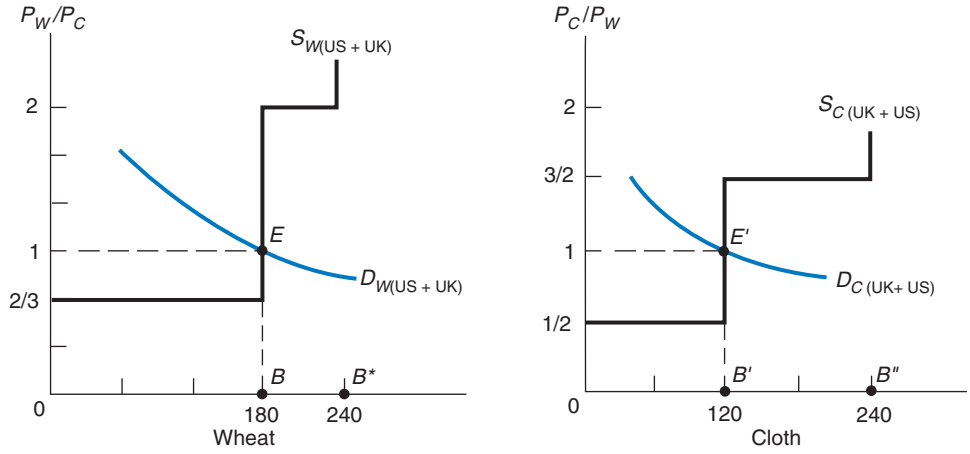

FIGURE 2.3. Equilibrium-Relative Commodity Prices with Demand and Supply.
In the left panel, $S_{W(US+UK)}$ is the combined U.S. and U.K. supply curve of wheat. It shows that the United States could produce a maximum of $180\text{W} = 0B$ at $P_W/P_C = \frac{2}{3}$, while the United Kingdom could produce a maximum of $60\text{W} = BB^*$ at $P_W/P_C = 2$. $D_{W(US+UK)}$ is the combined demand curve for wheat of the United States and the United Kingdom with trade. $D_{W(US+UK)}$ intersects $S_{W(US+UK)}$ at point E, resulting in the equilibrium quantity of 180W (all of which is produced in the United States) and equilibrium price of $P_W/P_C = 1$ with trade. The right panel shows equilibrium for cloth at the intersection of $D_{C(UK+US)}$ with $S_{C(UK+US)}$ at point E' with 120C (all of which is produced in the United Kingdom) and $P_C/P_W = 1$.