

>> International Trade

A ROSE BY ANY OTHER NATION

GIVING YOUR BELOVED ROSES ON Valentine's Day is a well-established tradition in the United States. But in the past it was a very expensive gesture: in the northern hemisphere, Valentine's Day falls not in summer, when roses are in bloom, but in the depths of winter. Until recently, that meant that the roses in the florist's shop were grown, at great cost, in heated greenhouses. Nowadays, however, most of the Valentine's Day roses sold in this country are flown in from South America, mainly from Colombia, where growing a rose in February is no trouble at all.

Is it a good thing that we now buy our winter roses from abroad? The vast majority of economists say yes: international trade, in which countries specialize in producing different goods and trade those goods with each other, is a source of mutual benefit to the countries involved. In Chapter 2 we laid out the basic principle of *gains from trade*; it's a principle that applies to countries as well as individuals.

But politicians and the public are often not convinced. In fact, during the 1996 presidential campaign one contender used the occasion of Valentine's Day to visit a flower-growing greenhouse in New Hamp-

shire, where he denounced imports of South American roses as a threat to U.S. jobs.

Up to now this book has analyzed the economy as if it were self-sufficient, as if the economy produced all the goods and services it consumes, and vice versa. This is, of course, true of the world economy as a whole. But it is not true of any individual country. It's true that 40 years ago the United States exported only a small fraction of what it produced and imported only a

What you will learn in this chapter:

- ▶ How comparative advantage leads to mutually beneficial international trade
- ▶ The sources of international comparative advantage
- ▶ Who gains and who loses from international trade, and why the gains exceed the losses
- ▶ How **tariffs** and **import quotas** cause inefficiency and reduce total surplus
- ▶ Why governments often engage in **trade protection** to shelter domestic industries from imports and how **international trade agreements** counteract this



Reif/Bruce/Masterfile



Pablo Corral/Corbis

What do these sweethearts and this rose farmer have in common? They are enjoying the mutual benefits of international trade.

small fraction of what it consumed. Since then, however, both U.S. imports and U.S. exports have grown much faster than the U.S. economy as a whole. And other countries engage in far more foreign trade, relative to the size of their economies, than does the United States. To have a full picture of how national economies work, we must understand international trade.

This chapter examines the economics of international trade. We start from the model of *comparative advantage*, which, as we saw in Chapter 2, explains why there are gains from international trade. It's also important, however, to understand how some individuals can be hurt by international trade and the effects of *trade policies* that countries use to limit imports or promote exports.

Comparative Advantage and International Trade

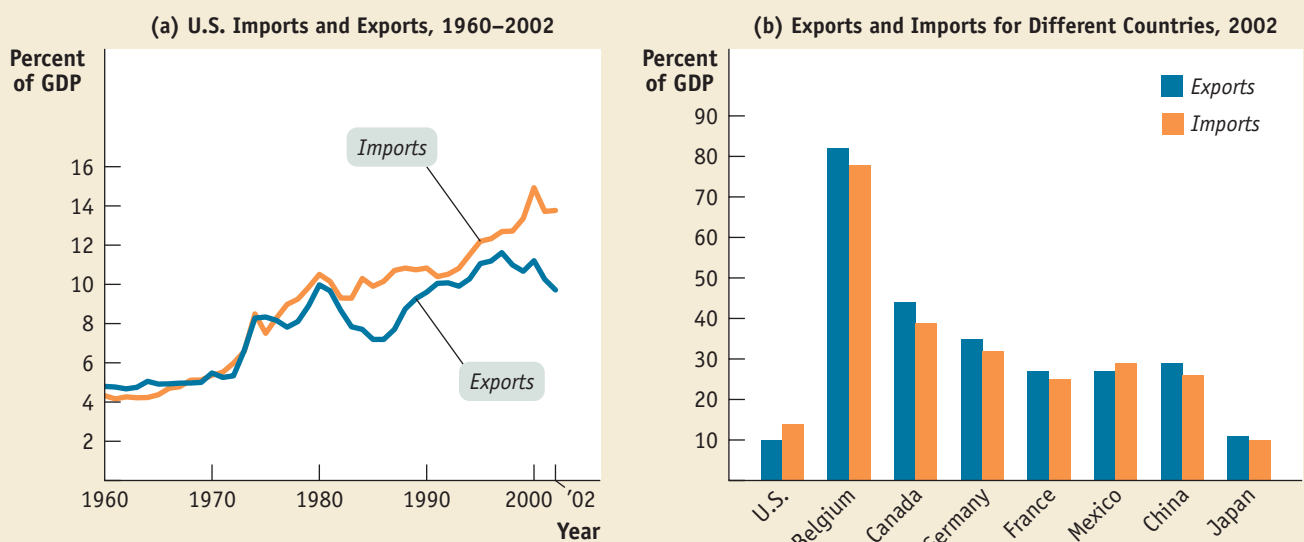
The United States buys roses—and many other goods and services—from other countries. At the same time, it sells many goods and services to other countries. Goods and services purchased from abroad are **imports**; goods and services sold abroad are **exports**.

As you saw in the opening story, imports and exports have taken on an increasingly important role in the U.S. economy. Over the last 40 years, both imports into the United States and exports from the United States have grown faster than the U.S. economy, as shown in panel (a) of Figure 17-1, which shows the value of imports and exports relative to gross domestic product. And, as panel (b) shows, foreign trade is even more important for other countries than for the United States.

To understand why international trade occurs and why economists believe it is beneficial to the economy, we will first review the concept of *comparative advantage*.

Goods and services purchased from other countries are **imports**; goods and services sold to other countries are **exports**.

Figure 17-1 The Growing Importance of International Trade



Panel (a) illustrates the fact that over the past 40 years, the United States has exported a steadily growing share of its output (that is, its gross domestic product) to other countries and imported a growing share of its consumption from abroad. Panel (b) illustrates the fact that international trade

is even more important to most other countries than it is to the United States.

Source: U.S. Department of Commerce, National Income and Product Accounts [for panel (a)] and United Nations Human Development Report 2004 [for panel (b)].

Production Possibilities and Comparative Advantage, Revisited

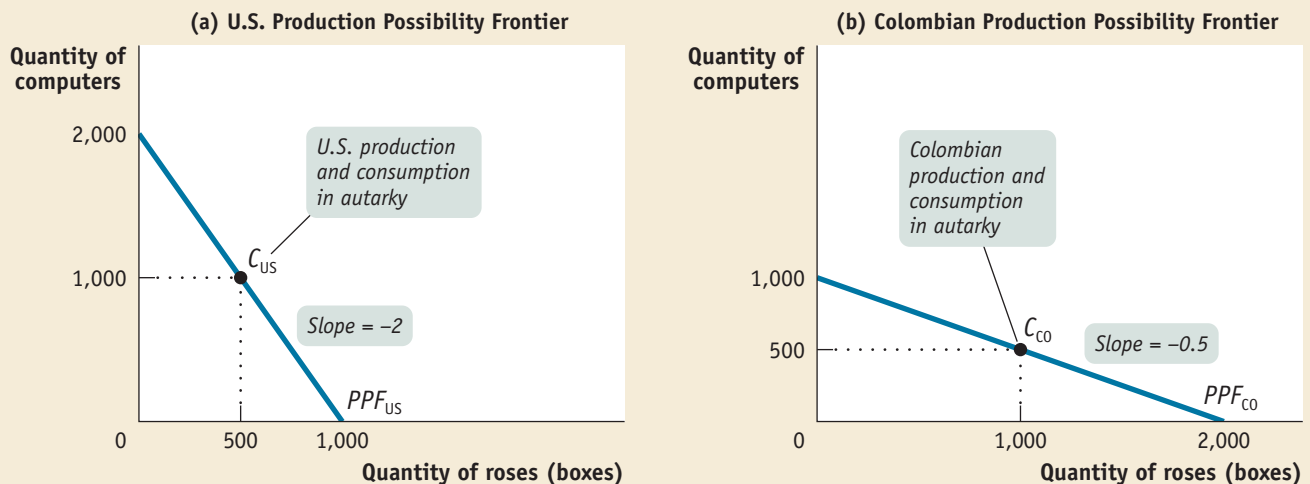
To grow Valentine's Day roses, any country must use resources—labor, energy, capital, and so on—that could have been used to produce other things. The potential production of other goods a nation must forgo to produce a rose is the opportunity cost of that rose.

It's a lot easier to grow Valentine's Day roses in Colombia, where the weather in January and February is nearly ideal, than it is in the United States. Conversely, other goods are not produced as easily in Colombia as in the United States. For example, Colombia doesn't have the base of skilled workers and technological know-how that makes the United States so good at producing high-technology goods. So the opportunity cost of a Valentine's Day rose in Colombia, in terms of other goods such as computers, is much less than it is in the United States.

And so we say that Colombia has a comparative advantage in producing roses. Let's repeat the definition of comparative advantage from Chapter 2: *a country has a comparative advantage in producing a good if the opportunity cost of producing the good is lower for that country than for other countries.*

Figure 17-2 provides a specific numerical example of comparative advantage in international trade. We assume that only two goods are produced and consumed: roses and computers. We also assume that roses are shipped in standard refrigerated boxes, each containing 100 roses. The figure shows hypothetical production possibility frontiers for the United States and Colombia. As in Chapter 2, we simplify the model by assuming that the production possibility frontiers are straight lines, rather than the more realistic bowed-out shape shown in Figure 2-1. The straight-line shape implies that the opportunity cost of a box of roses in terms of computers in each country is constant—it does not depend on how many units of each good the country produces. The analysis of international trade under the assumption that

Figure 17-2 Comparative Advantage and the Production Possibility Frontier



The U.S. opportunity cost of a box of roses in terms of a computer is 2: 2 computers must be forgone for every additional box of roses produced. The Colombian opportunity cost of a box of roses in terms of a computer is only 0.5: 0.5 computer must be forgone for every additional box of

roses produced. Therefore, Colombia has a comparative advantage in roses and the United States has a comparative advantage in computers. In autarky, C_{US} is the U.S. production and consumption bundle and C_{CO} is the Colombian production and consumption bundle.

TABLE 17-1

| Production Possibilities | | |
|---------------------------|------------|----------------|
| (a) United States | Production | |
| | One choice | Another choice |
| Quantity of roses (boxes) | 0 | 1,000 |
| Quantity of computers | 2,000 | 0 |
| (b) Colombia | Production | |
| | One choice | Another choice |
| Quantity of roses (boxes) | 0 | 1,000 |
| Quantity of computers | 2,000 | 0 |

production possibility frontiers are straight lines is known as the **Ricardian model of international trade**, named after the English economist David Ricardo, who introduced this analysis in the early nineteenth century.

Table 17-1 shows the production possibilities of the United States and Colombia. The same information is presented graphically in Figure 17-2. We assume that the United States can produce 1,000 boxes of roses if it produces no computers or 2,000 computers if it produces no roses. The slope of the production possibility frontier in part (a) is $-2,000/1,000$, or -2 : to produce an additional box of roses, the United States must forgo the production of 2 computers.

Similarly, we assume that Colombia can produce 2,000 boxes of roses if it produces no computers or 1,000 computers if it produces no roses. The slope of the production possibility frontier in part (b) is $-1,000/2,000$, or -0.5 : to produce an additional box of roses, Colombia must forgo the production of 0.5 computer.

Economists use the term **autarky** to describe a situation in which a country cannot trade with other countries. We assume that in autarky the United States would produce and consume 500 boxes of roses and 1,000 computers. This autarky production and consumption bundle is shown by point C_{US} in part (a). We also assume that in autarky Colombia would consume 1,000 boxes of roses and 500 computers, shown by point C_{CO} in part (b). The situation under autarky is summarized in Table 17-2.

If the countries are able to trade with each other, they can do better than they can under autarky. In this example, Colombia has a comparative advantage in the production

The **Ricardian model of international trade** analyzes international trade under the assumption that production possibility frontiers are straight lines.

Autarky is a situation in which a country cannot trade with other countries.

TABLE 17-2

| Production and Consumption Under Autarky | | |
|--|---------------------------|-------------|
| (a) United States | Production | Consumption |
| | Quantity of roses (boxes) | 500 |
| Quantity of computers | 1,000 | 1,000 |
| (b) Colombia | Production | Consumption |
| | Quantity of roses (boxes) | 1,000 |
| Quantity of computers | 500 | 500 |
| (c) World | Production | Consumption |
| | Quantity of roses (boxes) | 1,500 |
| Quantity of computers | 1,500 | 1,500 |

of roses. That is, the opportunity cost of roses is lower in Colombia than in the United States: 0.5 computer per box of roses in Colombia, versus 2 computers per box of roses in the United States. Conversely, the United States has a comparative advantage in the production of computers: to produce an additional computer, the United States must forgo the production of 0.5 box of roses, but producing an additional computer in Colombia requires forgoing the production of 2 boxes of roses. International trade allows each country to specialize in producing the good in which it has a comparative advantage: computers in the United States, roses in Colombia. And that leads to gains for both.

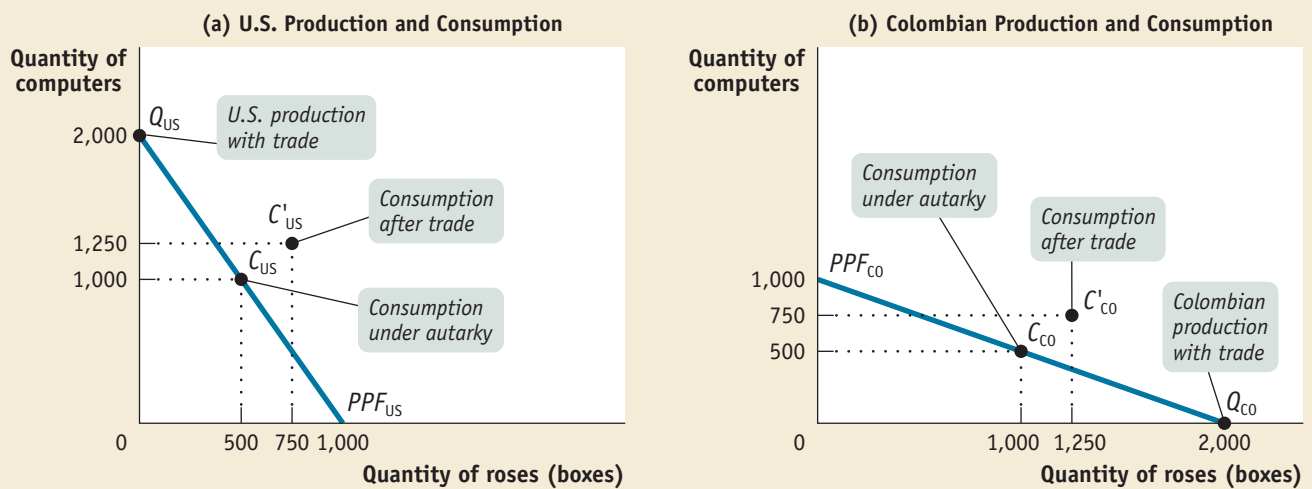
The Gains from International Trade

Figure 17-3 illustrates how both countries gain from specialization and trade. Again, panel (a) represents the United States and part (b) represents Colombia. As a result of international trade, the United States produces at point Q_{US} : 2,000 computers but no roses. Colombia produces at Q_{CO} : 2,000 boxes of roses but no computers. The new levels of production are shown in part (a) of Table 17-3.

By comparing Table 17-3 with Table 17-2, you can see that specialization has the effect of increasing total world production of *both* goods. In the absence of international specialization and trade, total world production consists of 1,500 computers and 1,500 boxes of roses. After international specialization, total world production rises to 2,000 computers and 2,000 boxes of roses. These goods can now be traded, with the United States consuming roses produced in Colombia and Colombia consuming computers produced in the United States. The result is that each country can consume more of *both* goods than it did under autarky.

In addition to showing production under trade, Figure 17-3 shows one of many possible international patterns of consumption, which is also shown in Table 17-3. In this example, the United States moves from its autarky consumption of 1,000 computers and 500 boxes of roses, shown by C_{US} , to consumption after trade of 1,250 computers and 750 boxes of roses, represented by C'_{US} . Colombia moves from its

Figure 17-3 The Gains from International Trade



Trade increases world production of both goods, allowing both countries to consume more. Here, each country specializes its production as a result of trade: the United States produces at Q_{US} and Colombia produces at Q_{CO} . Total world production of computers has risen from 1,500 to 2,000

and of roses from 1,500 boxes to 2,000 boxes. The United States can now consume bundle C'_{US} , and Colombia can now consume bundle C'_{CO} consumption bundles that were unattainable without trade.

TABLE 17-3

Production and Consumption After Trade

| (a) United States | | |
|---------------------------|------------|-------------|
| | Production | Consumption |
| Quantity of roses (boxes) | 0 | 750 |
| Quantity of computers | 2,000 | 1,250 |
| (b) Colombia | | |
| | Production | Consumption |
| Quantity of roses (boxes) | 2,000 | 1,250 |
| Quantity of computers | 0 | 750 |
| (c) World | | |
| | Production | Consumption |
| Quantity of roses (boxes) | 2,000 | 2,000 |
| Quantity of computers | 2,000 | 2,000 |

autarky consumption of 500 computers and 1,000 boxes of roses, shown by C_{CO} , to consumption after trade of 750 computers and 1,250 boxes of roses, shown by C'_{CO} .

What makes this possible is the fact that with international trade countries need not consume the same bundle of goods that they produce. Each country produces at one point (Q_{US} for the United States, Q_{CO} for Colombia) but consumes at a different point (C'_{US} for the United States, C'_{CO} for Colombia). The difference reflects imports and exports: the 750 boxes of roses the United States consumes are imported from Colombia; the 750 computers Colombia consumes are imported from the United States.

In this example we have simply assumed the post-trade consumption bundles of the two countries. In fact, just as in the case of individual consumption choices, the consumption choices of nations reflect both the preferences of its residents and the *relative prices* in international markets—the prices of one good in terms of another. Although we have not explicitly given the price of computers in terms of roses, that price is implicit in our example: Colombia exports 750 boxes of roses and receives 750 computers in return, so that each box of roses is traded for 1 computer. This tells us that the price of a computer on world markets must be equal to the price of a box of roses.

What determines relative prices in international trade? The answer is supply and demand—and we'll turn to supply and demand in international trade in the next section. However, first let's look behind the production possibility frontiers and ask what determines comparative advantage.

Sources of Comparative Advantage

International trade is driven by comparative advantage, but where does comparative advantage come from? Economists who study international trade have found three main sources of comparative advantage: international differences in *climate*, international differences in *factor endowments*, and international differences in *technology*.

Differences in Climate A key reason the opportunity cost of producing a Valentine's Day rose in Colombia is less than in the United States is that nurseries in Colombia can grow roses outdoors all year round but nurseries in the United States can't. In general, differences in

PITFALLS

THE PAUPER LABOR FALLACY

One common argument about international trade goes as follows: it's true that Bangladesh (to pick an example) can produce some goods, such as clothing, more cheaply than we can—but that cost advantage is based only on lower wages: in fact, it takes fewer hours of labor to produce a shirt in the United States than in Bangladesh. And importing goods produced by "pauper labor" (workers who are paid very low wages), goes the argument, actually reduces our standard of living.

Why is this a misconception? Because it confuses *comparative advantage* with *absolute advantage*. Yes, it takes less labor to produce a shirt in the United States than it does in Bangladesh. But what determines comparative advantage is not the amount of labor used to produce a good but the opportunity cost of that good—the quantity of other goods the labor used to produce a shirt could have produced.

Low wages in countries such as Bangladesh reflect the low productivity of labor across the board. Because labor productivity in other industries is very low, using a lot of labor to produce a shirt does not mean giving up the opportunity to produce large quantities of other goods. In fact, Bangladesh labor productivity is closer to U.S. levels in the clothing industry than it is in other industries, so that the opportunity cost of producing a shirt is less in Bangladesh than in the United States. So despite its lower labor productivity, Bangladesh has a comparative advantage in clothing production.

climate are a significant source of international trade. Tropical countries export tropical products like coffee, sugar, and bananas. Countries in the temperate zones export crops like wheat and corn. Some trade is even driven by the difference in seasons between the northern and southern hemispheres: winter deliveries of Chilean grapes and New Zealand apples have become commonplace in U.S. and European supermarkets.

Differences in Factor Endowments Canada is a major exporter of forest products—lumber and products derived from lumber, like pulp and paper—to the United States. These exports don't reflect the special skill of Canadian lumberjacks. Instead, Canada has a comparative advantage in forest products because its forested area is much greater compared to the size of its population than the ratio of forestland to people in the United States.

Forestland, like labor and capital, is a factor of production. Due to history and geography, the mix of factors of production available differs among countries, providing an important source of comparative advantage. The relationship between comparative advantage and factor availability is found in an influential model of international trade, the **Heckscher–Ohlin model** (developed by two Swedish economists in the first half of the twentieth century).

A key concept in the model is *factor intensity*. Producers use different ratios of factors of production in the production of different goods. For example, at any given wage rate and rental rate on capital, oil refineries will use much more capital per worker than clothing factories. Economists use the term **factor intensity** to describe this difference: oil refining is capital-intensive, because it tends to use a high ratio of capital to labor, but clothing manufacture is labor-intensive, because it tends to use a high ratio of labor to capital.

According to the Heckscher–Ohlin model, a country will have a comparative advantage in a good whose production is intensive in the factors that are abundantly available in that country. So a country that has an abundance of capital will have a comparative advantage in capital-intensive industries such as oil refining, but a country that has an abundance of labor will have a comparative advantage in labor-intensive industries such as cloth production. The basic intuition behind this result is simple, and based on opportunity cost. The opportunity cost of a given factor—

The **Heckscher–Ohlin model** of international trade shows how a country's comparative advantage can be determined by its supply of factors of production.

The **factor intensity** of production refers to differences in the ratio of factors used to produce a good. Oil refining is capital-intensive compared to clothing manufacture, because oil refiners use a higher ratio of capital to labor than clothing producers.

FOR INQUIRING MINDS DOES TRADE HURT POOR COUNTRIES?

It's a good bet that the clothes you are wearing right now were produced in a labor-abundant country such as Bangladesh or Sri Lanka. If so, the workers who produced those clothes were paid very low wages by Western standards: in 2000 (the most recent data available) workers in Sri Lankan factories were paid an average of only \$0.48 an hour. Doesn't this mean that Sri Lankan workers are getting a bad deal?

The answer of most economists is that it doesn't. The wages paid to export workers in poor countries should be compared not to what workers get in rich countries but to what they would get if those export jobs weren't available. The reason Sri Lankans are willing to work for so little is that in an underdeveloped

economy, with factors of production other than labor scarce, the opportunities available to workers are limited. And it's almost certain that international trade makes Sri Lanka and other low-wage countries *less* poor than they would be otherwise and raises workers' wages relative to what they would be without international trade.

Nonetheless, many people in advanced countries—students in particular—are disturbed by the thought that their consumer goods are produced by such poorly paid workers and want to see those workers receive higher pay in better working conditions. The dilemma is whether it is possible to insist on higher wages without choking off the benefits of international trade.

the value that the factor would generate in alternative uses—is low for a country when it possesses an abundance of that factor. (For example, water has a low opportunity cost in rainy parts of the United States; in arid states, where it is essential for irrigation, its opportunity cost is much higher.) So the opportunity cost of producing goods that are intensive in their use of that factor is also low for that country.

The most dramatic example of the validity of the Heckscher–Ohlin model is world trade in clothing. Clothing production is a labor-intensive activity: it doesn't take much physical capital, nor does it require a lot of human capital in the form of highly educated workers. So you would expect labor-abundant countries such as China and Bangladesh to have a comparative advantage in clothing production, and they do.

Differences in Technology In the 1970s and 1980s, Japan became by far the world's largest exporter of automobiles, selling large numbers to the United States and the rest of the world. Japan's comparative advantage in automobiles wasn't the result of climate. Nor can it easily be attributed to differences in factor abundance: aside from lack of land, Japan's pattern of factor abundance is quite similar to that in other advanced countries. Instead, Japan's comparative advantage in automobiles was based on the superior production techniques developed by that country's manufacturers, which allowed them to produce more cars with a given amount of labor and capital than their American or European counterparts.

Japan's comparative advantage in automobiles was a case of comparative advantage caused by differences in technology—the techniques used in production.

The causes of differences in technology are somewhat mysterious. Sometimes they seem to be based on knowledge accumulated through experience—for example, Switzerland's comparative advantage in watches reflects a long tradition of watchmaking. Sometimes they are the result of a set of innovations that for some reason occur in one country but not in others. Technological advantage is also often transitory. American auto manufacturers have closed much of the gap in productivity with their Japanese competitors; Europe's aircraft industry has closed a similar gap with the U.S. aircraft industry. At any given point in time, however, differences in technology are a major source of comparative advantage.

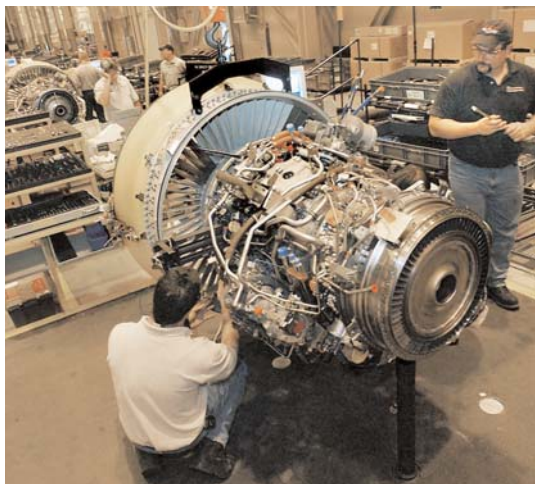
FOR INQUIRING MINDS

INCREASING RETURNS AND INTERNATIONAL TRADE

Most analysis of international trade focuses on how differences between countries—differences in climate, factor endowments, and technology—create national comparative advantage. However, economists have also pointed out another reason for international trade: the role of *increasing returns*.

Production of a good is characterized by increasing returns if the productivity of labor and other resources rises with the level of production. For example, in an industry characterized by increasing returns, increasing output by 10 percent might require only 8 percent more labor and 9 percent more raw materials. Increasing returns (sometimes also called economies of scale) can give rise to monopoly, because they give large firms an advantage over small firms.

But increasing returns can also give rise to international trade. The logic runs as follows: if production of a good is characterized by increasing returns, it makes sense to concentrate production in only a few locations, so as to achieve a high level of production in each location. But that also means that the good is produced in only a few countries, which export that good to other countries. A commonly cited example is the North American auto industry: although both the United States and Canada produce automobiles and their components, each particular model or component tends to be produced in only one of the two countries and exported to the other. Increasing returns probably play a large role in the trade in manufactured goods between advanced countries, which is about 25 percent of world trade.



AP/Wide World Photos

In the United States, an abundance of engineering know-how has led to a comparative advantage in aircraft.

economics in action

The Comparative Advantage of the United States

The United States is a country of superlatives: a nation richly endowed with many resources, human and natural, it has an *absolute* advantage in almost everything—that is, it is better at producing almost everything than anyone else. But what is its *comparative* advantage?

In 1951 the economist Wassily Leontief made a surprising discovery. Until his work, many economists had assumed that because U.S. workers were clearly better-equipped with machinery than their counterparts in other countries, the production of goods the U.S. exported was more capital-intensive than the production of goods it imported. But Leontief's work showed that this wasn't true: in fact, goods that the United States exported were produced with a slightly lower capital-labor ratio than goods the country imported. The "Leontief paradox" led to a sustained effort to make sense of U.S. trade patterns.

The main resolution of this paradox, it turns out, depends on the definition of capital. U.S. exports aren't intensive in *physical* capital—machines and buildings. Instead, they are intensive in *human* capital. U.S. exporting industries use a substantially higher ratio of highly educated workers to other workers than is found in U.S. industries that compete against imports. For example, one of America's biggest export sectors is aircraft; the aircraft industry employs large numbers of engineers and other people with graduate degrees relative to the number of manual laborers. Conversely, we import a lot of clothing, which is often produced by workers with little formal education. ■

>> QUICK REVIEW

- ▶ International trade is driven by comparative advantage. The *Ricardian model of international trade*, a simplified model of international trade based on assumption of constant opportunity cost, shows that trade between two countries makes both countries better off than they would be in *autarky*—that is, there are gains from trade.
- ▶ The main sources of comparative advantage are international differences in climate, factor endowments, and technology.
- ▶ The *Heckscher-Ohlin model* shows how comparative advantage can arise from differences in factory endowments: goods differ in their *factor intensity*, and countries tend to export goods that are intensive in the factors they have in abundance.
- ▶ Trade in manufactured goods amongst developed countries is best explained by increasing returns to production.

>> CHECK YOUR UNDERSTANDING 17-1

1. In the United States, the opportunity cost of 1 ton of corn is 50 bicycles. In China, the opportunity cost of 1 bicycle is 0.01 ton of corn.
 - a. Determine the pattern of comparative advantage.
 - b. In autarky, the United States can produce 200,000 bicycles if no corn is produced, and China can produce 3,000 tons of corn if no bicycles are produced. Draw each country's production possibility frontier assuming constant opportunity cost, with tons of corn on the vertical axis and bicycles on the horizontal axis.
 - c. With trade, each country specializes its production. The United States consumes 1,000 tons of corn and 200,000 bicycles; China consumes 3,000 tons of corn and 100,000 bicycles. Indicate the production and consumption points on your diagrams, and use them to explain the gains from trade.
2. Explain the following patterns using the Heckscher-Ohlin model:
 - a. France exports wine to the United States, and the United States exports movies to France.
 - b. Brazil exports shoes to the United States, and the United States exports shoe-making machinery to Brazil.

Solutions appear at back of book.

Supply, Demand, and International Trade

Simple models of comparative advantage are helpful for understanding the fundamental causes of international trade. However, to analyze the effects of international trade at a more detailed level and to understand trade policy, it helps to return to the supply and demand model. We'll start by looking at the effects of imports on domestic producers and consumers, then turn to the effect of exports.

The Effects of Imports

Figure 17-4 shows the U.S. market for roses, ignoring international trade for a moment. It introduces a few new concepts: the *domestic demand curve*, the *domestic supply curve*, and the *world price*.

The **domestic demand curve** shows how the quantity of a good demanded by residents of a country depends on the price of that good. Why “domestic”? Because people living in other countries may demand the good, too. Once we introduce international trade, we will need to distinguish between purchases of a good by domestic consumers and purchases by foreign consumers. So the domestic demand curve reflects only the demand of residents of our own country. Similarly, the **domestic supply curve** shows how the quantity of a good supplied by producers inside a country depends on the price of that good. Once we introduce international trade, we will need to distinguish between the supply of domestic producers and foreign supply—supply brought in from abroad.

In autarky, with no international trade in roses, the equilibrium in this market would be determined by the intersection of the domestic demand and domestic supply curves, point A. The equilibrium price of roses would be P_A , and the equilibrium quantity of roses produced and consumed would be Q_A . As always, both consumers and producers would gain from the existence of the domestic market. Consumer surplus would be equal to the area of the upper shaded triangle in Figure 17-4. Producer surplus would be equal to the area of the lower shaded triangle. And total surplus would be equal to the sum of these two shaded triangles.

Now let’s imagine opening up this market to imports. To do this, we must make some assumption about the supply of imports. The simplest assumption, which we will adopt here, is that unlimited quantities of roses can be purchased from abroad at a fixed price, known as the **world price** of roses. Figure 17-5 on page 416 shows a situation in which the world price of roses, P_W , is lower than the price of roses that would prevail in the domestic market under autarky, P_A .

Given the world price of roses is below the domestic price of roses, it is profitable for importers to buy roses abroad and resell them domestically. This increases the supply of roses to the domestic market, driving down the domestic market price. Roses will continue to be imported until the domestic price falls to a level equal to the world price.

The result is shown in Figure 17-5. Because of imports, the domestic price of roses falls from P_A to P_W . The quantity of roses demanded by domestic consumers rises from Q_A to Q_T , and the quantity supplied by domestic producers falls from Q_A to Q_T .

The **domestic demand curve** shows how the quantity of a good demanded by domestic consumers depends on the price of that good.

The **domestic supply curve** shows how the quantity of a good supplied by domestic producers depends on the price of that good.

The **world price** of a good is the price at which that good can be bought or sold abroad.

Figure 17-4

Consumer and Producer Surplus in Autarky

In the absence of trade, domestic price is P_A , the price at which the domestic supply curve and the domestic demand curve intersect. The quantity produced and consumed domestically is Q_A . Consumer surplus is represented by the blue-shaded area, and producer surplus is represented by the red-shaded area.

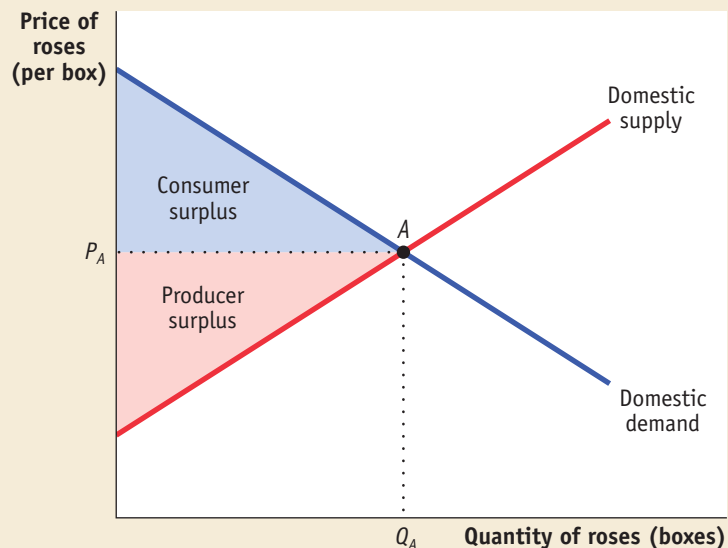
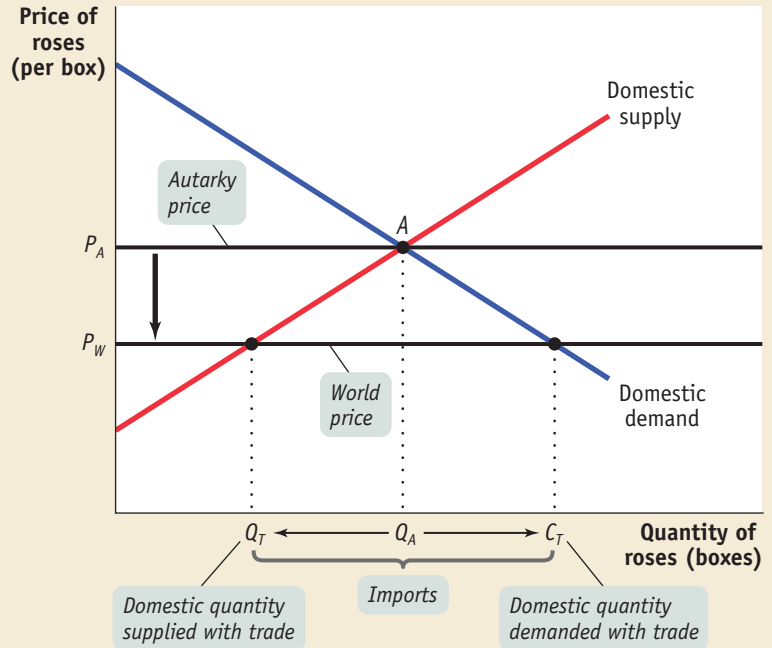


Figure 17-5

The Domestic Market with Imports

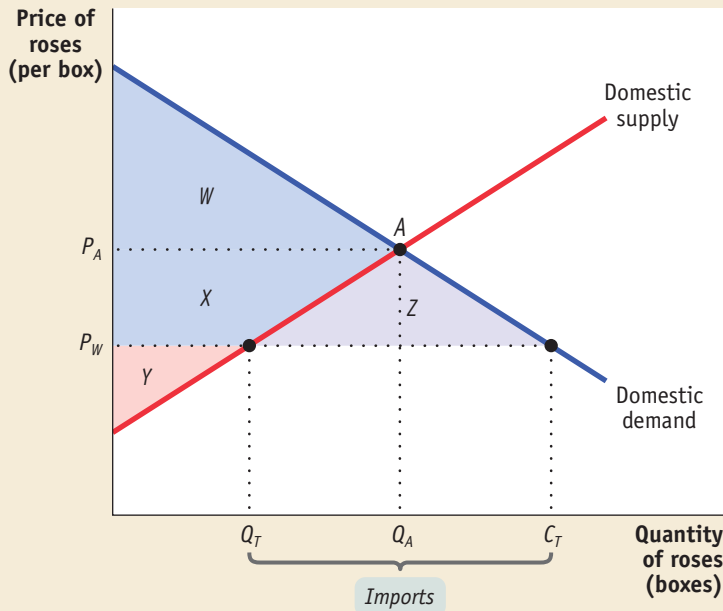
Here the world price of roses, P_W , is below the autarky price, P_A . When the economy is opened to trade, imports enter the domestic market, and the domestic price, P_A , falls to the world price, P_W . As the price falls, the domestic quantity demanded rises from Q_A to C_T and domestic production falls from Q_A to Q_T . The difference between domestic quantity demanded and domestic quantity supplied at P_W , the quantity $C_T - Q_T$, is filled by imports.



The difference between the domestic quantity demanded and the domestic quantity supplied, $C_T - Q_T$, is filled by imports.

Now let's turn to the effects of imports on consumer surplus and producer surplus. Because imports of roses lead to a fall in their domestic price, consumer surplus rises and producer surplus falls. Figure 17-6 shows how this works. We label four areas: W,

Figure 17-6 The Effects of Imports on Surplus



| | Changes in surplus | |
|----------------------|--------------------|------|
| | Gain | Loss |
| Consumer surplus | X + Z | |
| Producer surplus | | -X |
| Total surplus | Z | |

When the domestic price falls to P_W as a result of trade, consumers gain additional surplus (areas X + Z) and producers lose surplus (area X). Because the gains to

consumers outweigh the losses to producers, the total surplus in the economy as a whole increases (area Z).

X, Y, and Z. The autarky consumer surplus we identified in Figure 17-4 corresponds to W , and the autarky producer surplus corresponds to the sum of X and Y. The fall in the domestic price to the world price leads to an increase in consumer surplus; it increases by the areas X and Z, so that it now equals the sum of W , X, and Z. At the same time, producers lose the area X in surplus, so that producer surplus now equals only Y.

The table in Figure 17-6 summarizes the changes in consumer and producer surplus when the rose market is opened to imports. Consumers gain surplus equal to the area $X + Z$. Producers lose surplus equal to the area X. So the sum of producer and consumer surplus—the total surplus generated in the rose market—rises by Z. As a result of trade, consumers gain and producers lose, but the gain to consumers exceeds the loss to producers.

This is an important result. We have just shown that opening up a market to imports leads to a net gain in total surplus, which is what we should have expected given the proposition that there are gains from international trade. However, we have also learned that although the country as a whole gains, some groups—in this case, producers of roses—lose as a result of international trade. As we'll see shortly, the fact that international trade typically creates losers as well as winners is crucial for understanding the politics of trade policy.

We turn next to the case in which a country exports a good.

The Effects of Exports

Figure 17-7 shows the effects on a country when it exports a good, in this case computers. For this example, we assume that unlimited quantities of computers can be sold abroad at a given world price, P_W , which is higher than the domestic price, P_A , that would prevail under autarky.

The higher world price makes it profitable for exporters to buy computers domestically and sell them overseas. This increases the demand for computers in the domestic market and drives the domestic price up until the domestic price is equal to the world price. As a result, the quantity demanded by domestic consumers falls from Q_A to C_T , and the quantity supplied by domestic producers rises from Q_A to Q_T . This difference between domestic production and domestic consumption, $Q_T - C_T$, is exported.

Figure 17-7

The Domestic Market with Exports

Here the world price, P_W , is greater than the autarky price, P_A . When the economy is opened to trade, some of the domestic supply is now exported. The domestic price, P_A , rises to the world price, P_W . As the price rises, the domestic quantity demanded falls from Q_A to C_T and domestic production rises from Q_A to Q_T . The remainder of the domestic quantity supplied, $Q_T - C_T$, is exported.

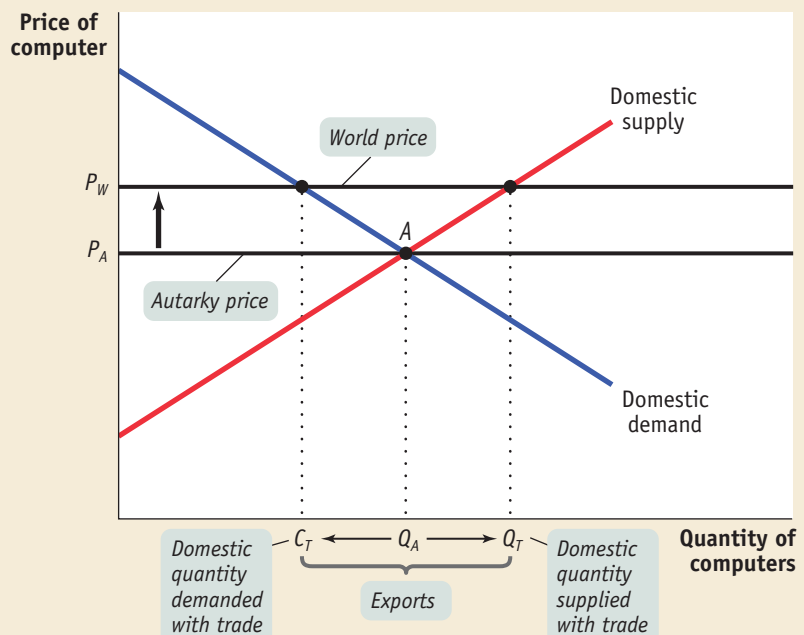
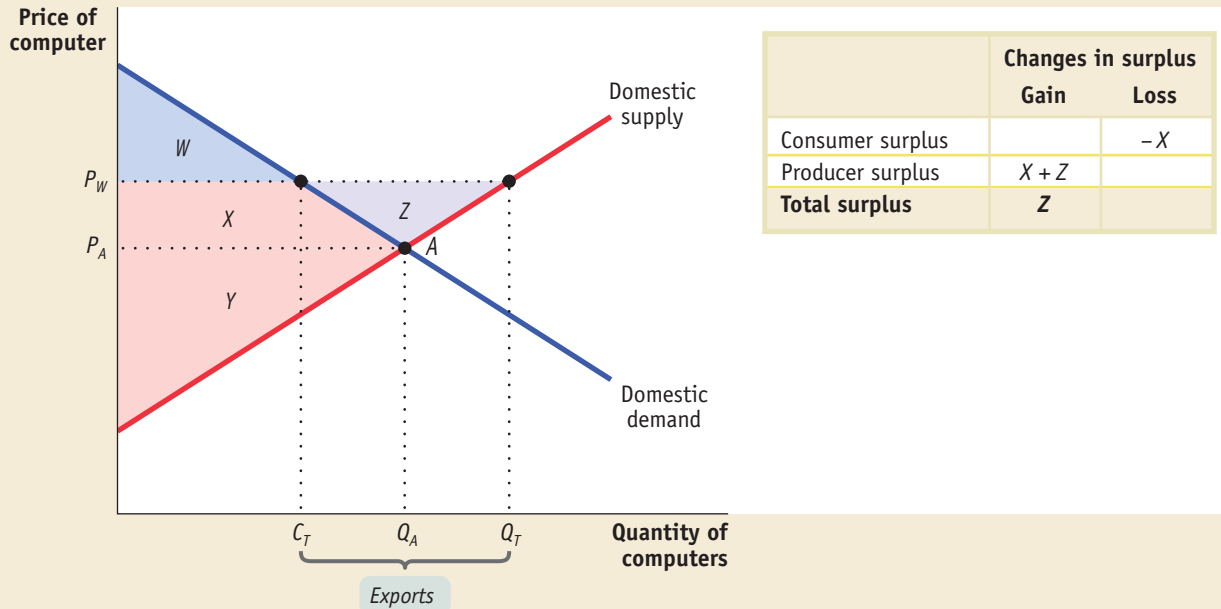


Figure 17-8 The Effect of Exports on Surplus



When the domestic price rises to P_W as a result of trade, producers gain additional surplus (areas $X + Z$) but consumers lose surplus (area X). Because the gains to

producers outweigh the losses to consumers, the total surplus in the economy as a whole increases (area Z).

Like imports, exports lead to an overall gain in total surplus for the exporting country, but also create losers as well as winners. Figure 17-8 shows the effects of computer exports on producer and consumer surplus. In the absence of trade, the price of computers would be P_A . Consumer surplus in the absence of trade is the sum of the areas W and X , and producer surplus would be the area Y . As a result of trade, P_A rises to P_W , consumer surplus falls to W and producer surplus rises to $Y + X + Z$. So producers gain $X + Z$, consumers lose X , and, as shown in the table accompanying the figure, the economy as a whole gains total surplus in the amount of Z .

We have learned, then, that imports of a particular good hurt domestic producers of that good but help domestic consumers, whereas exports of a particular good hurt domestic consumers but help domestic producers of that good. In each case, the benefits are larger than the losses.

International Trade and Factor Markets

So far we have focused on the effects of international trade on producers and consumers in a particular industry. For many purposes this is a very helpful approach. For understanding the long-run effects of international trade on income distribution, however, this approach can be inadequate, because factors of production can move between industries.

To see the problem, consider the position of Maria, a trained accountant who currently works for a U.S. company that grows flowers. If the economy is opened up to imports of roses from South America, her industry will contract and will hire fewer accountants. But accounting is a profession with employment opportunities in many industries, and Maria might well find a better job in the computer industry, which expands as a result of international trade. So it may not be appropriate to think of her as a producer of flowers who is hurt by competition from imported roses. Rather,

what matters to her is the effect of international trade on the salaries of accountants, wherever they are employed. In other words, sometimes it is important to analyze the effect of trade on *factor prices*.

Earlier in this chapter we described the Heckscher–Ohlin model of trade, which suggests that comparative advantage is determined by a country's factor endowment. This model also suggests how international trade affects factor prices: compared to autarky, international trade tends to raise the prices of factors in which a country is abundant and reduce the prices of factors that are scarce.

We won't work this out in detail, but the idea is intuitively simple. Think of industries as consisting of two kinds: **exporting industries**, which produce goods and services that are sold abroad, and **import-competing industries**, which produce goods and services that are also imported. Compared with autarky, international trade leads to higher production in exporting industries and lower production in import-competing industries. This indirectly increases the demand for the factors used by exporting industries and decreases the demand for factors used by import-competing industries. But the Heckscher–Ohlin model says that a country tends to export goods that are intensive in its abundant factors and to import goods that are intensive in its scarce factors. So international trade tends to increase the demand for factors that are abundant in our country compared with other countries, and to decrease the demand for factors that are scarce in our country compared with other countries.

The Economics in Action on page 414 pointed out that U.S. exports tend to be human-capital-intensive and U.S. imports tend to be unskilled-labor-intensive. This suggests that the effect of international trade on U.S. factor markets is to raise the wage rate of highly educated workers and to reduce the wage rate of unskilled workers.

This effect has been a source of some concern in recent years. Wage inequality—the gap between the wages of highly paid and low-paid workers—has increased substantially over the last 25 years. Some economists believe that growing international trade is an important factor in that trend. If international trade has the effects predicted by the Heckscher–Ohlin model, it raises the wages of highly educated workers, who already have relatively high wages, and lowers the wages of less educated workers, who already have relatively low wages.

How important are these effects? In some historical episodes, the impacts of trade on factor prices have been very large. As we explain in the Economics in Action that follows, the opening of transatlantic trade in the late nineteenth century had a large negative impact on land rents in Europe, hurting landowners but helping workers and owners of capital. The effects of trade on wages in the United States have been a source of considerable controversy in recent years. Most economists who have studied the issue agree that growing imports of labor-intensive products from newly industrializing economies, and the export of high-technology goods in return, have helped cause a widening wage differential between highly educated and less educated workers in this country. However, other forces, especially technological change, are probably more important in explaining growing wage inequality.

economics in action

Trade, Wages, and Land Prices in the Nineteenth Century

Beginning around 1870, there was an explosive growth of world trade in agricultural products, based largely on the steam engine. Steam-powered ships could cross the ocean much more quickly and reliably than sailing ships; until about 1860, steamships had higher costs than sailing ships, but after that rates dropped sharply. At the same time, railroads made it possible to bring grain and other bulk goods cheaply from the interior to ports. The result was that land-abundant countries—the United States, Canada, Argentina, Australia—began shipping large quantities of agricultural goods to the densely populated, land-scarce countries of Europe.

Exporting industries produce goods and services that are sold abroad.

Import-competing industries produce goods and services that are also imported.

>> QUICK REVIEW

- ▶ When a market is opened to trade, competition among importers or exporters drives the domestic price to equality with the *world price*. If the world price is lower than the autarky price, trade leads to imports and a fall in the domestic price compared to the world price. There are overall gains from trade because consumer gains exceed the producer losses.
- ▶ If the world price is higher than the autarky price, trade leads to exports and a rise in the domestic price compared to the world price. There are overall gains from trade because producer gains exceed the consumer losses.
- ▶ International trade leads to an expansion of *exporting industries*, which increases demand for a country's abundant factors, and a contraction of *import-competing industries*, which decreases demand for its scarce factors.

An economy has **free trade** when the government does not attempt either to reduce or to increase the levels of exports and imports that occur naturally as a result of supply and demand.

Policies that limit imports are known as **trade protection** or simply as **protection**.

A **tariff** is a tax levied on imports.

This opening up of trade led to higher prices of agricultural products, such as wheat, in exporting countries and a decline in their prices in importing countries. Notably, the difference between wheat prices in the midwestern United States and England plunged.

This change in prices created both winners and losers on both sides of the Atlantic. In England, land prices fell by half compared with average wages; landowners found their purchasing power sharply reduced, but workers benefited from cheaper food. In the United States, the reverse happened: land prices doubled compared with wages. Landowners did very well, but workers found the purchasing power of their wages dented by rising food prices. ■

>> CHECK YOUR UNDERSTANDING 17-2

1. Due to a sudden outbreak of food-borne illnesses, trade in food between the United States and Mexico is halted. In autarky, the price of Mexican grapes is lower than that of American grapes. Using a diagram of the domestic demand curve and the domestic supply curve for American grapes, explain the effect of these events on the following:
 - a. American grape consumers' surplus
 - b. American grape producers' surplus
 - c. American total surplus
2. What effect do you think these events have on Mexican grape producers? Mexican grape pickers? Mexican grape consumers? American grape pickers?

Solutions appear at back of book.

Effects of Trade Protection

Ever since David Ricardo laid out the principle of comparative advantage in the early nineteenth century, most economists have advocated **free trade**. That is, they have argued that government policy should not attempt either to reduce or to increase the levels of exports and imports that occur naturally as a result of supply and demand. Despite the free-trade arguments of economists, however, many governments use taxes and other restrictions to limit imports. More rarely, governments offer subsidies to encourage exports. Policies that limit imports, usually with the goal of protecting domestic producers in import-competing industries from foreign competition, are known as **trade protection** or simply as **protection**.

Let's look at the two most common protectionist policies, tariffs and import quotas, then turn to the reasons governments follow these policies.

Effects of a Tariff

A **tariff** is a form of excise tax, but one that is levied only against sales of imported goods. For example, the U.S. government could declare that anyone bringing in roses from Colombia must pay \$2 per rose. In the distant past, tariffs were an important source of government revenue because they were relatively easy to collect. But in the modern world, tariffs are usually intended to discourage imports and protect import-competing domestic producers.

The effect of a tariff is to raise both the price received by domestic producers and the price paid by domestic consumers. Suppose, for example, that our country imports roses, which are available on the world market at \$4 each. As we saw earlier, under free trade the domestic price would also be \$4. But if a tariff of \$2 per rose is imposed, the domestic price will rise to \$6, and it won't be profitable to import roses unless the price in the domestic market is high enough to compensate importers for the cost of paying the tariff.

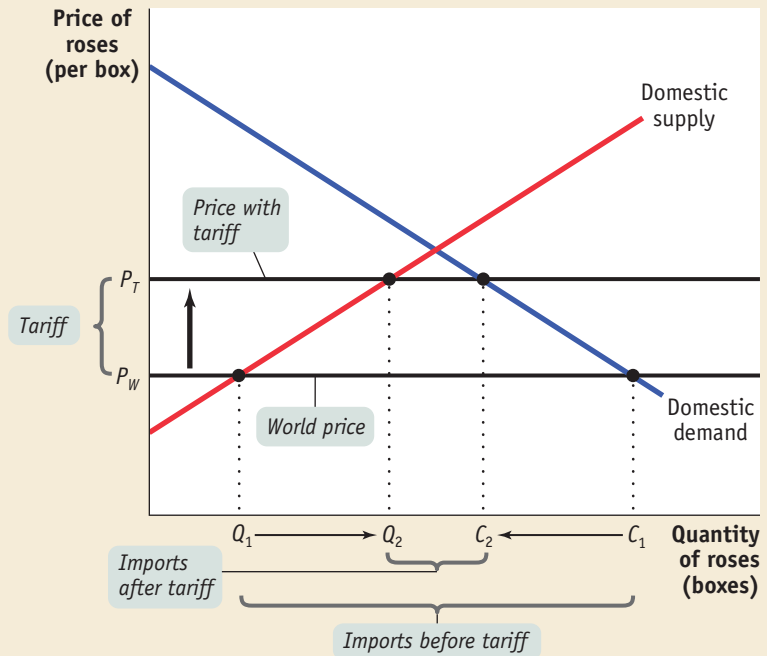
Figure 17-9 illustrates the effects of a tariff on rose imports. As before, we assume that P_w is the world price of roses. Before the tariff is imposed, imports have driven the domestic price down to P_w , so that pre-tariff domestic production is Q_1 , pre-tariff domestic consumption is C_1 , and pre-tariff imports are $C_1 - Q_1$.

Now suppose that the government imposes a tariff on each rose imported. As a consequence, it is no longer profitable to import roses unless the domestic price is

Figure 17-9

The Effect of a Tariff

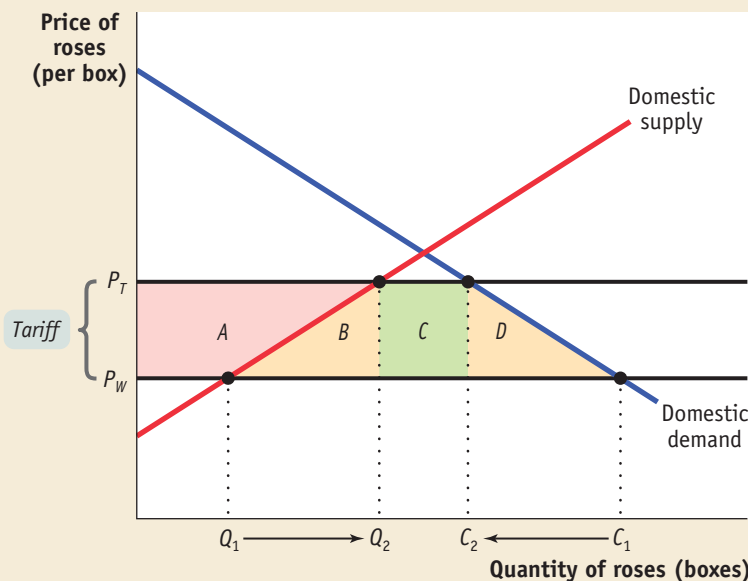
A tariff raises the domestic price of the good from P_W to P_T . Domestic demand shrinks from C_1 to C_2 and domestic supply increases from Q_1 to Q_2 . As a result, imports—which had been $C_1 - Q_1$ before the tariff was imposed—shrink to $C_2 - Q_2$ after the tariff is imposed.



greater than or equal to the world price plus the tariff. So the domestic price rises to P_T , which is equal to the world price, P_W , plus the tariff. Domestic production rises to Q_2 , domestic consumption falls to C_2 , and imports fall to $C_2 - Q_2$.

A tariff, then, raises domestic prices, leads to increased domestic production, and causes reduced domestic consumption compared to the situation under free trade. Figure 17-10 shows the effects on welfare. There are three effects. First, the higher

Figure 17-10 The Effect of a Tariff Reduces Total Surplus



| | Changes in surplus | |
|----------------------|--------------------|------------------------------|
| | Gain | Loss |
| Consumer surplus | | $-(A + B + C + D)$ |
| Producer surplus | A | |
| Government revenue | C | |
| Total surplus | | $-(B + D)$ |

When the domestic price rises as a result of a tariff, producers gain additional surplus (area A), the government gains revenue (area C), and consumers lose surplus (areas

$A + B + C + D$). Because the losses to consumers outweigh the gains to producers and the government, the economy as a whole loses surplus (areas $B + D$).

domestic price increases producer surplus, a gain equal to area A. Second, the higher domestic price reduces consumer surplus, a reduction equal to the sum of areas A, B, C, and D. Finally, the tariff yields revenue to the government. How much revenue? The government collects the tariff—which, remember, is equal to the difference between P_T and P_W on each of the $C_2 - Q_2$ roses imported. So total revenue is $(P_T - P_W) \times (C_2 - Q_2)$. This is equal to area C.

The welfare effects of a tariff are summarized in the table in Figure 17-10. Producers gain, consumers lose, the government gains. But consumer losses are greater than the sum of producer and government gains, leading to a net reduction in total surplus equal to areas B + D.

Recall that in Chapter 4 we analyzed the effects of an excise tax—a tax on buyers or sellers of a good. We saw that an excise tax creates inefficiency, or deadweight loss, because it prevents mutually beneficial trades from occurring. The same is true of a tariff, where its deadweight loss on society is equal to the loss in total surplus represented by areas B + D. Tariffs generate deadweight losses because they create inefficiencies in two ways. First, some mutually beneficial trades go unexploited: some consumers who are willing to pay more than the world price, P_W , do not purchase the good, even though P_W is the true cost of a unit of the good to the economy. The cost of this inefficiency is represented in Figure 17-10 by area D. Second, the economy's resources are wasted on inefficient production: some producers whose cost exceeds P_W produce the good, even though an additional unit of the good can be purchased abroad for P_W . The cost of this inefficiency is represented in Figure 17-10 by area B.

Effects of an Import Quota

An **import quota** is a legal limit on the quantity of a good that can be imported.

An **import quota**, another form of trade production, is a legal limit on the quantity of a good that can be imported. For example, a U.S. import quota on Colombian roses might limit the number imported each year to 50 million. Import quotas are usually administered through licenses: a number of licenses are issued, each giving the license-holder the right to import a limited quantity of the good each year.

We discussed quotas in Chapter 4, where we saw that a quota on sales in a domestic market has the same effect as an excise tax, with one difference: the money that would otherwise have accrued to the government as tax revenue under an excise tax becomes quota rents to license-holders under a quota. Similarly, an import quota has the same effect as a tariff, with one difference: the money that would otherwise have been government revenue becomes quota rents to license holders. Look again at Figure 17-10. An import quota that limits imports to $C_2 - Q_2$ will raise the domestic price of roses by the same amount as the tariff we considered previously. That is, it will raise the domestic price from P_W rises to P_T . However, area C will now represent quota rents rather than government revenue.

Who receives import licenses and so collects the quota rents? In the case of U.S. import protection, the answer may surprise you: the most important import licenses—mainly for clothing, to a lesser extent for sugar—are granted to foreign governments.

Because the quota rents for most U.S. import quotas go to foreigners, the cost to the nation of such quotas is larger than that of a tariff that produced the same level of imports. In Figure 17-10 the net loss from an import quota would be equal to B + C + D, the difference between consumer losses and producer gains.

economics in action

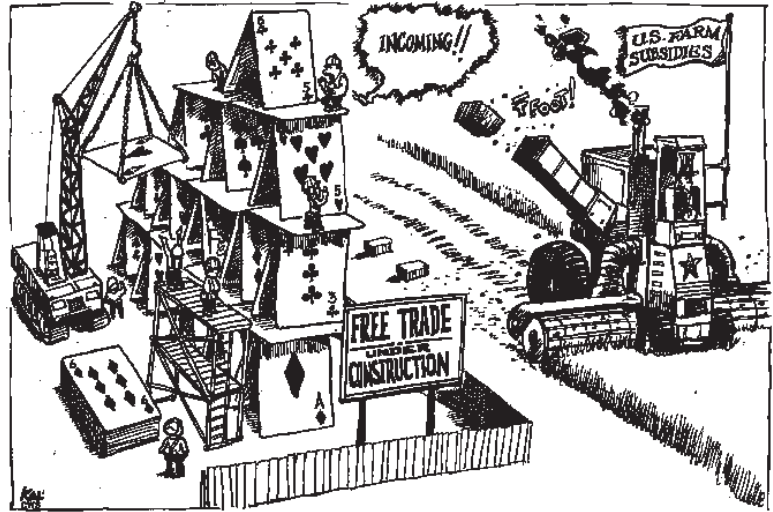
Trade Protection in the United States

The United States today generally follows a policy of free trade, at least in comparison with other countries and also in comparison with its own past. Most manufactured goods are subject either to no tariff or to a low tariff. However, there are two areas in which the United States does significantly limit imports.

One is agriculture. The typical U.S. policy here is something called a “tariff quota.” A certain amount of the imports are subject to a low tariff rate; this acts like an import quota because you’re allowed to pay the low rate only if you have a license. Any additional imports are subject to a much higher tariff rate. We have tariff quotas on beef, dairy products, sugar, peanuts, and other things. For Inquiring Minds on page 000 discusses the sugar quota in the context of worldwide sugar policy.

The other area in which the United States significantly limits imports is clothing and textiles, where the government applies an elaborate system of import quotas.

The peculiar thing about U.S. trade protection is that in most cases quota licenses are assigned to foreigners, often foreign governments. For example, rights to sell clothing in the United States are allotted to various exporting countries, which can then hand those rights out as they see fit. This means that the quota rents go overseas, greatly increasing the cost to the United States of the import limitations. In fact, according to some estimates, about 70 percent of the total cost of U.S. import restrictions comes not from deadweight loss but from the transfer of quota rents to foreigners. ■



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>> QUICK REVIEW

- ▶ Most economists advocate *free trade*, although many governments engage in *trade protection* of import-competing industries. The two most common protectionist policies are tariffs and import quotas. In rare instances, governments subsidize export industries.
- ▶ A *tariff* is a tax on imports. It raises the domestic price above the world price, leading to a fall in trade and total consumption and a rise in domestic production. Domestic producers and the government gain, but consumer losses more than offset this gain, leading to deadweight loss in total surplus.
- ▶ An *import quota* is a legal quantity limit on imports. Its effect is like that of a tariff, except that revenues—the quota rents—accrue to the licensee, not to the government.

>> CHECK YOUR UNDERSTANDING 17-3

1. Suppose that the world price of butter is \$0.50 per pound and the domestic price in autarky is \$1.00 per pound. Use a diagram similar to Figure 17-9 to show the following:
 - a. Why domestic producers want the tariff to be no less than \$0.50 per pound
 - b. What happens when the tariff is greater than \$0.50 per pound.
2. Suppose the government imposes an import quota rather than a tariff on butter. What quota limit would generate the same result as a tariff of \$0.50 per pound?

Solutions appear at back of book.

The Political Economy of Trade Protection

We have seen that international trade produces mutual benefits to the countries that engage in it. We have also seen that tariffs and import quotas, although they produce winners as well as losers, reduce total surplus. Yet many countries continue to impose tariffs, import quotas, and enact other protectionist measures.

To understand why trade protection takes place, we will first look at some common justifications for protection. Then we will look at the politics of trade protection. Finally, we will look at an important feature of trade protection in today’s world: tariffs and import quotas are the subject of international negotiation and are policed by international organizations.

Arguments for Trade Protection

Advocates of tariffs and import quotas offer a variety of arguments. Three common arguments are *national security*, *job creation*, and the *infant industry argument*.

The national security argument is based on the propositions that overseas sources of goods are vulnerable to disruption in time of international conflict and that a country should aim to be self-sufficient in crucial goods. In the 1960s, the United States—which had begun to import oil as domestic oil reserves ran low—had an import quota on oil, justified on national security grounds. Some people have argued that we should again have policies to discourage imports of oil, especially from the Middle East.

FOR INQUIRING MINDS

BITTERSWEET

If there's one good in which we can be absolutely sure that neither the European Union nor the United States has a comparative advantage, it's sugar. The cheapest way to produce sugar is by growing sugar cane, a crop that requires a tropical climate. A few places in the United States, basically along the Gulf of Mexico and in Hawaii, can grow cane sugar, but they are no match for the sugar-growing capacity of genuinely tropical countries. And it's almost impossible to grow sugar cane in Western Europe.

Yet Europe is a net *exporter* of sugar, and the United States imports only a fraction of

its consumption. How is this possible, and why does it happen?

It's possible because there is another way to produce sugar: sugar beets can survive even in cold climates. And some sugar beets would probably be grown in the United States and Europe even in the absence of government support. But on both sides of the Atlantic, sugar producers receive huge amounts of government support. In the United States, an import quota keeps prices on average at twice world levels. In Europe, import restrictions are supplemented by huge government subsidies.

What's the rationale for this trade protection? Governments hardly even bother to make excuses: on both sides of the Atlantic, there's a powerful farm lobby. In fact, agriculture in industrial countries is heavily subsidized, at the expense of both consumers and taxpayers.

The really sad thing is that some of the protected goods—sugar in particular—would be major exports of poor countries if it weren't for the import quotas and subsidies.

The job creation argument points to the additional jobs created in import-competing industries as a result of trade protection. Economists argue that these jobs are offset by the jobs lost elsewhere, but noneconomists don't always find this argument persuasive.

Finally, the infant industry argument, often raised in newly industrializing countries, holds that new industries require a temporary period of trade protection to get established. For example, in the 1950s many countries in Latin America imposed tariffs and import quotas on manufactured goods, in an effort to switch from their traditional role as exporters of raw materials to a new status as industrial countries.

The Politics of Trade Protection

In practice, much trade protection has little to do with the arguments just described. Instead, it reflects the political influence of import-competing producers.

We've seen that a tariff or import quota leads to gains for import-competing producers and losses for consumers. Producers, however, usually have much more influence over trade policy decisions. The producers who compete with imports of a particular good are usually a smaller, more cohesive group than the consumers of that good.

An example is trade protection for sugar, discussed in For Inquiring Minds above. The United States has an import quota on sugar, which on average leads to a domestic price about twice the world price. This quota is difficult to rationalize in terms of any economic argument. However, consumers rarely complain about the quota because they are unaware that it exists: Because no individual consumer buys large amounts of sugar, the cost of the quota is only a few dollars per family each year, not enough to attract notice. But there are only a few thousand sugar growers in the United States. They are very aware of the benefits they receive from the quota and make sure that their representatives in Congress are aware of their interest in the matter.

Given these political realities, it may seem surprising that trade is as free as it is. As explained in *Economics in Action* on page 425, the United States has low tariffs, and its import quotas are mainly confined to clothing and a few agricultural products. It would be nice to say that the main reason trade protection is so limited is that economists have convinced governments of the virtues of free trade. A more important reason, however, is the role of *international trade agreements*.

International Trade Agreements and the World Trade Organization

When a country imposes a tariff or an import quota, it hurts two groups. We've already emphasized the adverse effect on domestic consumers, but protection also hurts foreign export industries. This means that countries care about each others' trade policies: the Canadian lumber industry has a strong interest in keeping U.S. tariffs on forest products low.

Because countries care about each others' trade policies, they engage in **international trade agreements**: treaties in which a country promises to engage in less trade protection against the exports of another country in return for a promise by the other country to do the same for its exports. Most world trade is now governed by such agreements.

Some international trade agreements involve just two countries or a small group of countries. In 1993, Congress approved the North American Free Trade Agreement (NAFTA) between the United States, Canada, and Mexico. Once fully implemented, this agreement will remove all barriers to trade among the three nations. Free trade has already been implemented among the 25 nations of the European Union.

There are also global trade agreements, covering most of the world. Such global agreements are overseen by the **World Trade Organization**, or WTO, which plays two roles. First, it provides the framework for the massively complex negotiations involved in a major international trade agreement: the full text of the last major agreement, approved in 1994, was 24,000 pages long. Second, the WTO resolves disputes between members. These disputes typically arise when one country claims that another country's policies violate its previous agreements.

Here are two examples that illustrate the WTO's role. First, in 2000 the WTO ruled that the European Union's import restrictions on bananas, which discriminate in favor of former European colonies and against Central American producers, are in violation of international trade rules. The banana dispute had threatened to become a major source of conflict between the European Union and the United States, because the United States has taken the side of the Central American countries; now Europe is in the process of revising its system. In 2002 the United States was on the losing side of a WTO decision: the European Union complained that a provision in U.S. tax law, intended to help exporting companies, is in effect an export subsidy—something that the United States, according to its international agreements, is not supposed to have. The WTO ruled in Europe's favor; this means that the United States is now obliged to revise its tax law.

The WTO is sometimes, with great exaggeration, described as a world government. In fact, it has no army, no police, and no direct enforcement power. The grain of truth in that description is that when a country joins the WTO, it agrees to accept the organization's judgments—and these judgments apply not only to tariffs and import quotas but also to domestic policies that, according to the organization, are in effect trade protection under another name. So in joining the WTO a country does give up a bit of its sovereignty.

International trade agreements are treaties in which a country promises to engage in less trade protection against the exports of other countries in return for a promise by other countries to do the same for its own exports.

The **World Trade Organization** oversees international trade agreements and rules on disputes between countries over those agreements.

economics in action

Declining Tariffs

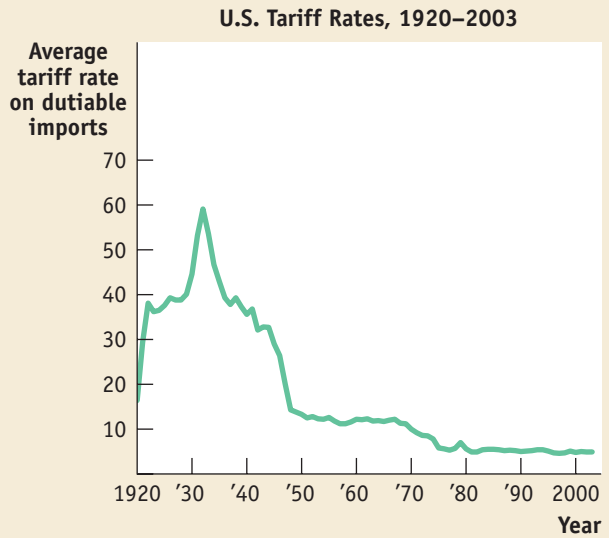
The United States began basing its trade policy on international agreements in the 1930s, and global trade negotiations began soon after World War II. The success of these agreements in reducing trade protection is illustrated by Figure 17-11 on page 426 which shows the average U.S. tariff rate on imports subject to tariffs since the 1920s.

Figure 17-11

Declining Tariff Rates

U.S. tariff rates were very high in the early 1930s but have steadily fallen since then. This move toward relatively free trade has been achieved in large part through international trade agreements.

Source: U.S. International Trade Commission.



>> QUICK REVIEW

- The three major justifications for trade protection are national security, job creation, and protection of infant industries.
- Despite the deadweight losses, import protections are often imposed because groups representing import-competing industries are smaller and more cohesive than groups of consumers.
- To further trade liberalization, countries engage in *international trade agreements*. Some agreements are for only a small number of countries, such as the North American Free Trade Agreement. The *World Trade Organization (WTO)* is a multinational organization that seeks to negotiate global trade agreements as well as adjudicate trade disputes between members.

Tariffs reached a peak in the early 1930s after the passage of a very protectionist bill, known as the Smoot-Hawley tariff, in 1929. (Some people blame Smoot-Hawley for causing the Great Depression of the 1930s, though few economists think it was *that* bad.) From then on, tariff rates have steadily ratcheted down, with U.S. moves matched in other advanced countries, and later in many poorer countries as well.

At this point world trade in manufactured goods is subject to low tariffs and relatively few import quotas, with clothing the main exception. Agricultural products are subject to many more restrictions, reflecting the political power of farmers in advanced countries. ■



>> CHECK YOUR UNDERSTANDING 17-4

1. In 2002 the U.S. imposed tariffs on steel imports, which are an input in a large number and variety of U.S. industries. Explain why political lobbying to eliminate these tariffs is more likely to be effective than political lobbying to eliminate tariffs on consumer goods such as sugar or clothing.
2. Over the years, the WTO has increasingly found itself adjudicating trade disputes that involve not just tariffs or quota restrictions but also restrictions based on quality, health, and environmental considerations. Why do you think this has occurred? What method would you, as a WTO official, use to decide whether a quality, health, or environmental restriction is in violation of a free-trade agreement?

Solutions appear at back of book.

• A LOOK AHEAD •

As we move ahead to new topics, it is important that we carry with us the insights learned here about the logic of comparative advantage and the gains from international trade. They will provide us with a deeper understanding of what drives the world economy and of the reasons countries differ economically. In addition, the study of international trade teaches us how economic policies can create both winners and losers despite the fact that society as a whole gains, an important consideration in any study of how policies are actually made.

SUMMARY

1. International trade is of growing importance to the United States and of even greater importance to most other countries. International trade, like trade among individuals, arises from comparative advantage: the opportunity cost of producing an additional unit of a good is lower in some countries than in others. Goods and services are purchased abroad are **imports**; of sold abroad are **exports**.
2. The **Ricardian model of international trade** assumes that opportunity costs are constant. It shows that there are gains from trade: two countries are better off with trade than in **autarky**.
3. In practice, comparative advantage reflects differences between countries in climate, factor endowments, and technology. The **Heckscher–Ohlin model** shows how differences in factor endowments determine comparative advantage: goods differ in **factor intensity**, and countries tend to export goods that are intensive in the factors they have in abundance.
4. The **domestic demand curve** and the **domestic supply curve** determine the price of a good in autarky. When international trade occurs, the domestic price is driven to equality with the **world price**, the price at which the good may be bought or sold abroad.
5. If the world price is below the autarky price, a good is imported. This leads to an increase in consumer surplus, a fall in producer surplus, and a gain in total surplus. If the world price is above the autarky price, a good is exported. This leads to an increase in producer surplus, a fall in consumer surplus, and a gain in total surplus.
6. International trade leads to expansion in **exporting industries** and contraction in **import-competing industries**. This raises the domestic demand for abundant factors of production, reduces the demand for scarce factors, and so affects factor prices.
7. Most economists advocate **free trade**, but in practice many governments engage in **trade protection**. The two most common forms of **protection** are tariffs and quotas; in rare occasions, export industries are subsidized.
8. A **tariff** is a tax levied on imports. It raises the domestic price above the world price, hurting consumers, benefiting domestic producers, and generating government revenue. As a result, total domestic surplus falls. An **import quota** is a legal limit on the quantity of a good that can be imported. It has the same effects as a tariff, except that the revenue goes not to the government but to those who receive import licenses.
9. Although several popular arguments have been made in favor of trade protection, in practice the main reason for protection is probably political: import-competing industries are well organized and well informed about how they gain from trade protection, but consumers are unaware of the costs they pay. Still, U.S. trade is fairly free, mainly because of the role of **international trade agreements**, in which countries agree to reduce trade protection against each others' exports. Trade negotiations are overseen, and the resulting agreements are enforced, by the **World Trade Organization**.

KEY TERMS

Imports, p. 000

Exports, p. 000

Ricardian model of international trade, p. 000

Autarky, p. 000

Heckscher–Ohlin model, p. 000

Factor intensity, p. 000

Domestic demand curve, p. 000

Domestic supply curve, p. 000

World price, p. 000

Exporting industries, p. 000

Import-competing industries, p. 000

Free trade, p. 000

Trade protection, p. 000

Protection, p. 000

Tariff, p. 000

Import quota, p. 000

International trade agreements, p. 000

World Trade Organization, p. 000

PROBLEMS

1. Assume the United States and Saudi Arabia face the production possibility frontiers for oil and cars shown in the accompanying table.

| Saudi Arabia | | United States | |
|---------------------------------------|-----------------------------|---------------------------------------|-----------------------------|
| Quantity of oil (millions of barrels) | Quantity of cars (millions) | Quantity of oil (millions of barrels) | Quantity of cars (millions) |
| 0 | 4 | 0 | 10 |
| 200 | 3 | 100 | 7.5 |
| 400 | 2 | 200 | 5 |
| 600 | 1 | 300 | 2.5 |
| 800 | 0 | 400 | 0 |

- a. What is the opportunity cost of producing cars in Saudi Arabia? in the United States? What is the opportunity cost of producing oil in Saudi Arabia? in the United States?
- b. Which country has the comparative advantage in producing oil? in producing cars?
- c. Suppose that in autarky, Saudi Arabia produces 200 million barrels of oil and 3 million cars; and that the United States produces 300 million barrels of oil and 2.5 million cars. Without trade, can Saudi Arabia produce more oil *and* more cars? Without trade, can the United States produce more oil *and* more cars?
2. The production possibility frontiers for the United States and Saudi Arabia are given in Problem 1. Suppose now that each country specializes in the good in which it has the comparative advantage, and the two countries trade.
- a. What is the total quantity of oil produced? What is the total quantity of cars produced?
- b. Is it possible for Saudi Arabia to consume 400 million barrels of oil and 5 million cars, and for the United States to consume 400 million barrels of oil and 5 million cars?
- c. Suppose that, in fact, Saudi Arabia consumes 300 million barrels of oil and 4 million cars and the United States consumes 500 million barrels of oil and 6 million cars. How many barrels of oil does the United States import? How many cars does the United States export? Suppose a car costs \$10,000 on the world market. How much, then, does a barrel of oil cost on the world market?
3. Both Canada and the United States produce lumber and music CDs. The United States can produce either 10 tons of lumber and no CDs, or 1,000 CDs and no lumber, or any combination in between. Canada can produce either 8 tons of lumber and no CDs, or 400 CDs and no lumber, or any combination in between.
- a. Draw the U.S. and Canadian production possibility frontiers in two separate diagrams, with CDs on the horizontal axis and lumber on the vertical axis.
- b. In autarky, if the United States wants to consume 500 CDs, how much lumber can it consume at most? Label this point A in your diagram. Similarly, if Canada wants to consume 1 ton of lumber, how many CDs can it consume in autarky? Label this point C in your diagram.
- c. Which country has the absolute advantage in lumber production?
- d. Which country has the comparative advantage in lumber production?
- Suppose each country specializes in the good in which it has the comparative advantage, and there is trade.
- e. How many CDs does the United States produce? How much lumber does Canada produce?
- f. Is it possible for the United States to consume 500 CDs and 7 tons of lumber? Label this point B in your diagram. Is it possible for Canada at the same time to consume 500 CDs and 1 ton of lumber? Label this point D in your diagram.
4. For each of the following trade relationships, explain the likely source of the comparative advantage of each of the exporting countries.
- a. The United States exports software to Venezuela, and Venezuela exports oil to the United States.
- b. The United States exports airplanes to China, and China exports clothing to the United States.
- c. The United States exports wheat to Colombia, and Colombia exports coffee to the United States.
5. Shoes are labor-intensive and airplanes are capital-intensive to produce. The United States has abundant capital. China has abundant quantities of labor. According to the Heckscher–Ohlin model, which good will China export? Which good will the United States export? In the United States, what will happen to the price of labor (the wage) and to the price of capital?
6. Before the North American Free Trade Agreement (NAFTA) gradually eliminated import tariffs on goods, the equilibrium price of tomatoes in Mexico was below the world price and in the United States was above the world price. Similarly, the equilibrium price of poultry in Mexico was above the world price and in the United States was below the world price. Draw diagrams with domestic supply and demand curves for each country and each of the two goods. As a result of NAFTA, the U.S. imports of tomatoes from Mexico have increased and U.S. exports of poultry to Mexico have also increased. Based on the Heckscher–Ohlin model, how would you expect the following groups to be affected?
- a. Mexican and U.S. consumers of tomatoes. Illustrate the effect on consumer surplus in your diagram.
- b. Mexican and U.S. producers of tomatoes. Illustrate the effect on producer surplus in your diagram.

- c. Mexican and U.S. tomato workers.
 - d. Mexican and U.S. consumers of poultry. Illustrate the effect on consumer surplus in your diagram.
 - e. Mexican and U.S. producers of poultry. Illustrate the effect on producer surplus in your diagram.
 - f. Mexican and U.S. poultry workers.
7. The accompanying table indicates the U.S. domestic demand schedule and domestic supply schedule for commercial jet airplanes. Suppose that the world price of a commercial jet airplane is \$100 million.

| Price of jet (millions) | Quantity of jets demanded | Quantity of jets supplied |
|-------------------------|---------------------------|---------------------------|
| \$120 | 100 | 1,000 |
| 110 | 150 | 900 |
| 100 | 200 | 800 |
| 90 | 250 | 700 |
| 80 | 300 | 600 |
| 70 | 350 | 500 |
| 60 | 400 | 400 |
| 50 | 450 | 300 |
| 40 | 500 | 200 |

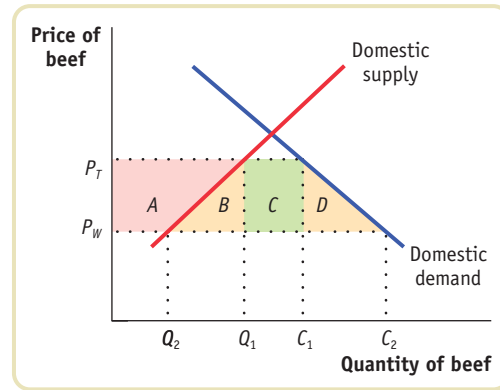
- a. In autarky, how many commercial jet airplanes does the United States produce, and at what price are they bought and sold?
 - b. When there is trade, what will the price for commercial jet airplanes be? Will the United States import or export airplanes? How many?
8. The accompanying table shows the U.S. domestic demand schedule and domestic supply schedule for oranges. Suppose that the world price of oranges is \$0.30 per orange.

| Price of orange | Quantity of oranges demanded (thousands) | Quantity of oranges supplied (thousands) |
|-----------------|--|--|
| \$1.00 | 2 | 11 |
| 0.90 | 4 | 10 |
| 0.80 | 6 | 9 |
| 0.70 | 8 | 8 |
| 0.60 | 10 | 7 |
| 0.50 | 12 | 6 |
| 0.40 | 14 | 5 |
| 0.30 | 16 | 4 |
| 0.20 | 18 | 3 |

- a. Draw the U.S. domestic supply curve and domestic demand curve.
- b. If there is free trade, with no tariffs, how many oranges will the United States import or export?

Suppose that the U.S. government imposes a tariff on oranges of \$0.20 per orange.

- c. How many oranges will the United States import or export after introduction of the tariff?
 - d. In your diagram, shade the gain or loss to the economy as a whole from the introduction of this tariff.
9. The accompanying diagram illustrates the U.S. domestic demand curve and domestic supply curve for beef.



The world price of beef is P_W . The United States currently imposes an import tariff of t on beef, so that the price of beef is P_T . Congress decides to eliminate the tariff. In terms of the areas marked in the diagram, answer the following questions.

- a. What is the gain/loss in consumer surplus?
 - b. What is the gain/loss in producer surplus?
 - c. What is the gain/loss to the government?
 - d. What is the gain/loss to the economy as a whole?
10. The U.S. domestic demand schedule and domestic supply schedule for oranges was given in Problem 8. Suppose that the world price of oranges is \$0.30. The United States introduces an import quota of 3,000 oranges. Draw the domestic demand and supply curves and answer the following questions.
- a. What will be the domestic price of oranges after introduction of the quota?
 - b. How large are the quota rents that importers of oranges receive?
11. As the United States has opened up to trade, it has lost many of its low-skill manufacturing jobs, but it has gained jobs in high-skill industries, such as the software industry. Explain whether the United States as a whole has been made better off by trade.
12. The United States is highly protective of its agricultural industry, imposing import tariffs, and sometimes quotas, on imports of agricultural goods. The chapter has presented three arguments for trade protection. For each argument, discuss whether it is a valid justification for trade protection of U.S. agricultural products.

13. In World Trade Organization (WTO) negotiations, if a country agrees to reduce trade barriers (tariffs or quotas), it usually refers to this as a *concession* to other countries. Do you think that this terminology is appropriate?
14. Producers in import-competing industries often make the following argument: “Other countries have an advantage in pro-

duction of certain goods purely because workers abroad are paid lower wages. In fact, American workers are much more productive than foreign workers. So import-competing industries need to be protected.” Is this a valid argument? Explain your answer.

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