

INCOME For most goods, an increase in income will lead to an increase in demand. That is, an increase in income will lead to a rightward shift in the position of the demand curve from, say, D_1 to D_2 in Figure 3-4 on the facing page. You can avoid confusion about shifts in curves by always relating a rise in demand to a rightward shift in the demand curve and a fall in demand to a leftward shift in the demand curve. Goods for which the demand rises when consumer income rises are called **normal goods**. Most goods, such as shoes, computers, and flash memory drives, are “normal goods.” For some goods, however, demand *falls* as income rises. These are called **inferior goods**. Beans might be an example. As households get richer, they tend to purchase fewer and fewer beans and purchase more and more fish. (The terms *normal* and *inferior* are merely part of the economist’s lexicon. No value judgments are associated with them.)

Remember, a shift to the left in the demand curve represents a decrease in demand, and a shift to the right represents an increase in demand.

How have recent declines in incomes for a large share of U.S. consumers affected the demand for used cell phones that specialty firms recondition and resell?

Normal goods

Goods for which demand rises as income rises. Most goods are normal goods.

Inferior goods

Goods for which demand falls as income rises.

EXAMPLE

Lower Incomes Boost the Demand for Reconditioned Cell Phones

The more than 15 percent of U.S. residents who either have been out of work or are classified by the government as discouraged workers who have given up looking for jobs. These people are earning much lower incomes than they did a few years ago. Many of these people are customers of companies such as ReCellular and Second Rotation, firms that obtain used cell phones from previous owners, recondition the devices, and resell them. Since the economy slipped into its dampened state, sales of reconditioned cell phones have increased by more than 150 percent. Thus, as incomes have fallen for a significant

percentage of U.S. consumers, the amount of reconditioned cell phones demanded has increased, indicating that reconditioned cell phones are an inferior good.

FOR CRITICAL THINKING

What is your prediction about the likely effect on the amount of reconditioned cell phones demanded if the U.S. economy were to rebound?

TASTES AND PREFERENCES A change in consumer tastes in favor of a good can shift its demand curve outward to the right. When Pokémon trading cards became the rage, the demand curve for them shifted outward to the right. When the rage died out, the demand curve shifted inward to the left. Fashions depend to a large extent on people’s tastes and preferences. Economists have little to say about the determination of tastes. That is, they don’t have any “good” theories of taste determination or why people buy one brand of product rather than others. (Advertisers, however, have various theories that they use to try to make consumers prefer their products over those of competitors.)

PRICES OF RELATED GOODS: SUBSTITUTES AND COMPLEMENTS Demand schedules are always drawn with the prices of all other commodities held constant. That is to say, when deriving a given demand curve, we assume that only the price of the good under study changes. For example, when we draw the demand curve for laptop computers, we assume that the price of tablet devices is held constant. When we draw the demand curve for home cinema speakers, we assume that the price of surround-sound amplifiers is held constant. When we refer to *related goods*, we are talking about goods for which demand is interdependent. If a change in the price of one good shifts the demand for another good, those two goods have interdependent demands.

There are two types of demand interdependencies: those in which goods are *substitutes* and those in which goods are *complements*. We can define and distinguish between substitutes and complements in terms of how the change in price of one commodity affects the demand for its related commodity.

- c. There is a dramatic increase in the price of secure digital cards that, like flash memory drives, can be used to store digital data.
- d. A booming economy increases the income of the typical buyer of flash memory drives.
- e. Consumers of flash memory drives anticipate that the price of this good will decline in the future.

3-5. Give an example of a complement and a substitute in consumption for each of the following items. (See pages 55–56.)

- a. Bacon
- b. Tennis racquets
- c. Coffee
- d. Automobiles

3-6. For each of the following shifts in the demand curve and associated price change of a complement or substitute item, explain whether the change in the price of the complement or substitute must have been an increase or a decrease. (See page 56.)

- a. A rise in the demand for a dashboard global-positioning-system device follows a change in the price of automobiles, which are complements.
- b. A fall in the demand for e-book readers follows a change in the price of e-books, which are complements.
- c. A rise in the demand for tablet devices follows a change in the price of ultrathin laptop computers, which are substitutes.
- d. A fall in the demand for physical books follows a change in the price of e-books, which are substitutes.

3-7. Identify which of the following would generate an increase in the market demand for tablet devices, which are a normal good. (See pages 54–57.)

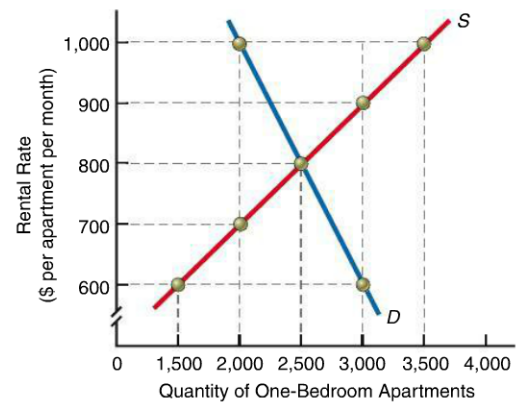
- a. A decrease in the incomes of consumers of tablet devices
- b. An increase in the price of ultrathin computers, which are substitutes
- c. An increase in the price of online apps, which are complements
- d. An increase in the number of consumers in the market for tablet devices

3-8. Identify which of the following would generate a decrease in the market demand for e-book readers, which are a normal good. (See pages 54–57.)

- a. An increase in the price of downloadable apps utilized to enhance the e-book reading experience, which are complements
- b. An increase in the number of consumers in the market for e-book readers

- c. A decrease in the price of tablet devices, which are substitutes
- d. A reduction in the incomes of consumers of e-book readers

3-9. Consider the following diagram of a market for one-bedroom rental apartments in a college community. (See pages 66–67.)



- a. At a rental rate of \$1,000 per month, is there an excess quantity supplied, or is there an excess quantity demanded? What is the amount of the excess quantity supplied or demanded?
- b. If the present rental rate of one-bedroom apartments is \$1,000 per month, through what mechanism will the rental rate adjust to the equilibrium rental rate of \$800?
- c. At a rental rate of \$600 per month, is there an excess quantity supplied, or is there an excess quantity demanded? What is the amount of the excess quantity supplied or demanded?
- d. If the present rental rate of one-bedroom apartments is \$600 per month, through what mechanism will the rental rate adjust to the equilibrium rental rate of \$800?

3-10. Consider the market for paperbound economics textbooks. Explain whether the following events would cause an increase or a decrease in supply or an increase or a decrease in the quantity supplied. (See page 64.)

- a. The market price of paper increases.
- b. The market price of economics textbooks increases.
- c. The number of publishers of economics textbooks increases.
- d. Publishers expect that the market price of economics textbooks will increase next month.

- 4-2. Advances in research and development in the pharmaceutical industry have enabled manufacturers to identify potential cures more quickly and therefore at lower cost. At the same time, the aging of our society has increased the demand for new drugs. Construct a supply and demand diagram of the market for pharmaceutical drugs. Illustrate the impacts of these developments, and evaluate the effects on the market price and the equilibrium quantity. (See page 78.)
- 4-3. There are simultaneous changes in the demand for and supply of global-positioning-system (GPS) devices, with the consequences being an unambiguous increase in the market clearing price of these devices but no change in the equilibrium quantity. What changes in the demand for and supply of GPS devices could have generated these outcomes? Explain. (See pages 78–79.)
- 4-4. There are simultaneous changes in the demand for and supply of tablet devices, with the consequences being an unambiguous decrease in the equilibrium quantity of these devices but no change in the market clearing price. What changes in the demand for and supply of tablet devices could have generated these outcomes? Explain. (See pages 78–79.)
- 4-5. The following table depicts the quantity demanded and quantity supplied of studio apartments in a small college town.

Monthly Rent	Quantity Demanded	Quantity Supplied
\$600	3,000	1,600
\$650	2,500	1,800
\$700	2,000	2,000
\$750	1,500	2,200
\$800	1,000	2,400

What are the market price and equilibrium quantity of apartments in this town? If this town imposes a rent control of \$650 per month, how many studio apartments will be rented? (See pages 83–84.)

- 4-6. Suppose that the government places a ceiling on the price of a medical drug below the equilibrium price. (See page 82.)
- Show why there is a shortage of the medical drug at the new ceiling price.
 - Suppose that a black market for the medical drug arises, with pharmaceutical firms secretly selling the drug at higher prices. Illustrate the black market for this medical drug, including the implicit supply schedule, the ceiling price, the black market supply and demand, and the highest feasible black market price.

- 4-7. The table below illustrates the demand and supply schedules for seats on air flights between two cities:

Price	Quantity Demanded	Quantity Supplied
\$200	2,000	1,200
\$300	1,800	1,400
\$400	1,600	1,600
\$500	1,400	1,800
\$600	1,200	2,000

What are the market price and equilibrium quantity in this market? Now suppose that federal authorities limit the number of flights between the two cities to ensure that no more than 1,200 passengers can be flown. Evaluate the effects of this quota if price adjusts. (Hint: What price per flight are the 1,200 passengers willing to pay? See page 89.)

- 4-8. The consequences of decriminalizing illegal drugs have long been debated. Some claim that legalization will lower the price of these drugs and reduce related crime and that more people will use these drugs. Suppose that some of these drugs are legalized so that anyone may sell them and use them. Now consider the two claims—that price will fall and quantity demanded will increase. Based on positive economic analysis, are these claims sound? (See page 89.)
- 4-9. In recent years, the government of Pakistan has established a support price for wheat of about \$0.20 per kilogram of wheat. At this price, consumers are willing to purchase 10 billion kilograms of wheat per year, while Pakistani farmers are willing to grow and harvest 18 billion kilograms of wheat per year. The government purchases and stores all surplus wheat. (See page 85.)
- What are annual consumer expenditures on the Pakistani wheat crop?
 - What are annual government expenditures on the Pakistani wheat crop?
 - How much, in total, do Pakistani wheat farmers receive for the wheat they produce?
- 4-10. Consider the information in Problem 4-9 and your answers to that question. Suppose that the market clearing price of Pakistani wheat in the absence of price supports is equal to \$0.10 per kilogram. At this price, the quantity of wheat demanded is 12 billion kilograms. Under the government wheat price-support program, how much more is spent each year on wheat harvested in Pakistan than otherwise would have been spent in an unregulated market for Pakistani wheat? (See page 85.)

YOU ARE THERE

To contemplate how a widening spread between the price of an item and the price of another good that is a close substitute can affect the industry producing the item, take a look at **Why the Casket Industry Is on Life Support**, on page 69.

Substitutes

Two goods are substitutes when a change in the price of one causes a shift in demand for the other in the same direction as the price change.

Butter and margarine are **substitutes**. Either can be consumed to satisfy the same basic want. Let's assume that both products originally cost \$2 per pound. If the price of butter remains the same and the price of margarine falls from \$2 per pound to \$1 per pound, people will buy more margarine and less butter. The demand curve for butter shifts inward to the left. If, conversely, the price of margarine rises from \$2 per pound to \$3 per pound, people will buy more butter and less margarine. The demand curve for butter shifts outward to the right. In other words, an increase in the price of margarine will lead to an increase in the demand for butter, and an increase in the price of butter will lead to an increase in the demand for margarine. For substitutes, a change in the price of a substitute will cause a change in demand *in the same direction*.

How has the availability of lower-priced plastic substitutes affected the market demand for natural cork stoppers for wine bottles?

EXAMPLE

Why Fewer Wine Bottles Have Natural Cork Stoppers

In the late 1600s, a French monk discovered that natural cork bottle stoppers seal wine into a bottle while allowing the wine to indirectly "breathe" air via the porous characteristics of natural cork's cell structure. Nevertheless, many of today's wine sellers utilize plastic stoppers. These plastic stoppers add to the overall price of a bottle of wine an amount ranging from \$0.02 for screw-on stoppers to \$0.20 for stoppers composed of extruded plastic that replicates the sponginess of natural cork.

Since the early 2000s, prices of natural cork stoppers have risen above those of plastic stoppers, to levels from about \$0.03 for low-quality stoppers to as much as \$2 for stoppers of the highest quality. Wine

consumers have responded to higher prices of wines bottled with natural cork stoppers by substituting in favor of wines bottled with plastic stoppers. During the past decade, purchases of wine bottled with plastic stoppers have increased by more than 50 percent.

FOR CRITICAL THINKING

Natural cork producers advertise that plastic stoppers harm the environment. If such ads shift the preferences of wine producers and consumers back in favor of natural cork stoppers, what will happen to the market demand for plastic stoppers?

Complements

Two goods are complements when a change in the price of one causes an opposite shift in the demand for the other.

For **complements**, goods typically consumed together, the situation is reversed. Consider digital devices and online applications (apps). We draw the demand curve for apps with the price of digital devices held constant. If the price per constant-quality unit of digital devices decreases from, say, \$500 to \$300, that will encourage more people to purchase apps. They will now buy more apps, at any given app price, than before. The demand curve for apps will shift outward to the right. If, by contrast, the price of digital devices increases from \$250 to \$450, fewer people will purchase downloadable applications. The demand curve for apps will shift inward to the left.

To summarize, a decrease in the price of digital devices leads to an increase in the demand for apps. An increase in the price of digital devices leads to a decrease in the demand for apps. Thus, for complements, a change in the price of a product will cause a change in demand *in the opposite direction* for the other good.

EXPECTATIONS Consumers' expectations regarding future prices and future incomes will prompt them to buy more or less of a particular good without a change in its current money price. For example, consumers getting wind of a scheduled 100 percent increase in the price of magneto optical disks next month will buy more of them today at today's prices. Today's demand curve for MO disks will shift from D_1 to D_2 in Figure 3-4 on page 54. The opposite would occur if a decrease in the price of MO disks was scheduled for next month (from D_1 to D_3).

Expectations of a rise in income may cause consumers to want to purchase more of everything today at today's prices. Again, such a change in expectations of higher future income will cause a shift in the demand curve from D_1 to D_2 in Figure 3-4.

Finally, expectations that goods will not be available at any price will induce consumers to stock up now, increasing current demand.

Price floor

A legal minimum price below which a good or service may not be sold. Legal minimum wages are an example.

YOU ARE THERE

To learn about how government controls of prices of life-saving medications are creating situations in which quantities demanded exceed quantities supplied year after year, read **Explaining the "Crisis" of Persistent Drug Shortages** on page 89.

Nonprice rationing devices

All methods used to ration scarce goods that are price-controlled. Whenever the price system is not allowed to work, nonprice rationing devices will evolve to ration the affected goods and services.

Black market

A market in which goods are traded at prices above their legal maximum prices or in which illegal goods are sold.

applied to product prices, wages, rents, and interest rates. Occasionally, a government will set a **price floor**—a minimum price below which a good or service may not be sold. Price floors have most often been applied to wages and agricultural products. Let's first consider price ceilings.

Price Ceilings and Black Markets

As long as a price ceiling is below the market clearing price, imposing a price ceiling creates a shortage, as can be seen in Figure 4-3 below. At any price below the market clearing, or equilibrium, price of \$1,000, there will always be a larger quantity demanded than quantity supplied—a shortage, as you will recall from Chapter 3. Normally, whenever quantity demanded exceeds quantity supplied—that is, when a shortage exists—there is a tendency for the price to rise to its equilibrium level. But with a price ceiling, this tendency cannot be fully realized because everyone is forbidden to trade at the equilibrium price.

The result is fewer exchanges and **nonprice rationing devices**. Figure 4-3 shows the situation for portable electric generators after a natural disaster: The equilibrium quantity of portable generators demanded and supplied (or traded) would be 10,000 units, and the market clearing price would be \$1,000 per generator. But, if the government essentially imposes a price ceiling by requiring the price of portable generators to remain at the predisaster level, which the government determines was a price of \$600, the equilibrium quantity offered is only 5,000.

Because frustrated consumers will be able to purchase only 5,000 units, there is a shortage. The most obvious nonprice rationing device to help clear the market is queuing, or physical lines, which we have already discussed. To avoid physical lines, waiting lists may be established.

Typically, an effective price ceiling leads to a **black market**. A black market is a market in which the price-controlled good is sold at an illegally high price through various methods. For example, if the price of gasoline is controlled at lower than the market clearing price, drivers who wish to fill up their cars may offer the gas station attendant a cash payment on the side (as happened in the United States in the 1970s and in China and India in the mid-2000s during price controls on gasoline). If the price of beef is controlled at below its market clearing price, a customer who offers the butcher tickets for good seats to an upcoming football game may be allocated otherwise

FIGURE 4-3**Black Markets for Portable Electric Generators**

The demand curve is D . The supply curve is S . The equilibrium price is \$1,000. The government, however, steps in and imposes a maximum price of \$600. At that lower price, the quantity demanded will be 15,000, but the quantity supplied will be only 5,000. There is a "shortage." The implicit price (including time costs) tends to increase to \$1,400. If black markets arise, as they generally will, the equilibrium black market price will end up somewhere between \$600 and \$1,400. The actual quantity transacted will be between 5,000 and 10,000.

