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CHAPTER 20

International Trade*

Learning Objective

- LO20.1 List and discuss several key facts about international trade.
- LO20.2 Define comparative advantage, and demonstrate how specialization and trade add to a nation's output.
- LO20.3 Describe how differences between world prices and domestic prices prompt exports and imports.
- LO20.4 Analyze the economic effects of tariffs and quotas.
- LO20.5 Analyze the validity of the most frequently presented arguments for protectionism.
- LO20.6 Identify and explain the objectives of GATT, WTO, EU, eurozone, and NAFTA, and discuss offshoring and trade adjustment assistance.

Backpackers in the wilderness like to think they are “leaving the world behind,” but, like Atlas, they carry the world on their shoulders. Much of their equipment is imported—knives from Switzerland, rain gear from South Korea, cameras from Japan, aluminum pots from England, sleeping bags from China, and compasses from Finland. Moreover, they may have driven to the trailheads in Japanese-made Toyotas or German-made BMWs, sipping coffee from Brazil or snacking on bananas from Honduras.

International trade and the global economy affect all of us daily, whether we are hiking in the wilderness, driving our cars, buying groceries, or working at our jobs. We cannot “leave the world behind.” We are enmeshed in a global web of economic relationships, such as trading goods and services, multinational corporations, cooperative

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ventures among the world's firms, and ties among the world's financial markets.

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The focus of this chapter is the trading of goods and services. Then in Chapter 21, we examine the U.S. balance of payments, exchange rates, and U.S. trade deficits. In Chapter 21W on our Web site, we look at the economics of developing nations.

Some Key Trade Facts

The following are several important facts relating to international trade.

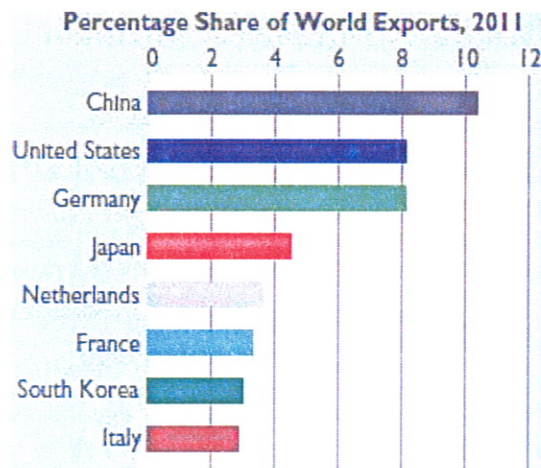
- U.S. exports and imports have more than doubled as percentages of GDP since 1980.
- A *trade deficit* occurs when imports exceed exports. The United States has a trade deficit in goods. In 2012 U.S. imports of goods exceeded U.S. exports of goods by \$735 billion.
- A *trade surplus* occurs when exports exceed imports. The United States has a trade surplus in services (such as air transportation services and financial services). In 2012 U.S. exports of services exceeded U.S. imports of services by \$196 billion.
- Principal U.S. exports include chemicals, agricultural products, consumer durables, semiconductors, and aircraft; principal imports include petroleum, automobiles, metals, household appliances, and computers.
- As with other advanced industrial nations, the United States imports many goods that are in some of the same categories as the goods that it exports. Examples: automobiles, computers, chemicals, semiconductors, and telecommunications equipment.
- Canada is the United States' most important trading partner quantitatively. In 2012 about 20 percent of U.S. exported goods were sold to Canadians, who in turn provided 15 percent of imported U.S. goods.
- The United States has a sizable trade deficit with China. In 2012 it was \$315 billion.
- The U.S. dependence on foreign oil is reflected in its trade with members of OPEC. In 2012 the United States imported \$181 billion of goods (mainly oil) from OPEC members, while exporting \$82 billion of goods to those countries.
- The United States leads the world in the combined volume of exports and imports, as measured in dollars. China, the United States, Germany, Japan, and the Netherlands were the top five exporters by dollar in 2012.



GLOBAL PERSPECTIVE 20.1

Shares of World Exports, Selected Nations

China has the largest share of world exports, followed by Germany and the United States. The eight largest export nations account for about 43.9 percent of world exports.



Source: *International Trade Statistics*, 2012, WTO Publications.

- Currently, the United States provides about 8.1 percent of the world's exports. (See Global Perspective 20.1.)
- Exports of goods and services (on a national income account basis) make up about 14 percent of total U.S. output. That percentage is much lower than the percentage in many other nations, including Canada, France, Germany, the Netherlands, and South Korea. (See Global Perspective 20.2.)
- China has become a major international trader, with an estimated \$2.05 trillion of exports in 2012. Other Asian economies—including South Korea, Taiwan, and Singapore—are also active in international trade. Their combined exports exceed those of France, Britain, or Italy.

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GLOBAL PERSPECTIVE 20.2

Exports of Goods and Services as a Percentage of GDP, Selected Countries

Although the United States is one of the world's largest exporters, as a percentage of GDP, its exports are quite low relative to many other countries.



Source: Derived by authors from *IMF International Financial Statistics*, 2012.

- International trade links world economies. Through trade, changes in economic conditions in one place on the globe can quickly affect other places.
- International trade is often at the center of debates over economic policy, both within the United States and internationally.

With this information in mind, let's turn to the economics of international trade.

The Economic Basis for Trade

Sovereign nations, like individuals and the regions of a nation, can gain by specializing in the products they can produce with the greatest relative efficiency and by trading for the goods they cannot produce as efficiently. The simple answer to the question “Why do nations trade?” is “They trade because it is beneficial.” The benefits that emerge relate to three underlying facts:

- The distribution of natural, human, and capital resources among nations is uneven; nations differ in their endowments of economic resources.
- Efficient production of various goods requires different technologies, and not all nations have the same level of technological expertise.

- Products are differentiated as to quality and other attributes, and some people may prefer certain goods imported from abroad rather than similar goods produced domestically.

To recognize the character and interaction of these three facts, think of China, which has abundant and inexpensive labor. As a result, China can produce efficiently (at low cost of other goods forgone) a variety of **labor-intensive goods**, such as textiles, electronics, apparel, toys, and sporting goods.

In contrast, Australia has vast amounts of land and can inexpensively produce such **land-intensive goods** as beef, wool, and meat. Mexico has the soil, tropical climate, rainfall, and ready supply of unskilled labor that allow for the efficient, low-cost production of vegetables. Industrially advanced economies such as the United States and Germany that have relatively large amounts of capital can inexpensively produce goods whose production requires much capital, including such **capital-intensive goods** as airplanes, automobiles, agricultural equipment, machinery, and chemicals.

Also, regardless of their resource intensities, nations can develop individual products that are in demand worldwide because of their special qualities. Examples: fashions from Italy, chocolates from Belgium, software from the United States, and watches from Switzerland.

The distribution of resources, technology, and product distinctiveness among nations is relatively stable in short time periods but certainly can change over time. When that distribution changes, the relative efficiency and success that nations have in producing and selling goods also change. For example, in the past several decades, South Korea has greatly expanded its stock of capital. Although South Korea was primarily an exporter of agricultural products and raw materials a half-century ago, it now exports large quantities of manufactured goods. Similarly, the new technologies that gave us synthetic fibers and synthetic rubber drastically altered the resource mix needed to produce fibers and rubber and changed the relative efficiency of nations in manufacturing them.

As national economies evolve, the size and quality of their labor forces may change, the volume and composition of their capital stocks may shift, new technologies may develop, and even the quality of land and the quantity of natural resources may be altered. As such changes take place, the relative efficiency with which a nation can produce specific goods will also change. As economists would say, comparative advantage can and does sometimes change.

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Comparative Advantage

In an open economy (one with an international sector), a country produces more of certain goods (exports) and fewer of other goods (imports) than it would otherwise. Thus, the country shifts the use of labor and other productive resources toward export industries and away from import industries. For example, in the presence of international trade, the United States uses more resources to make commercial aircraft and to grow wheat and fewer resources to make television sets and sew clothes. So we ask: Do such shifts of resources make economic sense? Do they enhance U.S. total output and thus the U.S. standard of living?

The answers are affirmative. Specialization and international trade increase the productivity of U.S. resources and allow the United States to obtain greater total output than otherwise would be possible. These benefits are the result of exploiting both *absolute advantages* and *comparative advantages*. A country is said to have an *absolute advantage* over other producers of a product if it is the most efficient producer of that product (by which we mean that it can produce more output of that product from any given amount of resource inputs than can any other producer). A country is said to have a *comparative advantage* over other producers of a product if it can produce the product at a lower opportunity cost (by which we mean that it must forgo less output of alternative products when allocating productive resources to producing the product in question).

In 1776 Adam Smith used the concept of absolute advantage to argue for international specialization and trade. His point was that nations would be better off if each specialized in the production of those products in which it had an absolute advantage and was therefore the most efficient producer:

It is the maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy. The taylor does not attempt to make his own shoes, but buys them of the shoemaker. The shoemaker does not attempt to make his own clothes, but employs a taylor. The farmer attempts to make neither the one nor the other, but employs those different artificers....

What is prudence in the conduct of every private family, can scarce be folly in that of a great kingdom. If a foreign country can supply us with a commodity cheaper than we can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage.¹

CONSIDER THIS ...

A CPA and a House Painter



Suppose that Madison, a certified public accountant (CPA), is a swifter painter than Mason, the professional painter she is thinking of hiring. Also assume that Madison can earn \$50 per hour as an accountant but would have to pay Mason \$15 per hour. And suppose that Madison would need 30 hours to paint her house but Mason would need 40 hours.

Should Madison take time from her accounting to paint her own house, or should she hire the painter? Madison's opportunity cost of painting her house is \$1,500 (= 30 hours of sacrificed CPA time \times \$50 per CPA hour). The cost of hiring Mason is only \$600 (= 40 hours of painting \times \$15 per hour of painting). Although Madison is better at both accounting and painting, she will get her house painted at lower cost by specializing in accounting and using some of her earnings from accounting to hire a house painter.

Similarly, Mason can reduce his cost of obtaining accounting services by specializing in painting and using some of his income to hire Madison to prepare his income tax forms. Suppose Mason would need 10 hours to prepare his tax return, while Madison could handle the task in 2 hours. Mason would sacrifice \$150 of income (= 10 hours of painting time \times \$15 per hour) to do something he could hire Madison to do for \$100 (= 2 hours of CPA time \times \$50 per CPA hour). By specializing in painting and hiring Madison to prepare his tax return, Mason lowers the cost of getting his tax return prepared.

We will see that what is true for our CPA and house painter is also true for nations. Specializing on the basis of comparative advantage enables nations to reduce the cost of obtaining the goods and services they desire.

In the early 1800s, David Ricardo extended Smith's idea by demonstrating that it is advantageous for a country to specialize and trade with another country even if it is more productive in all economic activities than that other country. Stated more formally, a nation does not need Smith's absolute advantage—total superiority in the efficiency with which it produces products—to benefit from specialization and trade. It needs only a comparative advantage.

The nearby Consider This box provides a simple, two-person illustration of Ricardo's principle of comparative advantage. Be sure to read it now because it will greatly help you understand the graphical analysis that follows.

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QUICK REVIEW 20.1

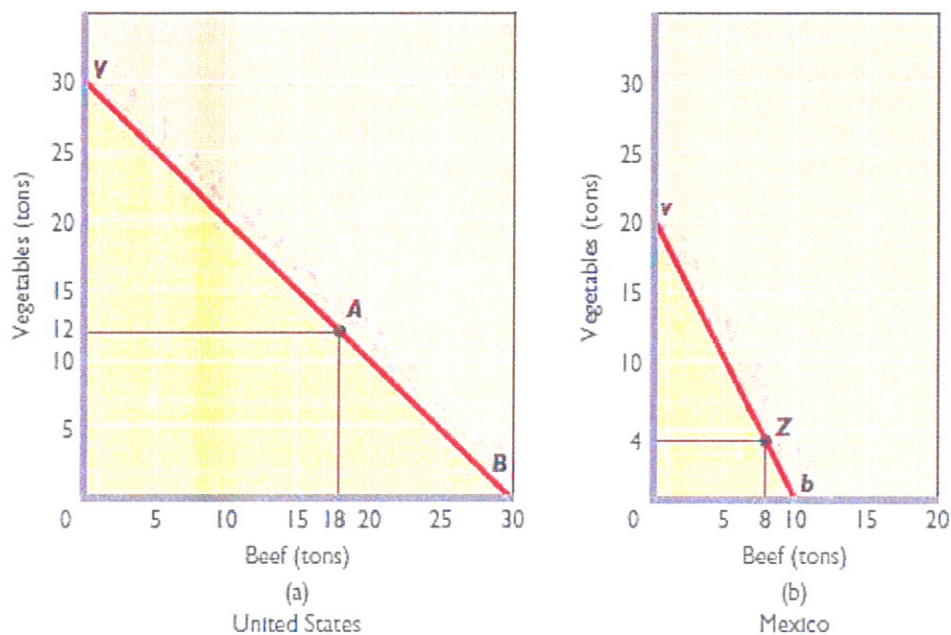
- International trade enables nations to specialize, increase productivity, and increase the amount of output available for consumption.
- A country is said to have an *absolute advantage* over the other producers of a product if it can produce the product more efficiently, by which we mean that it can produce more of the product from any given amount of resource inputs than can any other producer.
- A country is said to have a *comparative advantage* over the other producers of a product if it can produce the product at a lower opportunity cost, by which we mean that it must forgo less of the output of alternative products when allocating resources to producing the product in question.

Two Isolated Nations

Our goal is to place the idea of comparative advantage into the context of trading nations. Our method is to build a simple model that relies on the familiar concepts of production possibilities curves. Suppose the world consists of just two nations, the United States and Mexico. Also for simplicity, suppose that the labor forces in the United States and Mexico are of equal size. Each nation can produce both beef and raw (unprocessed) vegetables but at different levels of economic efficiency. Suppose the U.S. and Mexican domestic production possibilities curves for beef and vegetables are those shown in Figure 20.1a and Figure 20.1b. Note three realities relating to the production possibilities curves in the two graphs:

- **Constant costs** The curves derive from the data in Table 20.1 and are drawn as straight lines, in contrast to the bowed-outward production possibilities frontiers we examined in Chapter 1. This means that we have replaced the law of increasing opportunity costs with the assumption of constant costs. This substitution simplifies our discussion but does not impair the validity of our analysis and conclusions. Later we will consider the effects of increasing opportunity costs.
- **Different costs** The production possibilities curves of the United States and Mexico reflect different resource mixes and differing levels of technology. Specifically, the differing slopes of the two curves reflect the numbers in the figures and reveal that the opportunity costs of producing beef and vegetables differ between the two nations.
- **U.S. absolute advantage in both** A producer (an individual, firm, or country) has an *absolute advantage* over another producer if it can produce more of a product than the other producer using the same amount of resources. Because of our convenient assumption that the U.S. and Mexican labor forces are the same size, the two production possibilities curves show that the United States has an absolute advantage in producing both products. If the United States and Mexico use their entire (equal-size) labor forces to produce either vegetables or beef, the United States can produce more of either than Mexico. The United States, using the same number of workers as Mexico, has greater production possibilities. So output per worker—labor productivity—in the United States exceeds that in Mexico in producing both products.

FIGURE 20.1 Production possibilities for the United States and Mexico. The two production possibilities curves show the combinations of vegetables and beef that the United States and Mexico can produce domestically. The curves for both countries are straight lines because we are assuming constant opportunity costs. (a) As reflected by the slope of VB in the left graph, the opportunity-cost ratio in the United States is 1 vegetables \equiv 1 beef. (b) The production possibilities curve vb in the right graph has a steeper slope, reflecting the different opportunity-cost ratio in Mexico of 2 vegetables \equiv 1 beef. The difference in the opportunity-cost ratios between the two countries defines their comparative advantages and is the basis for specialization and international trade.



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TABLE 20.1 International Specialization According to Comparative Advantage and the Gains from Trade

Country	(1) Outputs before Specialization	(2) Outputs after Specialization	(3) Amounts Exported (-) and Imported (+)	(4) Outputs Available after Trade	(5) Gains from Specialization and Trade (4) - (1)
United States	18 beef	30 beef	-10 beef	20 beef	2 beef
	12 vegetables	0 vegetables	+15 vegetables	15 vegetables	3 vegetables
Mexico	8 beef	0 beef	+10 beef	10 beef	2 beef
	4 vegetables	20 vegetables	-15 vegetables	5 vegetables	1 vegetables

Opportunity-Cost Ratio in the United States In Figure 20.1a, with full employment, the United States will operate at some point on its production possibilities curve. On that curve, it can increase its output of beef from 0 tons to 30 tons by forgoing 30 tons of vegetables output. So the slope of the production possibilities curve is 1 ($= 30 \text{ vegetables}/30 \text{ beef}$), meaning that 1 ton of vegetables must be sacrificed for each extra ton of beef. In the United States the **opportunity-cost ratio** (domestic exchange ratio) for the two products is 1 ton of vegetables (V) for 1 ton of beef (B), or

$$\text{United States: } 1V \equiv 1B \text{ (The “}\equiv\text{” sign simply means “equivalent to.”)}$$

Within its borders, the United States can “exchange” a ton of vegetables from itself for a ton of beef from itself. Our constant-cost assumption means that this exchange or opportunity-cost relationship prevails for all possible moves from one point to another along the U.S. production possibilities curve.

Opportunity-Cost Ratio in Mexico Mexico's production possibilities curve in Figure 20.1b represents a different full-employment opportunity-cost ratio. In Mexico, 20 tons of vegetables must be given up to obtain 10 tons of beef. The slope of the production possibilities curve is 2 ($= 20 \text{ vegetables}/10 \text{ beef}$). This means that in Mexico the opportunity-cost ratio for the two goods is 2 tons of vegetables for 1 ton of beef, or

$$\text{Mexico: } 2V \equiv 1B$$

Self-Sufficiency Output Mix If the United States and Mexico are isolated and self-sufficient, then each country must choose some output mix on its production possibilities curve. It will select the mix that provides the greatest total utility or satisfaction. Let's assume that combination point A in Figure 20.1a is the optimal mix in the United States. That is, society deems the combination of 18 tons of beef and 12 tons of vegetables preferable to any other combination of the goods available along the production possibilities curve. Suppose Mexico's optimal product mix is 8 tons of beef and 4 tons of vegetables, indicated by point Z in Figure 20.1b. These choices by the two countries are reflected in column 1 of Table 20.1.

Specializing Based on Comparative Advantage

A producer (an individual, firm, or nation) has a **comparative advantage** in producing a particular product if it can produce that product at a lower opportunity cost than other producers. Comparative advantage is the key determinant in whether or not nations can gain from specialization and trade. In fact, absolute advantage turns out to be irrelevant.

In our example, for instance, the United States has an absolute advantage over Mexico in producing both vegetables and beef. But it is still the case that the United States can gain from specialization and trade with Mexico. That is because what actually matters is whether the opportunity costs of producing the two products (beef and vegetables) differ in the two countries. If they do, then each nation will enjoy a comparative advantage in one of the products, meaning that it can produce that product at a lower opportunity cost than the other country. As a result, total output can increase if each country specializes in the production of the good in which it has the lower opportunity cost.

This idea is summarized in the **principle of comparative advantage**, which says that total output will be greatest when each good is produced by the nation that has the lowest domestic opportunity cost for producing that good. In our two-nation illustration, the United States has the lower domestic opportunity cost for beef; the United States must forgo only 1 ton of vegetables to produce 1 ton of beef, whereas Mexico must forgo 2 tons of vegetables for 1 ton of beef. The United States has a comparative (cost) advantage in beef and should specialize in beef production. The “world” (that is, the United States and Mexico) in our example would clearly not be economizing in the use of its resources if a high-cost producer (Mexico)

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produced a specific product (beef) when a low-cost producer (the United States) could have produced it. Having Mexico produce beef would mean that the world economy would have to give up more vegetables than is necessary to obtain a ton of beef.

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Mexico has the lower domestic opportunity cost for vegetables. It must sacrifice only $\frac{1}{2}$ ton of beef to produce 1 ton of vegetables, while the United States must forgo 1 ton of beef to produce 1 ton of vegetables. Mexico has a comparative advantage in vegetables and should specialize in vegetable production. Again, the world would not be employing its resources economically if vegetables were produced by a high-cost producer (the United States) rather than by a low-cost producer (Mexico). If the United States produced vegetables, the world would be giving up more beef than necessary to obtain each ton of vegetables. Economizing requires that any particular good be produced by the nation having the lowest domestic opportunity cost or the nation having the comparative advantage for that good. The United States should produce beef, and Mexico should produce vegetables. The situation is summarized in Table 20.2.

ORIGIN OF THE IDEA

O20.1

Absolute and comparative advantage



A comparison of columns 1 and 2 in Table 20.1 verifies that specialized production enables the world to obtain more output from its fixed amount of resources. By specializing completely in beef, the United States can produce 30 tons of beef and no vegetables. Mexico, by specializing completely in vegetables, can produce 20 tons of vegetables and no beef. These figures exceed the yields generated without specialization: 26 tons of beef (= 18 in the United States + 8 in Mexico) and 16 tons of vegetables (= 12 in the United States + 4 in Mexico). As a result, the world ends up with 4 more tons of beef (= 30 tons – 26 tons) and 4 more tons of vegetables (= 20 tons – 16 tons) than it would if there were self-sufficiency and unspecialized production.

TABLE 20.2 Comparative-Advantage Example: A Summary

Beef	Vegetables
Mexico: Must give up 2 tons of vegetables to get 1 ton of beef.	Mexico: Must give up $\frac{1}{2}$ ton of beef to get 1 ton of vegetables.
United States: Must give up 1 ton of vegetables to get 1 ton of beef.	United States: Must give up 1 ton of beef to get 1 ton of vegetables.
Comparative advantage: United States	Comparative advantage: Mexico

Terms of Trade

We have just seen that specialization in production will allow for the largest possible amounts of both beef and vegetables to be produced. But with each country specializing in the production of only one item, how will the vegetables that are all produced by Mexico and the beef that is all produced by the United States be divided between consumers in the two countries? The key turns out to be the **terms of trade**, the exchange ratio at which the United States and Mexico trade beef and vegetables.

Crucially, the terms of trade also establish whether each country will find it in its own better interest to bother specializing at all. This is because the terms of trade determine whether each country can “get a better

deal” by specializing and trading than it could if it opted instead for self sufficiency. To see how this works, note that because $1B \equiv 1V (= 1V \equiv 1B)$ in the United States, it must get more than 1 ton of vegetables for each 1 ton of beef exported; otherwise, it will not benefit from exporting beef in exchange for Mexican vegetables. The United States must get a better “price” (more vegetables) for its beef through international trade than it can get domestically; otherwise, no gain from trade exists and such trade will not occur.

Similarly, because $1B \equiv 2V (= 2V \equiv 1B)$ in Mexico, Mexico must obtain 1 ton of beef by exporting less than 2 tons of vegetables to get it. Mexico must be able to pay a lower “price” for beef in the world market than it must pay domestically, or else it will not want to trade. The international exchange ratio or terms of trade must therefore lie somewhere between

$$1B \equiv 1V \text{ (United States' cost conditions)}$$

and

$$1B \equiv 2V \text{ (Mexico's cost conditions)}$$

Where between these limits will the world exchange ratio fall? The United States will prefer a rate close to $1B \equiv 2V$, say, $1B \equiv 1\frac{3}{4}V$. The United States wants to obtain as many vegetables as possible for each 1 ton of beef it exports. By contrast, Mexico wants a rate near $1B \equiv 1V$, say, $1B \equiv 1\frac{1}{4}V$. This is true because Mexico wants to export as few vegetables as possible for each 1 ton of beef it receives in exchange.

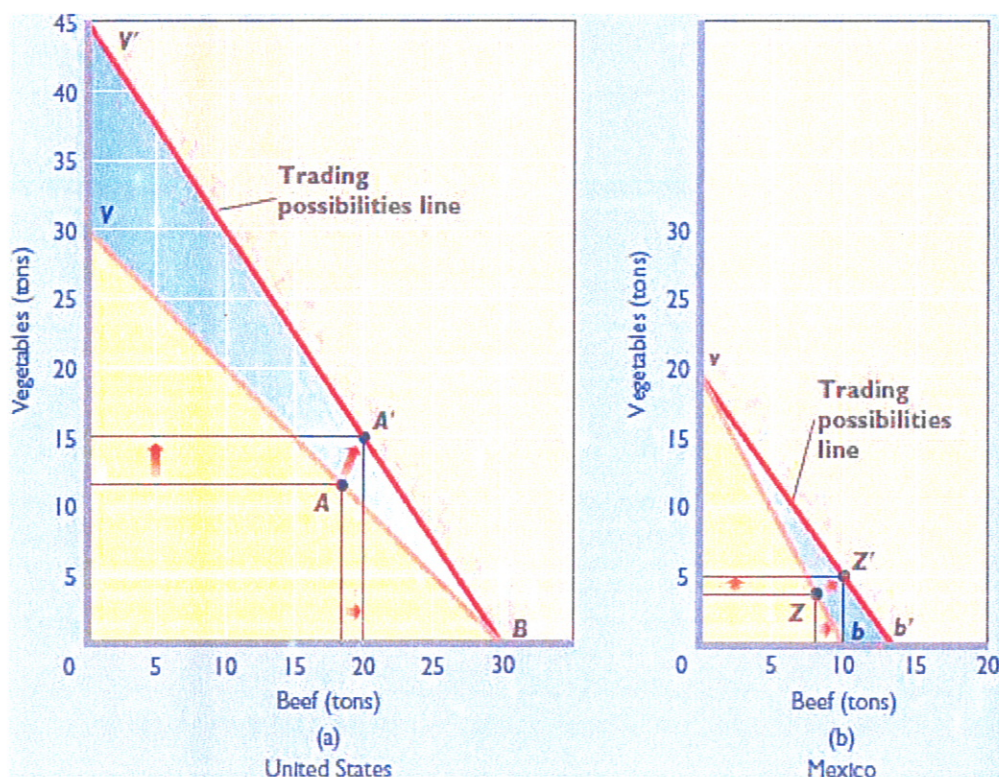
The actual exchange ratio depends on world supply and demand for the two products. If overall world demand for vegetables is weak relative to its supply and if the demand for beef is strong relative to its supply, the price of vegetables will be lower and the price of beef will be higher. The exchange ratio will settle nearer the $1B \equiv 2V$ figure the United States prefers. If overall world demand for vegetables is great relative to its supply and if the demand for beef is weak relative to its supply, the ratio will settle nearer the $1B \equiv 1V$ level favorable to Mexico. In this manner, the actual exchange ratio that is set by world supply and demand determines how the gains from international specialization and trade are divided between the two nations and, consequently, how the beef that is all produced in the United States and the vegetables that are all produced in Mexico get divided among consumers in the two countries. (We discuss equilibrium world prices later in this chapter.)

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KEY GRAPH

FIGURE 20.2 Trading possibilities lines and the gains from trade. As a result of specialization and trade, both the United States and Mexico can have higher levels of output than the levels attainable on their domestic production possibilities curves. (a) The United States can move from point *A* on its domestic production possibilities curve to, say, *A'* on its trading possibilities line. (b) Mexico can move from *Z* to *Z'*.



QUICK QUIZ FOR FIGURE 20.2

- The production possibilities curves in graphs (a) and (b) imply:
 - increasing domestic opportunity costs.
 - decreasing domestic opportunity costs.
 - constant domestic opportunity costs.
 - first decreasing, then increasing, domestic opportunity costs.
- Before specialization, the domestic opportunity cost of producing 1 unit of beef is:
 - 1 unit of vegetables in both the United States and Mexico.
 - 1 unit of vegetables in the United States and 2 units of vegetables in Mexico.
 - 2 units of vegetables in the United States and 1 unit of vegetables in Mexico.
 - 1 unit of vegetables in the United States and $\frac{1}{2}$ unit of vegetables in Mexico.
- After specialization and international trade, the world output of beef and vegetables is:

- a. 20 tons of beef and 20 tons of vegetables.
 - b. 45 tons of beef and 15 tons of vegetables.
 - c. 30 tons of beef and 20 tons of vegetables.
 - d. 10 tons of beef and 30 tons of vegetables.
4. After specialization and international trade:
- a. the United States can obtain units of vegetables at less cost than it could before trade.
 - b. Mexico can obtain more than 20 tons of vegetables, if it so chooses.
 - c. the United States no longer has a comparative advantage in producing beef.
 - d. Mexico can benefit by prohibiting vegetables imports from the United States.

Answers: 1. c; 2. b; 3. c; 4. a

Gains from Trade

Suppose the international terms of trade are $1B \equiv 1\frac{1}{2}V$. The possibility of trading on these terms permits each nation to supplant its domestic production possibilities curve with a trading possibilities line (or curve), as shown in **Figure 20.2 (Key Graph)**. Just as a production possibilities curve shows the amounts of these products that a full-employment

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economy can obtain by shifting resources from one to the other, a **trading possibilities line** shows the amounts of the two products that a nation can obtain by specializing in one product and trading for the other. The trading possibilities lines in Figure 20.2 reflect the assumption that both nations specialize on the basis of comparative advantage: The United States specializes completely in beef (at point B in Figure 20.2a), and Mexico specializes completely in vegetables (at point v in Figure 20.2b).

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Improved Alternatives With specialization and trade, the United States is no longer constrained by its domestic production possibilities line, which requires it to give up 1 ton of beef for every 1 ton of vegetables it wants as it moves up its domestic production possibilities line from, say, point B . Instead, the United States, through trade with Mexico, can get $1\frac{1}{2}$ tons of vegetables for every ton of beef that it exports to Mexico, as long as Mexico has vegetables to export. Trading possibilities line BV' thus represents the $1B \equiv 1\frac{1}{2}V$ trading ratio.

Similarly, Mexico, starting at, say, point v , no longer has to move down its domestic production possibilities curve, giving up 2 tons of vegetables for each ton of beef it wants. It can now export just $1\frac{1}{2}$ tons of vegetables for each 1 ton of beef that it wants by moving down its trading possibilities line vb' .

Specialization and trade create a new exchange ratio between beef and vegetables, and that ratio is reflected in each nation's trading possibilities line. For both nations, this exchange ratio is superior to the unspecialized exchange ratio embodied in their respective production possibilities curves. By specializing in beef and trading for Mexico's vegetables, the United States can obtain more than 1 ton of vegetables for 1 ton of beef. By specializing in vegetables and trading for U.S. beef, Mexico can obtain 1 ton of beef for less than 2 tons of vegetables. In both cases, self-sufficiency is inefficient and therefore undesirable.

Greater Output By specializing on the basis of comparative advantage and by trading for goods that are produced in the nation with greater domestic efficiency, the United States and Mexico can achieve combinations of beef and vegetables beyond their own individual production possibilities curves. Specialization according to comparative advantage results in a more efficient allocation of world resources, and larger outputs of both products are therefore available to both nations.

WORKED PROBLEMS

W20.1
Gains from
trade



Suppose that at the $1B \equiv 1\frac{1}{2}V$ terms of trade, the United States exports 10 tons of beef to Mexico and in return Mexico exports 15 tons of vegetables to the United States. How do the new quantities of beef and vegetables available to the two nations compare with the optimal product mixes that existed before specialization and trade? Point A in Figure 20.2a reminds us that the United States chose 18 tons of beef and 12 tons of vegetables originally. But by producing 30 tons of beef and no vegetables and by trading 10 tons of beef for 15 tons of vegetables, the United States can obtain 20 tons of beef and 15 tons of vegetables. This new, superior combination of beef and vegetables is indicated by point A' in Figure 20.2a. Compared with the no-trade amounts of 18 tons of beef and 12 tons of vegetables, the United States' **gains from trade** are 2 tons of beef and 3 tons of vegetables.

Similarly, recall that Mexico's optimal product mix was 4 tons of vegetables and 8 tons of beef (point Z) before specialization and trade. Now, after specializing in vegetables and trading for beef, Mexico can have 5 tons of vegetables and 10 tons of beef. It accomplishes that by producing 20 tons of vegetables and no beef and exporting 15 tons of its vegetables in exchange for 10 tons of American beef. This new position is indicated by point Z' in Figure 20.2b. Mexico's gains from trade are 1 ton of vegetables and 2 tons of beef.

Points A' and Z' in Figure 20.2 are superior economic positions to points A and Z . This fact is enormously important! We know that a nation can expand its production possibilities boundary by (1) expanding the quantity and improving the quality of its resources or (2) realizing technological progress. We have now established that international trade can enable a nation to circumvent the output constraint illustrated by its production possibilities curve. An economy can grow by expanding international trade. The outcome of international specialization and trade is equivalent to having more and better resources or discovering and implementing improved production techniques.

Table 20.1 summarizes the transactions and outcomes in our analysis. Please give it one final careful review.

QUICK REVIEW 20.2

- The principle of comparative advantage says that total world output will be greatest when each good is produced by the nation that has the lowest domestic opportunity cost.
- The rate at which countries can trade units of one product for units of another product is referred to as the terms of trade.
- A trading possibilities line shows the amounts of two products that a nation can obtain by specializing in the production of one product and then trading for the other.

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CONSIDER THIS ...

Misunderstanding the Gains from Trade



It is a common myth that the greatest benefit to be derived from international trade is greater domestic employment in the export sector. This suggests that exports are “good” because they increase domestic employment, whereas imports are “bad” because they deprive people of jobs at home. As we have demonstrated, the true benefit created by international trade is the overall increase in output available through specialization and exchange.

A nation does not need international trade to operate *on* its production possibilities curve. It can fully employ its resources, including labor, with or without international trade. International trade, however, enables a country to reach a point of consumption beyond its domestic production possibilities curve. The gain from trade to a nation is the extra output obtained from abroad—the imports obtained for less sacrifice of other goods than if they were produced at home.

Trade with Increasing Costs

To explain the basic principles underlying international trade, we simplified our analysis in several ways. For example, we limited discussion to two products and two nations. But multiproduct and multinational analysis yield the same conclusions. We also assumed constant opportunity costs (linear production possibilities curves), which is a more substantive simplification. Let's consider the effect of allowing increasing opportunity costs (concave-to-the-origin production possibilities curves) to enter the picture.

Suppose that the United States and Mexico initially are at positions on their concave production possibilities curves where their domestic cost ratios are $1B \equiv 1V$ and $1B \equiv 2V$, as they were in our constant-cost analysis. As before, comparative advantage indicates that the United States should specialize in beef and Mexico in vegetables. But now, as the United States begins to expand beef production, its cost of beef will rise; it will have to sacrifice more than 1 ton of vegetables to get 1 additional ton of beef. Resources are no longer perfectly substitutable between alternative uses, as the constant-cost assumption implied. Resources less and less suitable to beef production must be allocated to the U.S. beef industry in expanding beef output, and that means increasing costs—the sacrifice of larger and larger amounts of vegetables for each additional ton of beef.

Similarly, suppose that Mexico expands vegetable production starting from its $1B \equiv 2V$ cost ratio position. As production increases, it will find that its $1B \equiv 2V$ cost ratio begins to rise. Sacrificing 1 ton of beef will free resources that are capable of producing only something less than 2 tons of vegetables because those transferred resources are less suitable to vegetable production.

As the U.S. cost ratio falls from $1B \equiv 1V$ and the Mexican ratio rises from $1B \equiv 2V$, a point will be reached where the cost ratios are equal in the two nations, perhaps at $1B \equiv 1\frac{3}{4}V$. At this point the underlying basis for further specialization and trade—differing cost ratios—has disappeared, and further specialization is therefore uneconomical. And, most important, this point of equal cost ratios may be reached while the United States is still producing some vegetables along with its beef and Mexico is producing some beef along with its vegetables. The primary effect of increasing opportunity costs is less-than-complete specialization. For this reason, we often find domestically produced products competing directly against identical or similar imported products within a particular economy.

The Case for Free Trade

The case for free trade reduces to one compelling argument: Through free trade based on the principle of comparative advantage, the world economy can achieve a more efficient allocation of resources and a higher level of material well-being than it can without free trade.

Since the resource mixes and technological knowledge of the world's nations are all somewhat different, each nation can produce particular commodities at different real costs. Each nation should produce goods for which its domestic opportunity costs are lower than the domestic opportunity costs of other nations and exchange those goods for products for which its domestic opportunity costs are high relative to those of other nations. If each nation does this, the world will realize the advantages of geographic and human specialization. The world and each free-trading nation can obtain a larger real income from the fixed supplies of resources available to it.

Government trade barriers lessen or eliminate gains from specialization. If nations cannot trade freely, they must shift resources from efficient (low-cost) to inefficient (high-cost) uses to satisfy their diverse wants. A recent study suggests that the elimination of trade barriers since the Second World War has increased the income of the average U.S. household by at least \$7,000 and perhaps by

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LAST WORD

Petition of the Candlemakers, 1845

French Economist Frédéric Bastiat (1801–1850) Devastated the Proponents of Protectionism by Satirically Extending Their Reasoning to Its Logical and Absurd Conclusions.

Petition of the Manufacturers of Candles, Waxlights, Lamps, Candlesticks, Street Lamps, Snuffers, Extinguishers, and of the Producers of Oil Tallow, Rosin, Alcohol, and, Generally, of Everything Connected with Lighting.

TO MESSIEURS THE MEMBERS OF THE CHAMBER OF DEPUTIES.

Gentlemen—You are on the right road. You reject abstract theories, and have little consideration for cheapness and plenty. Your chief care is the interest of the producer. You desire to emancipate him from external competition, and reserve the national market for national industry.

We are about to offer you an admirable opportunity of applying your—what shall we call it? your theory? No; nothing is more deceptive than theory; your doctrine? your system? your principle? but you dislike doctrines, you abhor systems, and as for principles, you deny that there are any in social economy: we shall say, then, your practice, your practice without theory and without principle.

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 with it at a price fabulously reduced. The moment he shows himself, our trade leaves us—all consumers apply to him; and a branch of native industry, having countless ramifications, is all at once rendered completely stagnant. This rival ... is no 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, skylights, dormer windows, outside and inside shutters, curtains, blinds, bull's-eyes; in a word, of 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 manufacturers 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.



If you shut up as much as possible all access to natural light, and create a demand for artificial light, which of our French manufacturers 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.

The same remark applies to navigation. Thousands of vessels will proceed to the whale fishery; and, in a short time, we shall possess a navy capable of maintaining the honor of France, and gratifying the patriotic aspirations of your petitioners, the undersigned candle-makers and others.

Only have the goodness to reflect, Gentlemen, and you will be convinced that there is, perhaps, no Frenchman, from the wealthy coalmaster to the humblest vender of lucifer matches, whose lot will not be ameliorated by the success of this our petition.

Source: Frédéric Bastiat, *Economic Sophisms* (Irvington-on-Hudson, NY: The Foundation for Economic Education, Inc., 1996), abridged. Used with permission of Foundation for Economic Education. www.FEE.org.

Offshoring is a wrenching experience for many Americans who lose their jobs, but it is not necessarily bad for the overall economy. Offshoring simply reflects growing specialization and international trade in services, or, more descriptively, “tasks.” That growth has been made possible by recent trade agreements and new information and communication technologies. As with trade in goods, trade in services reflects comparative advantage and is

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beneficial to both trading parties. Moreover, the United States has a sizable trade surplus with other nations in services. The United States gains by specializing in high-valued services such as transportation services, accounting services, legal services, and advertising services, where it still has a comparative advantage. It then “trades” to obtain lower-valued services such as call-center and data-entry work, for which comparative advantage has gone abroad.

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Offshoring also increases the demand for complementary jobs in the United States. Jobs that are close substitutes for existing U.S. jobs are lost, but complementary jobs in the United States are expanded. For example, the lower price of writing software code in India may mean a lower cost of software sold in the United States and abroad. That, in turn, may create more jobs for U.S.-based workers such as software designers, marketers, and distributors. Moreover, offshoring may encourage domestic investment and the expansion of firms in the United States by reducing their production costs and keeping them competitive worldwide. In some instances, “offshoring jobs” may equate to “importing competitiveness.” Entire firms that might otherwise disappear abroad may remain profitable in the United States only because they can offshore some of their work.

QUICK REVIEW 20.8

- Increased international trade and offshoring of jobs have harmed some specific U.S. workers and have led to policies such as trade adjustment assistance to try to help them with their transitions to new lines of work.

SUMMARY

LO20.1 List and discuss several key facts about international trade.

The United States leads the world in the combined volume of exports and imports. Other major trading nations are Germany, Japan, the western European nations, and the Asian economies of China, South Korea, Taiwan, and Singapore. The United States' principal exports include chemicals, agricultural products, consumer durables, semiconductors, and aircraft; principal imports include petroleum, automobiles, metals, household appliances, and computers.

LO20.2 Define comparative advantage, and demonstrate how specialization and trade add to a nation's output.

World trade is based on three considerations: the uneven distribution of economic resources among nations, the fact that efficient production of various goods requires particular techniques or combinations of resources, and the differentiated products produced among nations.

Mutually advantageous specialization and trade are possible between any two nations if they have different domestic opportunity-cost ratios for any two products. By specializing on the basis of comparative advantage, nations can obtain larger real incomes with fixed amounts of resources. The terms of trade determine how this increase in world output is shared by the trading nations. Increasing (rather than constant) opportunity costs limit specialization and trade.

LO20.3 Describe how differences between world prices and domestic prices prompt exports and imports.

A nation's export supply curve shows the quantities of a product the nation will export at world prices that exceed the domestic price (the price in a closed, no-international-trade economy). A nation's import demand curve reveals the quantities of a product it will import at world prices below the domestic price.

In a two-nation model, the equilibrium world price and the equilibrium quantities of exports and imports occur where one nation's export supply curve intersects the other nation's import demand curve. A nation will export a particular product if the world price exceeds the domestic price; it will import the product if the world price is less than the domestic price. The country with the lower costs of production will be the exporter and the country with the higher costs of production will be the importer.

LO20.4 Analyze the economic effects of tariffs and quotas.

Trade barriers take the form of protective tariffs, quotas, nontariff barriers, and “voluntary” export restrictions. Export subsidies also distort international trade. Supply and demand analysis demonstrates that protective tariffs and quotas increase the prices and reduce the quantities demanded of the affected goods. Sales by foreign exporters diminish; domestic producers, however, gain higher prices and enlarged sales. Consumer losses from trade restrictions greatly exceed producer and government gains, creating an efficiency loss to society.

LO20.5 Analyze the validity of the most frequently presented arguments for protectionism.

The strongest arguments for protection are the infant industry and military self-sufficiency arguments. Most other arguments for protection are interest-group appeals or reasoning fallacies that emphasize producer interests over consumer interests or

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stress the immediate effects of trade barriers while ignoring long-run consequences.

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The cheap foreign labor argument for protection fails because it focuses on labor costs per hour rather than on what really matters, labor costs per unit of output. Due to higher productivity, firms in high-wage countries like the United States can have lower wage costs per unit of output than competitors in low-wage countries. Whether they do will depend on how their particular wage and productivity levels compare with those of their competitors in low-wage countries.

LO20.6 Identify and explain the objectives of GATT, WTO, EU, eurozone, and NAFTA, and discuss offshoring and trade adjustment assistance.

In 1947 the General Agreement on Tariffs and Trade (GATT) was formed to encourage nondiscriminatory treatment for all member nations, to reduce tariffs, and to eliminate import quotas. The Uruguay Round of GATT negotiations (1993) reduced tariffs and quotas, liberalized trade in services, reduced agricultural subsidies, reduced pirating of intellectual property, and phased out quotas on textiles.

GATT's successor, the World Trade Organization (WTO), had 159 member nations in 2013. It implements WTO agreements, rules on trade disputes between members, and provides forums for continued discussions on trade liberalization. The latest round of trade negotiations—the Doha Development Agenda—began in late 2001 and as of 2013 was still in progress.

Free-trade zones liberalize trade within regions. Two examples of free-trade arrangements are the 28-member European Union (EU) and the North American Free Trade Agreement (NAFTA), comprising Canada, Mexico, and the United States. Seventeen EU nations have abandoned their national currencies for a common currency called the euro.

The Trade Adjustment Assistance Act of 2002 recognizes that trade liberalization and increased international trade can create job loss for many workers. The Act therefore provides cash assistance, education and training benefits, health care subsidies, and wage subsidies (for persons aged 50 or older) to qualified workers displaced by imports or relocations of plants from the United States to abroad.

Offshoring is the practice of shifting work previously done by Americans in the United States to workers located in other nations. Although offshoring reduces some U.S. jobs, it lowers production costs, expands sales, and therefore may create other U.S. jobs. Less than 4 percent of all job losses in the United States each year are caused by imports, offshoring, and plant relocation abroad.

TERMS AND CONCEPTS

labor-intensive goods

land-intensive goods

capital-intensive goods

opportunity-cost ratio

comparative advantage

principle of comparative advantage

terms of trade

trading possibilities line

gains from trade

world price

domestic price
 export supply curve
 import demand curve
 equilibrium world price
 tariffs
 revenue tariff
 protective tariff
 import quota
 nontariff barrier (NTB)
 voluntary export restriction (VER)
 export subsidy
 dumping
 Smoot-Hawley Tariff Act
 General Agreement on Tariffs and Trade (GATT)
 World Trade Organization (WTO)
 Doha Development Agenda
 European Union (EU)
 eurozone
 North American Free Trade Agreement (NAFTA)
 Trade Adjustment Assistance Act
 offshoring

The following and additional problems can be found in 

DISCUSSION QUESTIONS

1. Quantitatively, how important is international trade to the United States relative to the importance of trade to other nations? What country is the United States' most important trading partner, quantitatively? With what country does the United States have the largest trade deficit? **LO20.1**
2. Distinguish among land-, labor-, and capital-intensive goods, citing an example of each without resorting to book examples. How do these distinctions relate to international trade? How do distinctive products, unrelated to resource intensity, relate to international trade? **LO20.1, LO20.2**
3. Explain: "The United States can make certain toys with greater productive efficiency than can China. Yet we import those toys from China." Relate your answer to the ideas of Adam Smith and David Ricardo. **LO20.2**