CHAPTER 3

Demand and Supply: Price Determination in Competitive Markets

LEARNING OBJECTIVES

1. Define demand and supply and represent these concepts graphically.
2. State the "laws" of demand and supply.
3. Identify the determinants of demand and supply.
4. Recognize the difference between a change in demand (supply) and a change in the quantity demanded (supplied).
5. Explain and illustrate graphically how the equilibrium price and quantity are determined.
6. Describe the rationing, signaling, and motivating functions of prices.
7. Identify the factors that can cause the equilibrium price to change.
8. Use demand and supply curves to predict changes in the equilibrium price and quantity.

HOW DO MARKETS work? A market economy is governed by the interaction of buyers and sellers in thousands of different product and resource markets. This interaction—what you might describe as bargaining or negotiating—determines prices. The prevailing prices of goods and services tell producers which products consumers want the most. Resource prices tell producers which resources to use to produce those products profitably. Because resource prices affect consumers' incomes, they also influence the distribution of goods and services. For example, workers whose skills are particularly scarce can command higher salaries and thereby claim a larger share of the society's limited output. In short, prices play a very important role in the functioning of all mixed economies.

This chapter introduces the model of demand and supply, the model intended to illustrate how buyers and sellers interact to determine prices in competitive markets. Competitive markets are composed of many independent buyers and sellers, each too small to be able to influence the market price significantly. We'll explore the meaning of competitive markets in greater detail later

in the text. For now, just remember that in competitive markets, prices are determined by the impersonal forces of demand and supply, not by manipulations of powerful buyers or sellers.

After you study this chapter, you will have a better understanding of how prices are determined and a greater appreciation of the role that prices play in a market economy. You'll understand why the price of gold fluctuates and why salaries are higher in some occupations than in others. You'll understand why antique cars often command higher prices than this year's models and why a poor wheat harvest in Canada or Ukraine can mean higher bread prices in the United States. You will also understand how prices both direct the actions of producers and determine the distribution of society's limited output of goods and services. In summary, the material in this chapter will give you a clearer comprehension of the role of markets and prices in our economy.

DEMAND

In a market economy, consumers are sovereign; that is, consumers dictate which goods and services will be produced. But it is consumer *demand* rather than consumer wants or desires that actually directs the market. We have already noted that human wants are unlimited. Wanting an item, however, and being willing and able to pay for it are two distinctly different things. If the item we want carries a price tag, we may do without it: we may lack the money to pay or we may prefer to spend that money on something else.

People who are both *willing and able* to make purchases are the consumers who determine which products a market economy will produce. When consumers lack either the willingness or the ability to spend, producers do not respond. Thus, the concept of demand includes the willingness and ability of potential buyers to purchase a product. We define **demand** as a schedule (or table) showing the quantities of a good or service that consumers are willing and able to purchase at various prices during a given time period, when all factors other than the product's price remain unchanged.

Exhibit 3.1 illustrates the concept of demand through a simple example. The schedule shows the yearly demand for jogging shoes of a given quality in the hypothetical community of Hometown, U.S.A. You can see that the number of pairs of jogging shoes that Hometown consumers are willing and able to purchase each year depends on the selling price. If jogging shoes sell for $100 a pair, Hometowners will purchase 2,000 pairs a year, assuming that other factors remain the same—their incomes, for example, and their present jogging routines.

EXHIBIT 3.1

Hometown Demand for Jogging Shoes

PRICE (per pair)	QUANTITY (pairs per year)
$100	2,000
80	4,000
60	6,000
40	8,000
20	10,000

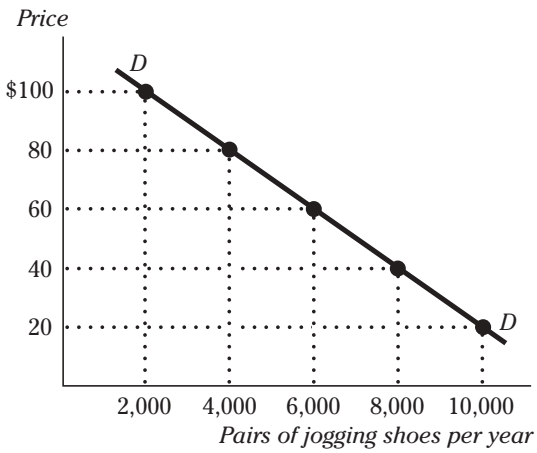
Demand is a schedule or table showing the quantities of a good or service that consumers are willing and able to purchase at various prices.

Demand Curves

Economists usually represent schedules in the form of graphs. To graph the demand for jogging shoes, we first plot the information in Exh. 3.1 and then connect the points to form a demand curve, as shown in Exhibit 3.2. A **demand curve** is simply a graphical representation of demand. By convention we measure price on the vertical axis and quantity on the horizontal axis. Each point on the curve represents a price and the quantity that consumers

EXHIBIT 3.2

The Demand Curve for Jogging Shoes in Hometown, U.S.A.



A demand curve is a graphical representation of demand. It demonstrates the inverse relationship between price and quantity demanded.

would demand per year at that price. For example, we can see in Exh. 3.2 that at a price of $80, Hometown joggers would demand 4,000 pairs; at a price of $60, the quantity demanded would increase to 6,000 pairs.

THE LAW OF DEMAND

Our hypothetical demand schedule and demand curve for jogging shoes demonstrate clearly what economists call the **law of demand**, which holds that the quantity demanded of a product is *negatively, or inversely, related* to its price. This simply means that consumers will purchase more of a product at lower prices than at higher prices. That's why demand curves always slope downward and to the right.

Economists believe that two factors explain the inverse relationship between price and quantity demanded:

1. When prices are lower, consumers can afford to purchase a larger quantity of the product out of any given income. Economists refer to this *ability* to purchase more as the **income effect** of a price reduction.
2. At lower prices the product becomes more attractive relative to other items serving the same function. This **substitution effect** explains the *willingness* of consumers to substitute for other products the product that has declined in price.

To illustrate the income and substitution effects, let's return to our Hometown consumers. Why will they purchase more jogging shoes at $20 than at $100? Because of the income effect, their incomes will now buy more: if the price of jogging shoes declines and other prices don't change, consumers will be able to buy more goods and services with their fixed incomes. It's almost as though each consumer had received a raise. And because of the substitution effect, consumers will buy jogging shoes instead of tennis shoes, sandals, or moccasins because jogging shoes have become a better footwear buy. Because of both the income effect and the substitution effect, we all, like these hypothetical consumers, tend to purchase more of a product at a lower price than at a higher price.

DETERMINANTS OF DEMAND

The demand curve and the law of demand emphasize the relationship between the price of a product and the quantity demanded. But price is not the only factor that determines how much of a product consumers will buy. A va-

riety of other factors underlie the demand schedule and determine the precise position of the demand curve. These **determinants of demand** include income, tastes and preferences, expectations regarding future prices, the price of related goods, and the number of buyers in the market. Any demand curve is based on the assumption that these factors are held constant. Changes in one or more of these determinants cause the entire demand curve to shift to a new position.

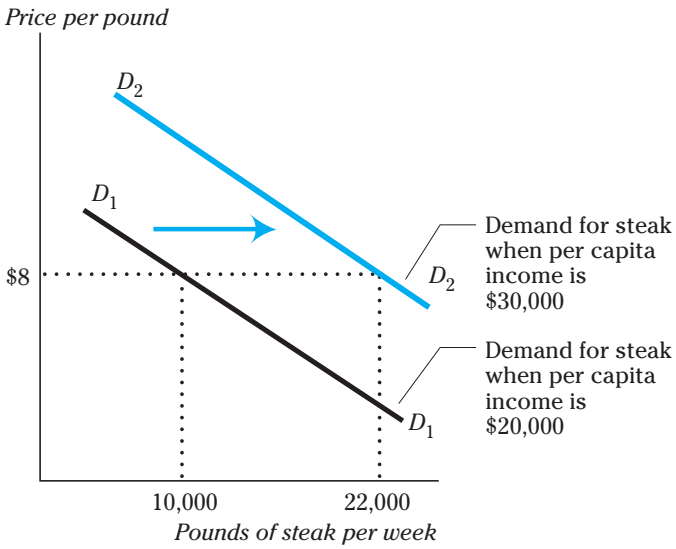
Income

The most obvious determinant of demand is income. Consumers' incomes influence their *ability* to purchase goods and services. For what economists call **normal goods**, an increase in income will cause consumers to purchase more of a product than before at each possible price. For example, an increase in per capita income (income per person) will probably cause consumers to buy more steak than before at whatever price exists. We would show this by shifting the demand curve to the right, as illustrated in Exhibit 3.3.

Not all products are normal goods, however. An increase in income will cause consumers to purchase less of an **inferior good**, thus shifting the demand curve to the left. Powdered milk, generic macaroni and cheese, and

EXHIBIT 3.3

Income as a Determinant of Demand



An increase in per capita income will shift the demand curve for a normal good to the right. Consumers will purchase more of the product at each price.

cheap wine are examples of products that might be inferior goods. When consumers' incomes increase, they may choose to buy less of these products in favor of more appetizing grocery items.

Tastes and Preferences

Consumers' tastes and preferences—how well they like the product relative to other products—are also important determinants of demand. A change in tastes and preferences will affect the demand for products. For example, the desire to limit cholesterol intake has altered consumer tastes and preferences for various food products. Today consumers demand less red meat and fewer eggs than in times past but demand more fish and chicken. In other words, this change in tastes and preferences has caused the demand curves for red meat and eggs to shift to the left and the demand curves for fish and chicken to shift to the right.

Expectations about Prices

Expectations may also influence consumer behavior. For example, the expectation that the price of an item will rise in the future usually encourages consumers to buy it now. We would represent this by shifting the entire demand curve to the right to show that more would be demanded now at whatever price prevailed. Similarly, the expectation that a product will decline in price is a good incentive to postpone buying it; the present demand curve for the product would shift to the left.

Price of Related Goods

A somewhat less obvious determinant of demand is the price of related goods. Although all goods compete for a consumer's income, the price of substitutes and complements may be particularly important in explaining consumer behavior. **Substitutes** are simply products that can be used in place of other products because, to a greater or lesser extent, they satisfy the same consumer wants. Hot dogs are a typical substitute for hamburgers, and tennis shoes may substitute for jogging shoes unless one is a serious jogger. **Complements** are products normally purchased along with or in conjunction with another product. For example, pickle relish and hot dogs are complements, as are lettuce and salad dressing.

If the price of hamburgers increased and the price of hot dogs remained unchanged, consumers might be expected to buy fewer hamburgers and more hot dogs. The demand curve for hot dogs would shift to the right. By the same token, an increase in the price of lettuce is likely to have an adverse effect on

the sale of salad dressing. Because people buy salad dressing as a complement to salad vegetables, anything that causes consumers to eat fewer salads causes them to demand less salad dressing. The demand curve for salad dressing would shift to the left.

The Number of Consumers in the Market

The final determinant of demand is the number of consumers in the market. The more consumers who demand a particular product, the greater the total demand for the product. When the number of consumers increases, the demand curve for the product shifts to the right to show that a greater quantity is now demanded at each price. If the number of consumers declines, the demand curve shifts to the left.

As we think about the demand for a particular product, we need to remember the five determinants we have listed and how changes in these factors will affect the demand curve. We also need to recognize that more and more U.S. firms are selling their products to consumers in Mexico, Europe, and other locations outside the United States. As a consequence, the position of the demand curve for many products is determined not solely by local or national factors but by international factors as well. For instance, rising incomes in Mexico are certain to shift the demand curve for American-made computers and software to the right, whereas the availability of cheap Chilean wines will probably shift the demand curve for many California wines to the left. The point is that markets are often international in scope, so that we need to look beyond national boundaries to determine the level of demand.

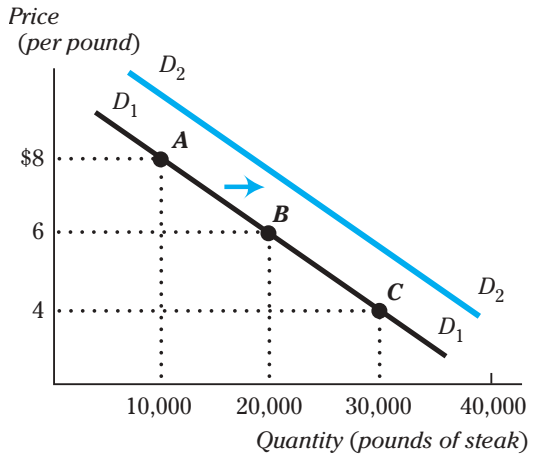
CHANGE IN QUANTITY DEMANDED VERSUS CHANGE IN DEMAND

In analyzing the factors that cause consumers to increase or decrease their purchases of a particular product, it is helpful to distinguish between the impact of a change (1) in the price of the product and (2) in one or more of the determinants of demand.

A change in the price of the product results in a **change in quantity demanded** and is represented graphically by movement along a stationary demand curve. For example, if the price of steak declines from $8 a pound to $6 a pound, consumers will move from point *A* to point *B* on demand curve D_1 in Exhibit 3.4. Note that the consumers will now choose to purchase a greater quantity of the product because its price is lower. This is an increase in the quantity demanded. If, on the other hand, the price rises from $4 a pound to

EXHIBIT 3.4

Distinguishing Change in Demand from Change in Quantity Demanded



A change in the price of steak will cause a *change in the quantity demanded*. When the price of steak declines from $8 to $4 a pound, the quantity demanded increases from 10,000 to 30,000 pounds; consumers move from *A* to *C* along demand curve D_1.

A change in a determinant of demand will cause a *change in demand*: the entire curve will shift. The movement from D_1 to D_2 is an increase in demand.

$6 a pound, the consumers will move from point *C* to point *B* on the demand curve. Here a price increase will cause a reduction in the quantity demanded.

When any determinant of demand changes, the result is a **change in demand**—an entirely new demand schedule represented graphically by a shift of the demand curve to a new position. If consumers develop a stronger preference for steak, for instance, or if the prices of substitutes for steak rise, the entire demand curve for steak will shift to the right—an increase in demand. Exh.3.4 depicts this shift. A leftward shift of the entire demand curve would denote a decrease in demand. (See "Faster Track to the American Dream—," on page 76, to test your understanding of the difference between a change in demand and a change in the quantity demanded.)

SUPPLY

A knowledge of demand is essential to an understanding of how prices are determined, but it is only half the picture. Now we turn to the supply side of the market.

When we use the term *supply* in our everyday language, we are usually referring to a fixed quantity. That's what the owner of the local sporting-goods store means when advertising a *limited supply* of Fleet Feet tennis shoes or Super-Fit swimsuits. But that's not what economists mean when they talk about supply. To economists, supply is a schedule—just as demand is. **Supply** is a

EXHIBIT 3.5

Hometown Supply of Jogging Shoes

PRICE (per pair)	QUANTITY (pairs per year)
$100	10,000
80	8,000
60	6,000
40	4,000
20	2,000

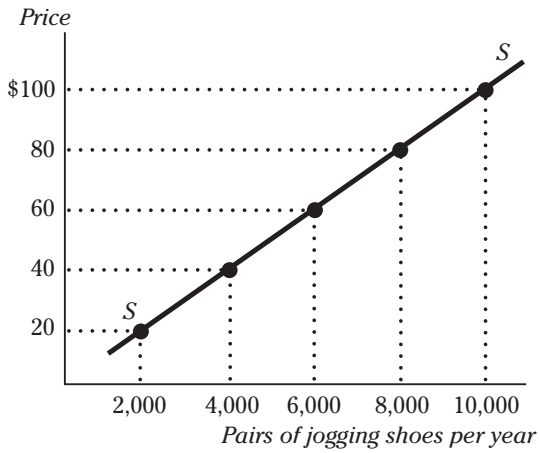
Supply is a schedule or table showing the quantities of a good or service that producers are willing and able to offer for sale at various prices.

schedule (or table) showing the quantities of a good or service that producers are willing and able to offer for sale at various prices during a given time period, when all factors other than the product's price remain unchanged.

Exhibit 3.5 represents the annual supply of jogging shoes in the Hometown market area. As the schedule shows, the number of pairs of jogging shoes that suppliers will make available for sale depends on the price of jogging shoes. At a price of $100 a pair, suppliers are willing to produce 10,000 pairs of jogging shoes a year; at a price of $60, they would offer only 6,000 pairs. Because supply is a schedule, we can't determine the quantity supplied unless we know the selling price.

EXHIBIT 3.6

The Supply Curve of Jogging Shoes in Hometown, U.S.A.



A supply curve is a graphical representation of supply. It demonstrates the direct relationship between price and quantity supplied.

USE YOUR ECONOMIC REASONING

Faster Track to the American Dream: Falling Interest Rates Give Younger Buyers a Chance to Own Home

By Thomas Grillo

BRENDA AND ANGEL Robles did something people in their 20s are doing more often these days. They bought a house. "Rents have increased so much we figured we could afford a mortgage," said Brenda Robles, a stay-at-home mom who was 28 when she and her husband purchased a multifamily house last summer. "Interest rates were a great incentive." . . .

The Robles are part of a surge of young home buyers—both in New England and across the nation—who are taking advantage of the lowest mortgage rates in nearly 40 years, easy credit terms, and a variety of low- and no-down-payment mortgage programs. The number of home purchases nationwide by 20-somethings has soared to 321,136 in 2001 from 199,000 in 1993—a 61 percent increase—according to a recent survey by the National Association of Realtors, a Washington, D.C.–based trade group. In addition, the median age for first-time home buyers has fallen from 36 in 1992 to 31 in 2001, the survey reported.

Realtors say the two biggest deterrents to a home loan—high interest rates and the down payment—have been erased in the past few years. Younger buyers are benefiting from 30-year fixed-rate mortgages at 6 percent or less in recent months. Offers of

Source: Boston Globe, January 26, 2003.

The Supply Curve

To transform our supply schedule into a supply curve, we follow the same procedure we used in constructing a demand curve. In Exhibit 3.6 we graph the information in Exh. 3.5, measuring price on the vertical axis and quantity on the horizontal axis. When we've finished graphing the points from the schedule, we connect them to get a **supply curve**—a graphical representation of supply.

Interpreting a supply curve is basically the same as interpreting a demand curve. Each point on the curve represents a price and the quantity of jogging shoes that producers will supply at that price. You can see, for example, that producers will supply 4,000 pairs of shoes at a price of $40 per pair or 8,000 pairs at a price of $80 per pair.

zero- to five-percent-down mortgages are widely available. Ten years ago, the interest rate for a 30-year fixed-rate mortgage was 9 percent.

Consider these numbers: while a $200,000 loan at 9 percent carries a monthly payment of $1,609, that same loan at 6 percent shrinks the monthly payment to $1,199—a savings of $410 each month or $4,920 annually.

"Every time interest rates fall by a percentage point, it opens the floodgates to potential buyers who had been unable to qualify," said Rosalind Levine, a realtor at R.S. Residential in Worcester. "Younger buyers realize that rates may never be this low again and they want a piece of the American Dream now."

John Battaglia, president of Cambridge Mortgage Group in Boston, said younger buyers have watched home prices skyrocket in the last few years, and they don't want to wait on the sidelines. "Many young people are looking to buy sooner rather than later, fearing that home prices will continue to escalate," he said. . . .

Use Your Economic Reasoning

1. The article suggests that apartment rents have increased significantly. Would that lead to a reduction in the demand for apartments or a reduction in the *quantity* of apartments demanded? How would you represent this graphically?
2. The rising apartment rents appear to be one of the factors pushing young people to purchase homes. Is that behavior consistent with the principles presented in this chapter? (What determinant of demand has changed?) Does this represent a change in the demand for homes or a change in the quantity of homes demanded?
3. Low interest rates are probably the major factor driving home purchases. Does this represent a change in the demand for homes or a change in the quantity demanded? (Hint: Recall that it is interest rates that have fallen, not home prices.)
4. "Many young people . . . [fear] that home prices will continue to escalate." What impact would this expectation have on prospective home buyers? Is this a change in demand or a change in the quantity demanded?

THE LAW OF SUPPLY

You've probably noticed that the supply curve slopes upward and to the right. The supply curve slopes upward because the **law of supply** holds that price and quantity supplied are *positively, or directly, related*. Producers will supply a larger quantity at higher prices than at lower prices.

Why would producers supply more jogging shoes at a higher price than at a lower price? The major reason is that the higher price allows them to cover the higher unit costs associated with producing the additional output. It probably costs more to produce the thousandth pair of jogging shoes than it did to produce the five hundredth pair. It's also likely that it would cost even more to produce the two thousandth pair, and so on. Producers are willing to supply a greater quantity at a higher price because the higher price enables

businesses to cover the higher cost of producing the additional units—units that would not have been profitable at lower prices.

Costs per unit tend to increase with output because some of a business's resources, such as its production plant and equipment, cannot be expanded in a short period of time. Therefore, as the business increases output by hiring more labor and employing more raw materials, it eventually begins to overutilize its factory and equipment. This leads to congestion, workers waiting to use equipment, more frequent breakdowns of equipment, and production bottlenecks—situations in which one stage of the production process is slowing down the entire operation. These problems increase the cost of producing additional units. Producers will supply the additional units only if they can obtain a price high enough to justify paying the higher costs. Thus, the supply curve slopes upward because a higher price is *necessary* to call forth additional output from suppliers.

DETERMINANTS OF SUPPLY

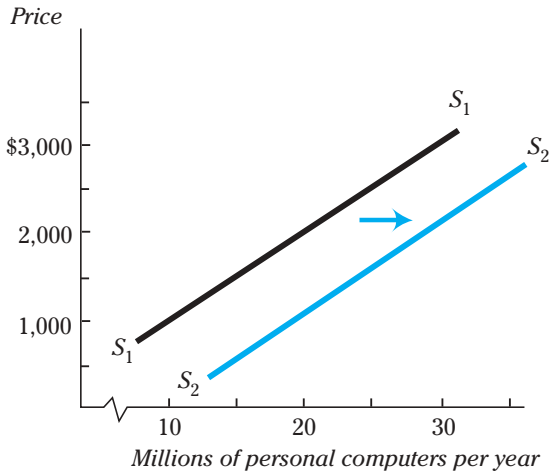
The supply curve shows the relationship between the price of a product and the quantity supplied when other factors remain unchanged. However, price is not the only factor that influences the amount producers will offer for sale. Three major **determinants of supply** underlie the supply schedule and determine the position of the supply curve: technology, prices of the resources used in producing the product, and the number of producers in the market. Each supply curve is based on the assumption that these factors are held constant. Changes in any of the determinants will shift the entire supply curve to a new position.

Technology

Each supply curve is based on the existing technology. **Technology** is our state of knowledge about how to produce products. It influences the types of machines we use and the combinations of other resources we select to produce goods and services. A **technological advance** is the discovery of a better way to produce a product—a method that uses fewer resources to produce each unit of output or that produces more output from a given amount of resources. Because a technological advance allows producers to supply a higher quantity at any given price, it is represented by shifting the supply curve to the right, as depicted in Exhibit 3.7. As you can see, the development of a better method for producing personal computers will allow computer producers to supply a higher quantity at each price.

EXHIBIT 3.7

The Impact of a Technological Advance on the Supply of Personal Computers



A technological advance will allow producers to supply a higher quantity at any given price.

Resource Prices

Businesses must purchase economic resources in order to produce their products. Each supply curve assumes that the prices of resources remain unchanged. An increase in the price of labor, materials, or some other production input will increase producers' costs and cause them to supply less at any given price. The supply curve will shift to the left. A reduction in resource prices will have the opposite effect; the supply curve will shift to the right because producers will be able to supply a higher quantity at each price.

The Number of Producers in the Market

A third determinant of supply is the number of producers in the particular market: the more producers, the greater the supply. Each supply curve assumes that the number of producers is unchanged. If additional producers enter the market, the supply curve will shift to the right; if some producers leave, the supply curve will shift left.

Many other changes have essentially the same impact on supply as an increase or decrease in the number of producers. A severe frost destroys half the orange crop, decreasing supply; a good growing season enlarges the wheat harvest, increasing supply; trade barriers are lowered and additional beef enters

the United States, increasing supply. With each of these changes, the supply curve shifts as it would if the number of suppliers had increased or decreased.

As with demand, we need to recognize that the three determinants of supply—technology, resource prices, and the number of producers in the market—may be subject to international influences. For instance, the need to compete with foreign rivals has been a major factor spurring U.S. producers to search for and implement cost-reducing technological advances. In the furniture industry, for example, pressure from foreign producers has resulted in innovations that increase the amount of furniture produced from a given amount of wood. These innovations will cause the supply curve for furniture to shift to the right. At the same time, the supply curve of aluminum has shifted to the right for a very different reason. In the wake of the collapse of the Soviet Union, Russia has been supplying the world with massive amounts of aluminum—aluminum that once would have gone to military uses in the USSR. As you can see, we cannot ignore international factors as we attempt to determine the level of supply.

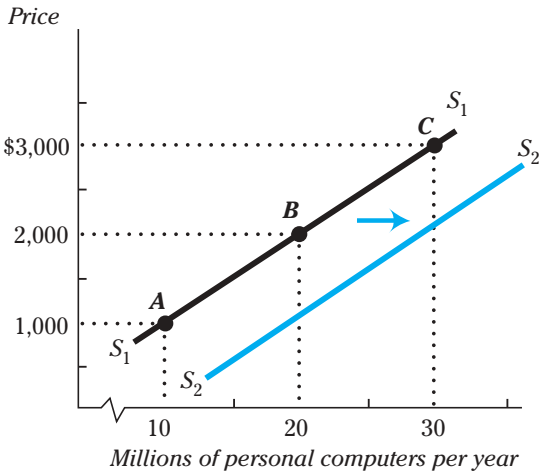
CHANGE IN SUPPLY VERSUS CHANGE IN QUANTITY SUPPLIED

Earlier in this chapter you learned the difference between a change in demand and a change in *quantity* demanded. Economists make the same distinction for supply. A **change in quantity supplied** results from a change in the price of the product, with factors other than price held constant. It is represented graphically by movement along a stationary supply curve. According to Exhibit 3.8, if the price of personal computers declines from $2,000 to $1,000, the quantity supplied will decrease from 20 million units to only 10 million units a year, as suppliers move from point *B* to point *A* along supply curve S_1. But if the price of computers increases from $2,000 to $3,000, producers will move from point *B* to point *C*, and the quantity supplied will expand from 20 million to 30 million computers a year.

A **change in supply** is an increase or decrease in the amount of a product supplied at each and every price. A change in supply is caused by a change in one of the determinants of supply and is represented graphically by a shift of the entire supply curve, as depicted in Exh. 3.8. If the supply curve shifts to the right (from S_1 to S_2), it denotes an increase in supply; a shift to the left indicates a decrease in supply. (To test your ability to distinguish between a change in supply and a change in the quantity supplied, read "Price Is Right," on page 82, and answer the questions.)

EXHIBIT 3.8

Distinguishing Change in Supply from Change in Quantity Supplied



A change in the price of computers will cause a *change in the quantity supplied*. When price increases from $1,000 to $3,000, the quantity supplied increases from 10 million to 30 million computers per year; we move from *A* to *C* along supply curve S_1.

A change in a determinant of supply will cause a *change in supply*: the entire curve will shift. The movement from S_1 to S_2 is an increase in supply.

THE PROCESS OF PRICE DETERMINATION

Now that you understand the basics of demand and supply, let's put those two pieces of the puzzle together and examine how prices are determined. To do that, we'll consider again the market for jogging shoes. Exhibit 3.9 displays hypothetical demand and supply schedules for that product. As you already know, the demand schedule shows the quantities of jogging shoes that will be demanded at various prices, and the supply schedule reveals the quantities

EXHIBIT 3.9

The Demand and Supply of Jogging Shoes in Hometown, U.S.A.

PRICE (per pair)	QUANTITY DEMANDED (pairs per year)	QUANTITY SUPPLIED (pairs per year)
$100	2,000	10,000
80	4,000	8,000
60	6,000	6,000
40	8,000	4,000
20	10,000	2,000

Price Is Right

By Bruce Gottlieb

EIGHT YEARS AGO, an article appeared in an obscure Israeli medical journal, *Medicine and Law* arguing that American citizens should be permitted to sell their kidneys. This would require changing federal law, which since 1984 has made selling any organ, even one's own, a felony punishable by up to five years in jail. The author of the article was a Michigan pathologist named Jack Kevorkian.

Kevorkian's argument was that the current system of accepting kidneys only from dead patients and Good Samaritan donors provides too few kidneys. While this was true even then, the situation is worse today. As of April 30, there were 44,989 people on the waiting list for a kidney transplant. About 2,300 of them will die this year while waiting. If kidney sales were permitted, Kevorkian argued, these lives would almost certainly be saved.

He may be right. In recent years, economists and economically minded lawyers at the University of Chicago and Yale Law School have made similar arguments. The idea was endorsed two years ago in the pages of *The Lancet* by a group of prominent transplant surgeons from Harvard Medical School and hospitals in Canada and England. Of course, legalizing kidney sales remains a fringe view, both within the medical profession and outside it. But that needs to change. . . .

There are several familiar arguments against legalizing kidney sales beginning with the idea that giving up a kidney is too dangerous for the donor. But, popular though this argument is the statistics don't bear it out—at least relative to other risks people are legally permitted to assume. In terms of effect on life expectancy, donating one of your two kidneys is more or less equivalent to driving an additional 16 miles to work each day. No one objects to the fact that ordinary jobs—like construction or driving a delivery van—carry roughly similar risks.

Another common objection is that government ought to encourage altruism, not profit seeking. But, from the perspective that matters—the recipient's — this distinction is irrelevant, so long as the donated kidney works. . . . Moreover, kidneys from cadavers function for eight years, on average, whereas those from live donors last 17 years. (The reason is that kidneys can be harvested from live donors in circumstances less hectic than death and that donors and recipients can be better matched.)

This brings us to the most powerful objection to the sale of kidneys—that, in practice, it would result in the poor selling parts of their bodies to the rich. But in today's

Source: Reprinted by permission of *The New Republic*, May 22, 2000, p. 16, © 2000. The New Republic, Inc.

health-care economy, that probably wouldn't be the case. For several decades, Congress has mandated that Medicare pay the medical bills of any patient—of any age—who requires dialysis. Transplant surgery and post surgical drug treatment are expensive, yes, but they're nothing compared to dialysis, which costs about $40,000 per year. That's a savings of $40,000 per year for the 17 years or so during which a transplanted kidney will function. In other words insurers and the federal government would probably be happy to buy a kidney for anyone who needs one. They'd even be willing to pay donors considerable sums—$50,000, $100,000, or more. (Indeed, according to one estimate, if kidneys could be found for all the patients now on dialysis, Medicare would break even after just two years.)

At these prices, there would be no shortage of sellers. . . . And, given the amount of money involved, it seems downright contradictory to argue that the poor should be prevented from taking the deal on the grounds that poverty is unfair. The solution to poverty is anyone's guess, but restricting poor people's economic opportunities definitely isn't the answer. . . .

Sure, critics will say that allowing kidney sales is the beginning of a slippery slope toward selling other, more essential organs. This, of course, would be a moral disaster, since it would mean legalizing serious maiming (selling eyes) or even murder (selling hearts or lungs). . . . But it's easy for legislators to draft a law that clearly allows kidney selling but forbids other forms of organ selling. (Kidneys are fairly unique in that, while everybody has two, somebody with just one can lead an almost entirely normal life.) And it seems implausible that a member of Congress would mistake public approval of kidney sales for approval of economic transactions that leave sellers dead or partially blind.

Nicholas L. Tilney, a Harvard Medical School professor and transplant surgeon wrote a paper in 1989 against kidney selling. . . . But in 1998—as the kidney shortage became more acute—he coauthored, along with other surgeons, lawyers, and philosophers, the provocative *Lancet* paper that argued for legalizing kidney sales. "We debated this question for about two years before writing that piece," says Tilney.

"All of us transplanters, and I'm sure the public, have this tremendous gut reaction against it. That was sort of our initial reaction. And then, when we all got around and really thought about this and talked about it, out thinking began to change."

The prospect of someone going under the knife to earn a down payment on a new house or to pay for college is far from pleasant. But neither is the reality of someone dying because a suitable kidney can't be found. The free market may be the worst way to allocate kidneys. The worst, that is, except for all the other alternatives.

Use Your Economic Reasoning

1. What economic theory suggests that paying people for kidneys will increase the number of kidneys available for transplant?
2. If it becomes legal to buy and sell kidneys, will this increase the supply of kidneys or the quantity supplied? Defend your answer.
3. What are the normative issues involved in the debate about buying and selling kidneys?
4. Suppose it became possible to transplant say, pig kidneys into humans. Would that represent an increase in supply or an increase in the quantity supplied?

that will be supplied at those prices. But which of these possible prices will prevail in the market? And what quantity of jogging shoes will be exchanged between buyers and sellers? To answer those questions, let's compare the reactions of buyers and sellers to each possible price.

What would happen in the market if jogging shoes were selling for $20 a pair? Because the $20 price would be attractive to consumers but not to producers, 10,000 pairs of jogging shoes would be demanded, but only 2,000 pairs would be supplied. At the $20 price there would be a **shortage**—an excess of quantity demanded over quantity supplied—of 8,000 pairs of jogging shoes. Therefore, some potential buyers would offer to pay a higher price in order to obtain the product. Competition among these buyers would tend to push the price to a higher level, and the higher price of jogging shoes would tend to reduce the quantity demanded while encouraging producers to expand the quantity supplied. In this way price increases would tend to reduce the shortage of jogging shoes.

Suppose that the price of jogging shoes rose to $40 a pair. At that price 8,000 pairs of jogging shoes would be demanded and 4,000 pairs supplied. Once again there would be a shortage, but this time it would amount to only 4,000 pairs of jogging shoes (8,000 pairs demanded minus 4,000 pairs supplied). Competition among potential buyers again would bid up the price of jogging shoes. The higher price would lead to a reduction in the quantity demanded and an increase in the quantity supplied, which would reduce the shortage still further.

You can probably see what happens as we move from lower to higher prices. Now let's reverse the process, beginning with the highest price in Exh. 3.9. A price of $100 would tend to encourage production and discourage consumption. Producers would be willing to supply 10,000 pairs of jogging shoes a year, but consumers would demand only 2,000 pairs. The result would be a **surplus**—an excess of quantity supplied over quantity demanded—of 8,000 pairs of jogging shoes a year. How do producers react to a surplus? They begin to cut the price of the product in order to compete for existing customers and lure additional customers into the market. The lower price of jogging shoes tends to increase the quantity demanded and decrease the quantity supplied, thus reducing the surplus. If the price fell to $80, there would still be a surplus of 4,000 pairs of jogging shoes (8,000 pairs supplied minus the 4,000 pairs demanded). Price cutting would then continue, and the surplus would continue to shrink.

Equilibrium Price and Quantity

In our example $60 is the market-clearing, or equilibrium, price, and 6,000 units is the equilibrium quantity. The **equilibrium price** is the price that

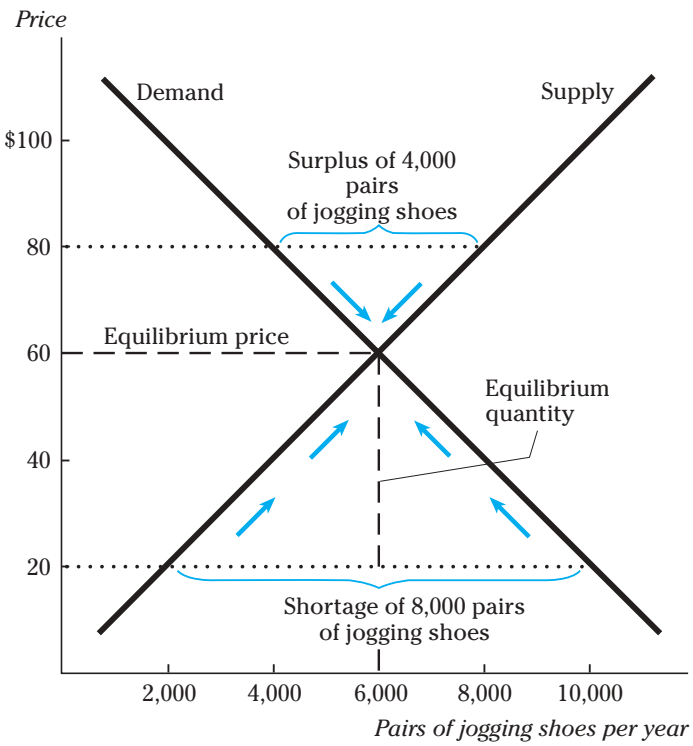
brings about an equality between the quantity demanded and the quantity supplied. The **equilibrium quantity** is the quantity demanded and supplied at the equilibrium price. Equilibrium essentially means stability; once established, the equilibrium price will be maintained so long as the basic supply and demand conditions remain unchanged.

In a competitive market the actual, or prevailing, price will tend toward equilibrium. As you saw in Exh. 3.9, when the price of jogging shoes is above or below equilibrium, market pressures tend to push it down or up toward the equilibrium level. Only when the existing price is at the equilibrium level will there be neither a shortage nor a surplus and no pressure for price to change.

We use supply and demand curves to represent the process of price determination. By graphing the demand and supply schedules in Exh. 3.9, we can construct the demand and supply curves found in Exhibit 3.10. These curves intersect at the equilibrium price ($60) and the equilibrium quantity (6,000

EXHIBIT 3.10

Demand and Supply Curves for Jogging Shoes in Hometown, U.S.A.



The equilibrium price is the price that equates the quantity supplied and the quantity demanded. In our example the equilibrium price is $60. Whenever the existing price is above or below equilibrium, pressure exists to push it toward the equilibrium level. For example, at a price of $80, there would be a surplus, and price cutting would take place. At a price of $20, there would be a shortage, and the price would tend to rise in order to eliminate the shortage. The arrows indicate the direction of the adjustments in price and quantity.

pairs of jogging shoes). At any price *above* equilibrium (say, $80), we can measure the amount of the surplus as the horizontal distance between the demand curve and the supply curve. For any price *below* equilibrium ($20, for example), the horizontal distance between the curves tells us the amount of the shortage. As we noted earlier, the shortage or surplus tends to shrink as price approaches the equilibrium level. The graph visually represents these shrinking amounts in the diminishing distance between the demand curve and the supply curve. When price finally achieves equilibrium, the curves intersect. At that point quantity demanded equals quantity supplied, and there is neither shortage nor surplus.

The Rationing and Motivating Functions of Prices

In the preceding example the equilibrium price succeeds in matching up the quantity supplied and the quantity demanded because it performs two important functions. First, the equilibrium price rations jogging shoes perfectly among the various users; at a price of $60, 6,000 pairs of jogging shoes are demanded—exactly the quantity made available by producers. Second, the $60 price motivates producers to supply the correct quantity, the quantity consumers are willing to purchase at $60. Let's consider these important functions in greater detail.

You may recall from Chapter 2 that because every society faces the basic economic problem of unlimited wants and limited resources, some system must exist for **rationing**—that is, dividing up or allocating the scarce items among those who want them. In the United States and other economies that rely heavily on markets, price is the dominant rationing device. Rationing in a market economy works hand in hand with **motivating**—providing incentives to produce the desired output. Let's use Exh. 3.10 to examine this process further, first from the perspective of the consumers demanding jogging shoes and then from the perspective of the producers supplying them.

How does the price of a product ration the supply of it among users? Prices ration because they influence our ability and willingness to purchase the product. The higher the price of jogging shoes, the more of our income it takes to buy them (which means a greater sacrifice in terms of other goods and services we must do without), and the less attractive jogging shoes become in relation to substitute products (tennis shoes, for instance).

To illustrate how price rations, let's begin with a relatively low price for jogging shoes—$20. If jogging shoes were selling for $20 (a price well below equilibrium), consumers would be willing and able to purchase a relatively high quantity—10,000 pairs. But as we learned earlier, producers are willing to supply only 2,000 pairs at that price, and so there will be a shortage, and

price will tend to rise. As the price of jogging shoes rises toward its equilibrium level, the quantity demanded is reduced—fewer consumers are willing and able to pay the higher price. By discouraging consumers from purchasing the product, the higher price of jogging shoes helps to bring the quantity demanded into line with the number of jogging shoes available; it *rations* jogging shoes. By the same token, at a price initially above equilibrium—for example, $80—the quantity demanded would be too low. But price will tend to decline, and the falling price will encourage consumers to purchase more of the product. Thus, higher prices ration by reducing the quantity demanded, and lower prices ration by increasing it.

But changing prices do more than reduce or increase the quantity demanded: they also motivate producers to expand or contract production. We know from the law of supply that more will be supplied at higher prices than at lower prices. Thus, when the price of jogging shoes increases from $20 to $60, the quantity of jogging shoes supplied will increase from 2,000 pairs to 6,000 pairs. At the same time, the quantity of jogging shoes is being rationed among consumers; the quantity demanded is declining from 10,000 pairs to 6,000 pairs. This is how the rationing and motivating functions of price work together to balance the desires of consumers and producers and prevent a shortage or surplus. Every consumer who values jogging shoes enough to pay $60 will have them, and every producer that is willing to supply jogging shoes at that price will be able to sell its entire output.

CHANGES IN THE EQUILIBRIUM PRICE

You have seen that in the absence of artificial restrictions, prices in competitive markets tend toward equilibrium. Once established, the equilibrium price will hold as long as the underlying demand and supply conditions remain unchanged. Of course, such conditions don't remain unchanged forever, often not even for a short time. Anything that causes a change in either demand or supply will bring about a new equilibrium price.

The Impact of a Change in Demand

Recall from earlier in this chapter that the determinants of demand are all the factors that underlie the demand schedule and determine the precise position of the demand curve. These include consumer tastes and preferences, consumer income, the prices of substitutes and complements, expectations regarding future prices, and the number of buyers in the market. Changes in any of these factors will cause a change in demand—a shift of the entire demand curve.

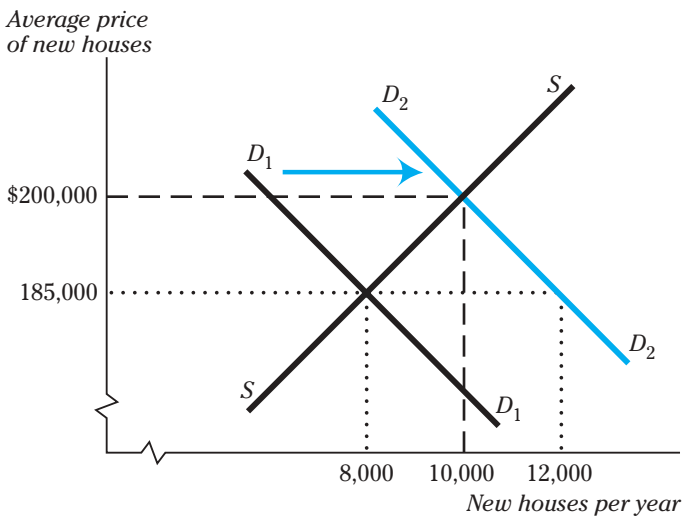
The housing market provides a good example. Increased demand for new houses in your city or town could result from any of several factors: heightened desire for single-family dwellings instead of apartments, an increase in residents' incomes, rent hikes in the area, expectations of higher housing prices in the near future, or a local population expansion. Any of these changes will cause the demand curve for new homes to shift to the right, as depicted in Exhibit 3.11.

You can see that 8,000 new houses are demanded and supplied at the initial equilibrium price of $185,000. However, as demand increases from D_1 to D_2, perhaps because of an increased number of buyers in the market, there is a shortage of 4,000 houses (12,000 minus 8,000) at the $185,000 price. This shortage will lead to competition among prospective home buyers, which in turn will push the average price upward toward the new equilibrium level of $200,000. The higher price will ration new houses by reducing the quantity demanded and will motivate builders to increase the quantity supplied from 8,000 to 10,000. Note here that the increase in demand (the shift of the entire demand curve) causes an increase in the *quantity* supplied (movement along the stationary supply curve). In other words, a *shift* in one curve causes movement *along* the other curve. Thus, an increase in demand leads to a higher equilibrium in both price ($200,000) and quantity (10,000 new homes per year).

Suppose that, instead of increasing, the demand for new houses falls. What impact would that change have on the equilibrium price and quantity?

EXHIBIT 3.11

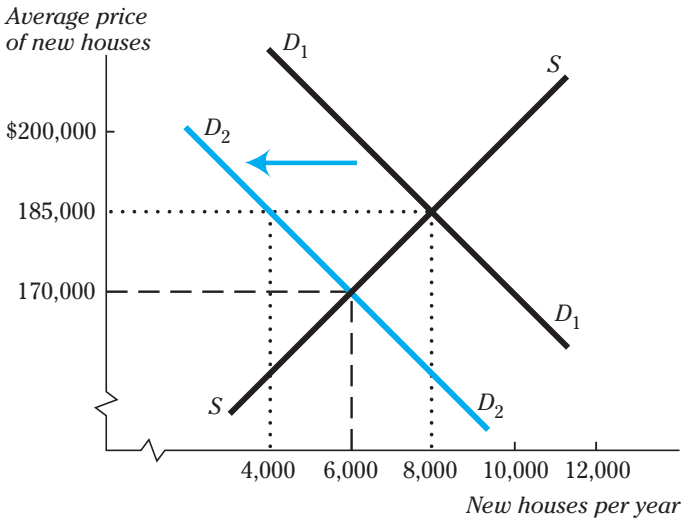
The Effect of an Increase in Demand on the Equilibrium Price



An increase in the demand for new houses will cause the equilibrium price of new homes to rise.

EXHIBIT 3.12

The Effect of a Decrease in Demand on the Equilibrium Price



A decrease in the demand for new houses will cause the equilibrium price of new homes to fall.

As shown in Exhibit 3.12, the demand curve would shift to the left, from D_1 to D_2. As demand declines, a surplus of houses develops at the old price of $185,000 (only 4,000 homes will be demanded, but 8,000 will be supplied). This surplus will lead to price cutting as builders compete for buyers and as customers shop around for the best buys. Once again, the price change performs two functions. The falling price convinces home buyers to purchase more than 4,000 homes per year, and it motivates builders to supply fewer than 8,000 homes. Price will continue to decline until the quantity of new houses demanded is exactly equal to the quantity supplied at that price. In our example the new equilibrium price is $170,000, and the new equilibrium quantity is 6,000 new homes per year.

The Impact of a Change in Supply

Price changes also can be initiated on the supply side. Recall the three determinants of supply: technology, prices of economic resources, and the number of suppliers in the market. Changes in any of these factors that underlie the supply schedule will cause a change in supply. In our example the supply of housing might be increased by any of the following: (1) the development of new construction methods that enable builders to produce more houses from a given amount of resources; (2) decreases in the cost of land, labor, or materials

used in home construction; (3) an increase in the number of builders, enabling the market to produce more houses than before at each possible price.

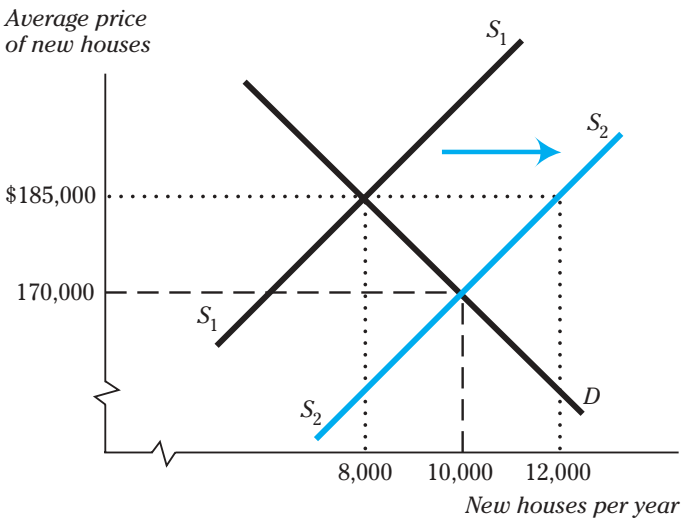
An increase in the supply of new houses is represented by shifting the supply curve to the right, as shown in Exhibit 3.13. When the supply of housing increases from S_1 to S_2, 12,000 new homes will be supplied at a price of $185,000, but only 8,000 will be demanded. As before, the surplus will lead to price cutting downward toward the new equilibrium level of $170,000. Note that here the increase in supply (the shift of the entire supply curve) causes an increase in the *quantity* demanded (movement along the stationary demand curve). As we saw earlier, a shift in one curve causes movement *along* the other. This is the process that results in the lower price and the higher equilibrium quantity. A *decrease* in the supply of housing would have the opposite effect; it would raise the equilibrium price and lower the equilibrium quantity.

The Impact of Simultaneous Changes in Demand and Supply

All the price changes we have explored so far have resulted from a single cause: either a change in demand while supply remained constant or a change in supply while demand remained constant. But in many real-world situations simultaneous changes occur in demand and supply. Let's consider two

EXHIBIT 3.13

Effect of an Increase in Supply on Equilibrium Price



An increase in the supply of new houses will cause the equilibrium price of new homes to fall.

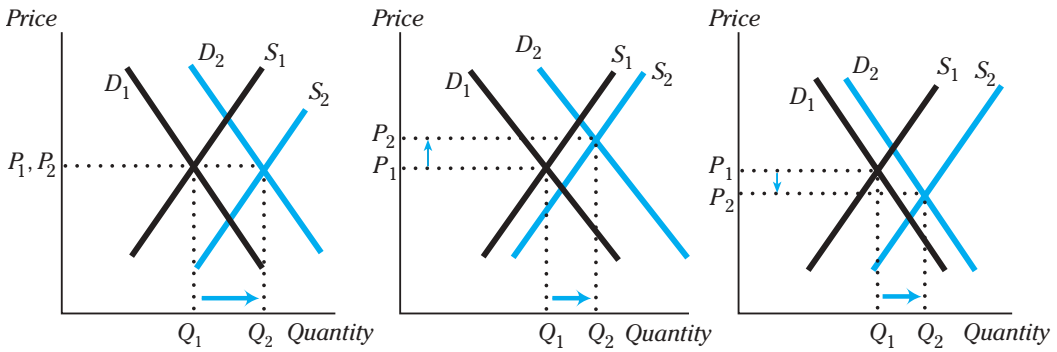
examples in the housing market. In the first case we find an area undergoing a population expansion (a source of increased demand for new houses) at the same time that building-material costs are rising (causing a decrease in supply). In the second case a period of high unemployment is causing the incomes of area residents to decline (less demand for new houses) while new production methods are reducing the cost of new-home construction (increased supply).

In these two examples the forces of demand and supply are pulling in opposite directions—the demand curve is shifting one way while the supply curve is shifting the other way. Under these conditions it is relatively easy to determine what will happen to the equilibrium price. In the first example demand increases while supply decreases, so that the equilibrium price tends to rise. In the second example demand decreases while supply increases, so that the equilibrium price tends to fall. Take a minute to draw the diagrams and convince yourself of these results.

Predicting the impact of simultaneous changes in demand and supply becomes a little trickier when both the demand curve and the supply curve are shifting in the same direction. As you can see from Exhibit 3.14, when demand and supply are both increasing, we can be certain that the equilibrium quantity will also increase. But the impact on the equilibrium price is uncertain; it depends on how much demand increases relative to supply. If demand and supply increase by the same amounts, the equilibrium price will not

EXHIBIT 3.14

Effect of Simultaneous Increases in Demand and Supply on Equilibrium Price



(a) Demand and supply increase by equal amounts; quantity increases but price does not change.

(b) Demand increases by more than supply; both price and quantity increase.

(c) Supply increases by more than demand; quantity increases, but price falls.

change. If demand increases more than supply, the equilibrium price will rise. If supply increases more than demand, the equilibrium price will fall. (If demand decreases and supply increases, the equilibrium price is certain to decrease. But in this instance, the impact on equilibrium quantity will be indeterminate. See if you can predict what will happen to the equilibrium quantity if demand and supply both decrease by the same amount, if demand decreases more than supply, and if supply decreases more than demand.)

In summary the price of a product can change because of a change in demand, a change in supply, or simultaneous changes in demand and supply. In all cases the basic principle is the same: whenever demand increases in relation to supply, the equilibrium price will rise; whenever supply increases relative to demand, the equilibrium price will fall. By keeping that principle in mind, we can predict what is going to happen to the price of cattle, wheat, or any other product whose price is determined in a competitive market. (The market for used cars is not as competitive as the market for cattle or wheat, but the supply and demand model can help us to understand that market as well. Read "The 'Bargain' Jaguar," on page 93, and see if you can explain why the prices of used luxury cars have been falling.)

ECONOMIC EFFICIENCY AND THE ROLE OF PRICES

The automatic response of price changes to changes in demand and supply conditions is an important feature of a market economy. As increasing consumer demand pushes the price of a product upward, the higher price rations some consumers out of the market and simultaneously motivates producers to expand their production of the product. Because these producers are receiving a higher price for their product, they will be able to outbid producers of less-valued items for the resources needed to expand production. In this way price changes help to ensure that businesses produce the goods and services that consumers value the most, in the quantities they desire.

Price changes also help ensure that each product is produced with as few of society's scarce resources as possible. As a particular resource becomes scarcer (because of increased demand or reduced supply), its price tends to rise. This higher cost encourages producers to economize on its use by substituting cheaper resources whenever possible. The end result is the efficient use of society's scarce resources: producers supply the most-wanted products in the least-costly way in terms of scarce resources. (Note that the fewer the resources an

USE YOUR ECONOMIC REASONING

The 'Bargain' Jaguar

By Karen Lundengaard

LOOKING FOR A luxury car bargain? Try the used car lot. For the past year, used car prices have been falling drastically. But until recently, the big drops were largely confined to mainstream cars, vans, and sport-utility vehicles. Now, the discounting is hitting used luxury cars.

A 2001 Saab 9–5 is currently selling for an average of $23,751, down 23% from a year earlier, according to Edmunds.com, which tracks used-car prices. While prices of particular model years always fall from year to year, that's a much bigger-than-normal drop.

It's a similar story for the more luxurious Jaguar XKR. A 2000 model of that car, with its hulking 390-horsepower 8 cylinder engine, has seen a 19% price drop in the past year. It now sells for about $49,500, Edmunds says. To put those deals in perspective, a new Saab 9–5 goes for around $35,000, while it would take about $82,000 to buy a new Jaguar XKR.

The big drops in used-car prices are being fueled by the huge barrage of rebates, financing deals, and subsidized leases in the new-car market. When manufacturers offer deals on new cars, that almost immediately begins undercutting the price of used cars as well. Since domestic cars have done the heaviest discounting, including plenty of 0% financing, domestic makers were hit first. . . .

Overall, the price of used luxury cars is falling faster than those of other used vehicles. The average price of a model-year 2000 luxury car fell 17% in March 2003 from a year earlier, compared with a 14.7% drop for the entire used-vehicle market. . . .

If you're interested in buying a used luxury car, the first step is checking Web sites such as Edmunds for the latest used-car pricing information. Prices change month by month for particular models, and it's important to have current information to make sure you're getting a good deal. . . .

Use Your Economic Reasoning

1. If new luxury cars are substitutes for used luxury cars, what impact would you expect new-car rebates to have on the demand for used luxury cars? How would you represent this change graphically?
2. New-car rebates also have an impact on the supply of used cars. Why? How would you graph this impact?
3. According to the article, the prices of used luxury cars have been falling. Is that the conclusion you reach by looking at your graphs? Will the equilibrium quantity of used luxury cars rise, fall, or be indeterminate?

Source: *Wall Street Journal*, April 22, 2003, p. D1.

economy needs to produce each product, the more goods and services it can produce with its limited resource stock. Thus, an economy that is operating efficiently is producing the goods and services that consumers value the most *and* producing as many of those goods and services as possible from the society's scarce resources.) The way competitive markets promote the efficient use of resources is explored in greater detail in Chapter 6. Later chapters examine how such factors as inadequate competition and the ability of firms to ignore the "cost" of the pollution they create can interfere with the ability of markets to achieve this optimal result.

SUMMARY

In a competitive market, prices are determined by the interaction of demand and supply. *Demand* is a schedule showing the quantities of a good or service that consumers are willing and able to purchase at various prices during some given time period, when all factors other than the product's price remain unchanged. Demand may be represented graphically in a *demand curve*, which slopes downward and to the right because the *law of demand* holds that consumers will purchase more of a product at a lower price than at a higher price. *Supply* is a schedule showing the quantities of a good or service that producers are willing and able to offer for sale at various prices during a given time period, when all factors other than the product's price remain unchanged. Supply may be represented graphically as a *supply curve*. The supply curve slopes upward and to the right because the *law of supply* states that price and quantity supplied are positively related; that is, a greater quantity will be supplied at higher prices than at lower prices.

The demand curve will shift to a new position if there is a change in any of the *determinants of demand:* consumer income, tastes and preferences, expectations regarding future prices, the prices of substitute and complementary goods, and the number of consumers in the market. By the same token, the supply curve will shift if there is a change in one or more of the *determinants of supply:* technology, the prices of resources, or the number of producers in the market.

Economists are careful to distinguish between a change in the quantity demanded and a change in demand. A change in the amount purchased as a result of a change in the price of the product while other factors are held constant is a *change in quantity demanded* and is represented by movement up or down a stationary demand curve. A change in any of the determinants of demand while price is held constant will cause consumers to purchase

more or less of a product at each possible price. This is described as a *change in demand* and is represented by a shift of the entire demand curve to the right (in the case of increased demand) or to the left (in the case of decreased demand).

A similar distinction is necessary on the supply side of the market. A *change in quantity supplied* results from a change in the price of the product and is represented graphically by a movement along a stationary supply curve. A *change in supply* results from a change in one of the determinants of supply and is represented by a shift of the entire supply curve to a new position.

The *equilibrium price* is the price that brings about an equality between the quantity demanded and the quantity supplied, which we call the *equilibrium quantity*. The equilibrium price can be identified by the intersection of the demand and supply curves. If the prevailing price is above equilibrium, a *surplus*—an excess of quantity supplied over quantity demanded—will occur, and sellers will be forced to reduce price to eliminate the surplus. If the prevailing price is below equilibrium, a *shortage*—an excess of quantity demanded over quantity supplied—occurs, and buyers will bid up the price as they compete for the product. Only when the existing price is at the equilibrium level will there be neither a shortage nor a surplus and no pressure for price to change.

Prices perform two important functions: They (1) *ration*, or divide, the limited amount of available output among possible buyers; and (2) *motivate* producers to supply the desired quantity. Higher prices ration by discouraging consumers from purchasing a product; they also motivate producers to increase the quantity supplied. Lower prices have the opposite effect. They encourage consumers to purchase more of the product and simultaneously motivate producers to reduce the quantity supplied. The equilibrium price succeeds in matching the quantity demanded with the quantity supplied because it balances the desires of consumers and producers. Every consumer who values the product enough to pay the equilibrium price will have it, and every producer willing to supply the product at that price will be able to sell its entire output.

In the absence of artificial restrictions, prices will rise and fall in response to changes in demand and supply. Whenever demand increases in relation to supply, the equilibrium price will tend to rise; whenever supply increases in relation to demand, the equilibrium price will fall. These price changes help to ensure that producers not only supply the goods and services consumers value the most but also use as few scarce resources as possible in the production of those goods and services.

KEY TERMS

Change in demand
Change in quantity demanded
Change in quantity supplied
Change in supply
Complement
Demand
Demand curve
Determinants of demand
Determinants of supply
Equilibrium price
Equilibrium quantity
Income effect
Inferior good
Law of demand
Law of supply
Motivating
Normal good
Rationing
Shortage
Substitute
Substitution effect
Supply
Supply curve
Surplus
Technology
Technological advance

STUDY QUESTIONS

Fill in the Blanks

1. If the entire demand curve shifts to a new position, we describe this as a change in _____ .
2. If a product is a normal good, an increase in income will cause the demand curve for the product to shift to the _____ .
3. Movement along a stationary supply curve due to a change in price is called a change in _____ .
4. The function of dividing up or allocating scarce items among those who desire to receive them is called _____ .
5. The price that exactly clears the market is called the _____ price.
6. Whenever the prevailing price is above equilibrium, a _____ will exist.
7. Prices perform two important functions: they ration scarce items among the consumers who desire to receive them; and they _____ producers to supply that quantity.
8. If supply rises and demand declines, we would expect the equilibrium price to _____ .
9. If supply increases more than demand, the equilibrium price will _____ .
10. If supply and demand both increase, we can be certain that the equilibrium (price/quantity) _____ will increase, but the impact on the equilibrium (price/quantity) _____ will be indeterminate.

Multiple Choice

1. If the price of automobiles increases and all other factors remain unchanged, it will be reasonable to expect
a) an increase in the demand for automobiles.
b) a decrease in the demand for automobiles.
c) an increase in the quantity of automobiles demanded.
d) a decrease in the quantity of automobiles demanded.

2. If the demand curve for Brock's Heavy Beer shifts to the left, this could be due to
a) an increase in the price of Brock's Heavy Beer.
b) an increase in consumer income.
c) an increase in the price of other beers.
d) a shift in tastes and preferences to light beers.

3. An increase in the price of apples is likely to cause
a) a decrease in the demand for apples.
b) an increase in the quantity demanded of apples.
c) an increase in the demand for other types of fruit.
d) an increase in the quantity demanded of other types of fruit.

4. If the price of black walnuts increases and other factors remain unchanged, it is reasonable to expect
a) a decrease in the demand for black walnuts.
b) an increase in the supply of black walnuts.
c) an increase in the quantity of black walnuts supplied.
d) a decrease in the demand for pecans and other walnut substitutes.

5. A new labor settlement that increases the cost of producing computers will probably cause
a) a decrease in supply of computers.
b) a reduction in the demand for computers.
c) a reduction in the quantity of computers supplied.
d) the supply curve of computers to shift to the right.

6. If grasshoppers destroy half of the wheat crop, the result will be
a) an increase in the demand for wheat.
b) a decrease in the demand for wheat.
c) a decrease in the quantity of wheat supplied.
d) a leftward shift of the supply curve for wheat.

7. If demand increases and supply declines,
a) the equilibrium price and quantity will both increase.
b) the equilibrium price will rise, but the quantity will fall.
c) the equilibrium price will fall, but the quantity will rise.
d) the equilibrium price and quantity will both fall.
e) the equilibrium price will rise; quantity will be indeterminate.

8. If the demand for used cars declines, the likely result will be
a) an increase in the supply of used cars.
b) a reduction in the equilibrium price of used cars.
c) an increase in the equilibrium price of used cars.
d) a temporary shortage of used cars at the old price.

9. If the price of cattle feed increases, the result will probably be
a) an increase in the supply of cattle and lower cattle prices.
b) a decrease in the supply of cattle and higher cattle prices.
c) an increase in the demand for cattle and higher cattle prices.
d) a decrease in the demand for cattle and lower cattle prices.

10. If a shortage exists, it indicates that the existing price is
a) the equilibrium price.
b) below the equilibrium price.
c) above the equilibrium price.

11. Consider the market for mobile homes. If personal incomes in the United States rise, we would expect to see
a) a decline in mobile home prices if mobile homes are a normal good.
b) an increase in the demand for mobile homes if mobile homes are an inferior good.
c) a decrease in mobile home prices if mobile homes are an inferior good.
d) a decrease in the demand for mobile homes if mobile homes are a normal good.

12. If the price of coffee increases, the probable result will be
a) a decrease in the demand for coffee.
b) a decrease in the price of substitutes for coffee.
c) an increase in the price of substitutes for coffee.
d) a decrease in the supply of coffee.

13. Which of the following statements is *incorrect*?
a) If demand increases and supply remains constant, the equilibrium price will rise.
b) If supply rises and demand remains constant, the equilibrium price will fall.
c) If demand rises and supply falls, the equilibrium price will rise.
d) If supply increases and demand decreases, the equilibrium price will rise.

14. If additional farmers enter the hog-producing industry, the result will be
a) lower prices but a higher equilibrium quantity.
b) higher prices but a lower equilibrium quantity.
c) lower prices but the same equilibrium quantity.
d) lower prices and a lower equilibrium quantity.

15. If the supply of cattle is increasing more rapidly than the demand,
a) cattle prices will rise.
b) cattle prices will fall.
c) cattle prices will not change.
d) each of the above is possible.

Problems and Questions for Discussion

1. My eldest daughter says that she really "needs" a new sweatshirt, but she won't use her allowance to buy it. ("I don't need it *that* badly.") How can a "need" evaporate like that? What is the difference between *need* and *demand*?

2. Podunk College experienced a substantial drop in enrollment last year. What possible explanations can you, as an economist, offer for what happened? Try to list all possibilities.

3. Why does the supply curve slope upward and to the right? In other words, why will producers supply a higher quantity at higher prices?

4. Which of the following events would cause movement along a stationary supply curve for wheat, and which would cause the supply curve to shift? Explain each situation from the producer's point of view.
a. The price of wheat declines.
b. The cost of fertilizer rises.
c. Wheat blight destroys half the wheat crop.
d. New combines make it possible for one person to do the work of three.

5. Explain the economic reasoning behind the following newspaper headlines:
a. "Weather Slows Fishing: Seafood Prices Double"
b. "Sugar: Crisis of Plenty"
c. "Bountiful Wheat Crop Is Hurting Crowers."

6. If the supply of oranges in a competitive market decreases as a result of severe weather, will there be a shortage of oranges? Why or why not? (Hint: Use graphs to help answer this question.)
7. Suppose that your local tennis courts are very crowded and your city is considering charging a fee to ration their use. Who would like to have a fee charged? Would only wealthy individuals feel this way? Why might someone be in favor of a fee?
8. People, including news reporters, often use the terms *supply* and *demand* incorrectly. For example, you will often read "Supply exceeds demand" or "Demand exceeds supply." What is wrong with these statements? What does the writer probably mean to say?
9. Why is it important that prices in a market economy be allowed to change in response to changing demand and supply conditions? What functions do these changing prices perform?
10. Assume that consumers are buying equal numbers of hamburgers and hot dogs when these products are selling at the same price. If the supply of hamburger declines, what will happen to the price of hamburgers? What about the price of hot dogs? Graph your conclusions.

ANSWER KEY

Fill in the Blanks

1. demand
2. right
3. quantity supplied
4. rationing
5. equilibrium
6. surplus
7. motivate
8. fall
9. fall
10. quantity, choice

Multiple Choice

1. d	4. c	7. e	10. b	13. d
2. d	5. a	8. b	11. c	14. a
3. c	6. d	9. b	12. c	15. b