

Demand, Supply, and Market Equilibrium

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The National Football League posted attendance of roughly 74,000 for Super Bowl XLIV in Miami. Just weeks before the game, however, tickets were selling on secondary ticket exchange sites such as StubHub and TicketMaster for anywhere from \$1,200 to \$3,500—well above face value. What does this tell us about the prices that fans are willing to pay and the number of tickets they are willing to buy? Why does the NFL set its ticket prices so low? Do scalpers “rip off” innocent buyers? A further look at supply and demand will help us answer these and many other questions.

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According to Thomas Carlyle, a nineteenth-century philosopher, “Teach a parrot the term ‘supply and demand’ and you’ve got an economist.”

Unfortunately, economics is more complicated than that. However, if Carlyle was hinting at the importance of supply and demand, he was right on target. Supply and demand is without a doubt the most powerful tool in the economist’s toolbox. It can help explain much of what goes on in the world and help predict what will happen tomorrow. In this chapter, we will learn about the law of demand and the law of supply and the factors that can change supply and demand.

We then bring market supply and market demand together to determine equilibrium price and quantity. We also learn how markets with many buyers and sellers adjust to temporary shortages and surpluses.



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Do markets have to be physical places?

market

the process of buyers and sellers exchanging goods and services

Markets

4.1

What is a market?

Why is it so difficult to define a market?

Defining a Market

Although we usually think of a market as a place where some sort of exchange occurs, a market is not really a place at all. A **market** is the process of buyers and sellers exchanging goods and services. Supermarkets, the New York Stock Exchange, drug stores, roadside stands, garage sales, Internet stores, and restaurants are all markets.

Every market is different. That is, the conditions under which the exchange between buyers and sellers takes place can vary. These differences make it difficult to precisely define a market. After all, an incredible variety of exchange arrangements exist in the real world—organized securities markets, wholesale auction markets, foreign exchange markets, real estate markets, labor markets, and so forth.

Goods being priced and traded in various ways at various locations by various kinds of buyers and sellers further compound the problem of defining a market. For some goods, such as housing, markets are numerous but limited to a geographic area. Homes in Santa Barbara, California, for example (about 100 miles from downtown Los Angeles), do not compete directly with homes in Los Angeles. Why? Because people who work in Los Angeles will generally look for homes within commuting distance. Even within cities, separate markets for homes are differentiated by amenities such as more living space, newer construction, larger lots, and better schools.

In a similar manner, markets are numerous but geographically limited for a good such as cement. Because transportation costs are so high relative to the selling price, the good is not shipped any substantial distance, and buyers are usually in contact only with local producers. Price and output are thus determined in a number of small markets. In other markets, such as those for gold or automobiles, markets are global. The important point is not what a market looks like, but what it does—it facilitates trade.



REUTERS/PETER FOLEY/LANDOV

The stock market involves many buyers and sellers; and profit statements and stock prices are readily available. New information is quickly understood by buyers and sellers and is incorporated into the price of the stock. When people expect a company to do better in the future, the price of the stock rises; when people expect the company to do poorly in the future, the price of the stock falls.

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Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives. Understanding the role of prices as signals and incentives helps people anticipate market opportunities and make better choices as producers and consumers.

Buyers and Sellers

The roles of buyers and sellers in markets are important. Buyers, as a group, determine the demand side of the market. Buyers include the consumers who purchase the goods and



AP PHOTO/PAUL SAKUMA

eBay is an Internet auction company that brings together millions of buyers and sellers from all over the world. The gains from these mutually beneficial exchanges are large. Craigslist also uses the power of the Internet to connect many buyers and sellers in local markets.

competitive market

a market where the many buyers and sellers have little market power—each buyer's or seller's effect on market price is negligible

of supply and demand is very good at predicting changes in prices and quantities in many markets large and small.

services and the firms that buy inputs—labor, capital, and raw materials. Sellers, as a group, determine the supply side of the market. Sellers include the firms that produce and sell goods and services and the resource owners who sell their inputs to firms—workers who “sell” their labor and resource owners who sell raw materials and capital. The interaction of buyers and sellers determines market prices and outputs—through the forces of supply and demand.

In the next few chapters, we focus on how supply and demand work in a **competitive market**. A competitive market is one in which a number of buyers and sellers are offering similar products, and no single buyer or seller can influence the market price. That is, buyers and sellers have little market power. Because many markets contain a high degree of competitiveness, the lessons of supply and demand can be applied to many different types of problems.

The supply and demand model is particularly useful in markets like agriculture, finance, labor, construction, services, wholesale, and retail.

In short, a model is only as good as it explains and predicts. The model

SECTION QUIZ

- Which of the following is a market?
 - a garage sale
 - a restaurant
 - the New York Stock Exchange
 - an eBay auction
 - all of the above
- In a competitive market,
 - there are a number of buyers and sellers.
 - no single buyer or seller can appreciably affect the market price.
 - sellers offer similar products.
 - all of the above are true.
- Which of the following is true?
 - Differences in the conditions under which the exchange between buyers and sellers occurs make it difficult to precisely define a market.
 - All markets are effectively global in scope.
 - All markets are effectively local in scope.
 - Both (a) and (b) are true.
- Buyers determine the _____ side of the market; sellers determine the _____ side of the market.
 - demand; demand
 - demand; supply
 - supply; demand
 - supply; supply

(continued)

SECTION QUIZ (Cont.)



5. When transportation costs are high relative to a good's selling price,
 - a. markets tend to be more local.
 - b. markets tend to be more global.
 - c. markets do not exist.
 - d. it makes no difference in how local or global markets are.
-
1. Why is it difficult to define a market precisely?
 2. Why do you get your produce at a supermarket rather than directly from farmers?
 3. Why do the prices people pay for similar items at garage sales vary more than for similar items in a department store?

Answers: 1. e 2. d 3. a 4. b 5. a.

Demand

4.2

What is the law of demand?

What is an individual demand curve?

What is a market demand curve?

The Law of Demand

Sometimes observed behavior is so pervasive it is called a law—the law of demand, for example. According to the **law of demand**, the quantity of a good or service demanded varies inversely (negatively) with its price, *ceteris paribus*. More directly, the law of demand says that, other things being equal, when the price (P) of a good or service falls, the quantity demanded (Q_D) increases. Conversely, if the price of a good or service rises, the quantity demanded decreases.

$$P \uparrow \Rightarrow Q_D \downarrow \text{ and } P \downarrow \Rightarrow Q_D \uparrow$$

Why Is There a Negative Relationship between Price and the Quantity Demanded?

The law of demand describes a negative (inverse) relationship between price and quantity demanded. When price goes up, the quantity demanded goes down, and vice versa. But why is this so? There are several reasons. Observed behavior tells us that consumers will buy more goods and services at lower prices than at higher prices. Businesses would not put items on sale if they did not think they could sell more at lower prices—that is, at a lower price, there is a greater quantity demanded.

Another reason for the negative relationship is what economists call **diminishing marginal utility**. In a given time period, a buyer will receive less satisfaction from each successive unit of a good consumed. For example, a second ice cream cone will yield less satisfaction than the first, a third will yield less satisfaction than the second, and so on.

ECS

economic content standards

Higher prices for a good or service provide the incentives for buyers to purchase less. Lower prices for goods or services provide incentives to purchase more of the good or service.

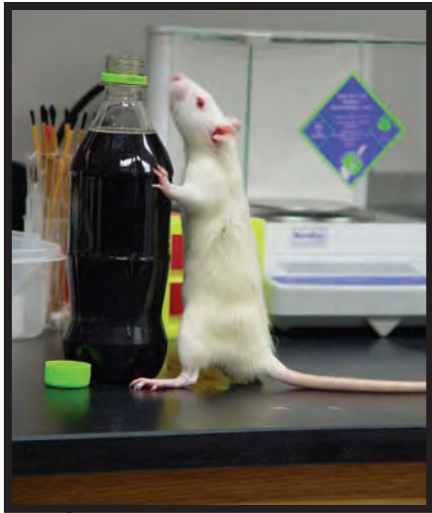
law of demand

the quantity of a good or service demanded varies inversely (negatively) with its price, *ceteris paribus*

diminishing marginal utility

the concept that in a given time period, an individual will receive less satisfaction from each successive unit of a good consumed

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Economists conducted an experiment with rats to see how they would respond to changing prices of different drinks (changing the number of times a rat had to press a bar). Rats responded by choosing more of the beverage with a lower price, showing they were willing to substitute when the price changed. That is, even rats seem to behave rationally—responding to incentives and opportunities to make themselves better off.

individual demand schedule
a schedule that shows the relationship between price and quantity demanded

individual demand curve
a graphical representation that shows the inverse relationship between price and quantity demanded

It follows from diminishing marginal utility that if people derive decreasing amounts of satisfaction from successive units, consumers will buy additional units only if the price is reduced.

Finally, there are the substitution and income effects of a price change. For example, if the price of pizza increases, the quantity of pizza demanded will fall because some consumers might switch from of pizza to hamburgers, tacos, burritos, submarine sandwiches or other foods that substitute for pizza. This is called the substitution effect of a price change. In addition, an increase in the price of pizza will reduce the quantity of pizza demanded because it reduces a buyer’s purchasing power. Purchasing power is the quantity of goods a consumer can buy with a fixed income. So when the price of pizza rises, the decreased purchasing power of the consumer’s income will usually lead the consumer to buy less pizza. Alternatively, when the price of a pizza falls, the increased purchasing power of the consumer’s income will usually lead the consumer to buy a greater quantity of pizza. This is called the income effect of a price change.

Individual Demand

An Individual Demand Schedule

The **individual demand schedule** shows the relationship between the price of the good and the quantity demanded. For example, suppose Elizabeth enjoys drinking coffee. How many pounds of coffee would Elizabeth be willing and able to buy at various prices during the year? At a price of \$3 a pound, Elizabeth buys 15 pounds of coffee over the course of a year. If the price is higher, at \$4 per pound, she might buy only 10 pounds; if it is lower, say \$1 per pound, she might buy 25 pounds of coffee during the year. Elizabeth’s demand for coffee for the year is summarized in the demand schedule in Exhibit 1. Elizabeth might not be consciously aware of the amounts that she would purchase at prices other than the prevailing one, but that does not alter the fact that she has a schedule in the sense that she would have bought various other amounts had other prices prevailed. It must be emphasized that the schedule is a list of alternative possibilities. At any one time, only one of the prices will prevail, and thus a certain quantity will be purchased.

An Individual Demand Curve

By plotting the different prices and corresponding quantities demanded in Elizabeth’s demand schedule in Exhibit 1 and then connecting them, we can create the **individual demand curve** for Elizabeth shown in Exhibit 2. From the curve, we can see that when the price is higher, the quantity demanded is lower, and when the price is lower, the quantity demanded is higher. The demand curve shows how the quantity of the good demanded changes as its price varies.

What Is a Market Demand Curve?

Although we introduced the concept of the demand curve in terms of the individual, economists usually speak of the demand curve in terms of large groups of people—a whole nation, a community, or a trading area. That is, to analyze how the market works, we will need to use market demand. As you know, every individual has his or her demand curve

section 4.2
exhibit 1 Elizabeth’s Demand Schedule for Coffee

Price of Coffee (per pound)	Quantity of Coffee Demanded (pounds per year)
\$5	5
4	10
3	15
2	20
1	25

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for every product. The horizontal summation of the demand curves of many individuals is called the **market demand curve**.

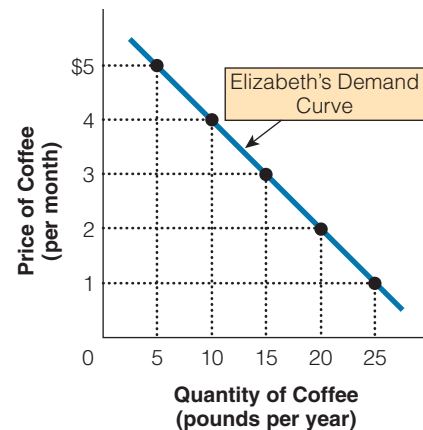
Suppose the consumer group is composed of Peter, Lois, and the rest of their small community, Quahog, and that the product is still coffee. The effect of price on the quantity of coffee demanded by Lois, Peter, and the rest of Quahog is given in the demand schedule and demand curves shown in Exhibit 3. At \$4 per pound, Peter would be willing and able to buy 20 pounds of coffee per year, Lois would be willing and able to buy 10 pounds, and the rest of Quahog would be willing and able to buy 2,970 pounds. At \$3 per pound, Peter would be willing and able to buy 25 pounds of coffee per year, Lois would be willing and able to buy 15 pounds, and the rest of Quahog would be willing and able to buy 4,960 pounds. The market demand curve is simply the (horizontal) sum of the quantities Peter, Lois, and the rest of Quahog demand at each price. That is, at \$4, the quantity demanded in the market would be 3,000 pounds of coffee ($20 + 10 + 2,970 = 3,000$), and at \$3, the quantity demanded in the market would be 5,000 pounds of coffee ($25 + 15 + 4,960 = 5,000$).

In Exhibit 4, we offer a more complete set of prices and quantities from the market demand for coffee during the year. Remember, the market demand curve shows the amounts that all the buyers in the market would be willing and able to buy at various prices. For example, when the price of coffee is \$2 per pound, consumers in the market collectively would be willing and able to buy 8,000 pounds per year. At \$1 per pound, the amount collectively demanded would be 12,000 pounds per year. The market demand curve is the negative (inverse) relationship between price and the total quantity demanded, while holding all other factors that affect how much consumers are able and willing to pay constant, *ceteris paribus*. For the most part, we are interested in how the market works, so we will primarily use market demand curves.

market demand curve
the horizontal summation of individual demand curves

section 4.2
exhibit 2

Elizabeth's Demand Curve for Coffee



The dots represent various quantities of coffee that Elizabeth would be willing and able to buy at different prices in a given period. The demand curve shows how the quantity demanded varies inversely with the price of the good when we hold everything else constant—*ceteris paribus*. Because of this inverse relationship between price and quantity demanded, the demand curve is downward sloping.

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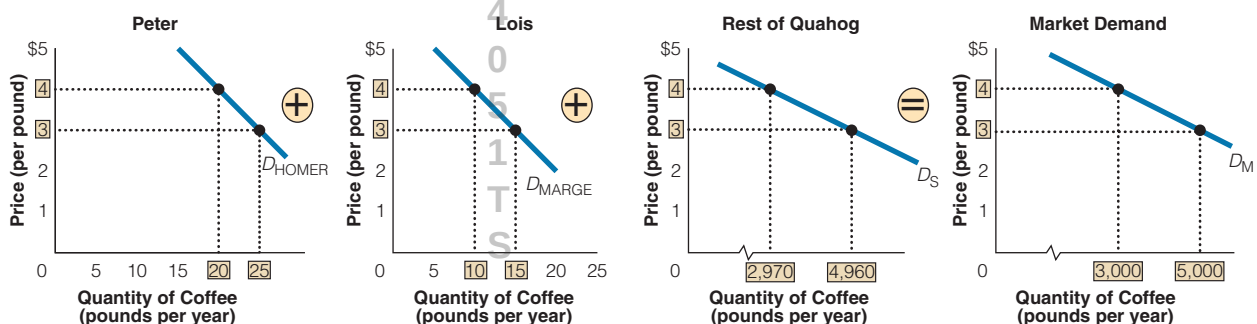
section 4.2
exhibit 3

Creating a Market Demand Curve

a. Creating a Market Demand Schedule for Coffee

Quantity of Coffee Demanded (pounds per year)						
Price (per pound)	Peter	+	Lois	+	Rest of Quahog	= Market Demand
\$4	20	+	10	+	2,970	= 3,000
\$3	25	+	15	+	4,960	= 5,000

b. Creating a Market Demand Curve for Coffee



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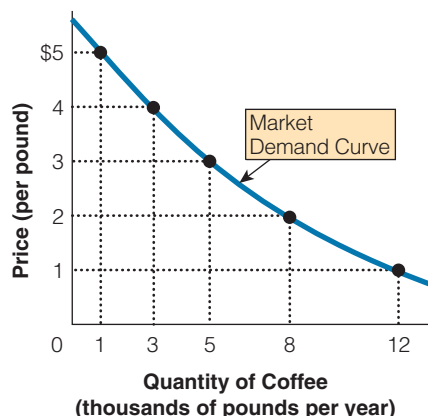
section 4.2
exhibit 4

A Market Demand Curve

a. Market Demand Schedule for Coffee

Price (per pound)	Quantity Demanded (pounds per year)
\$5	1,000
4	3,000
3	5,000
2	8,000
1	12,000

b. Market Demand Curve for Coffee



The market demand curve shows the amounts that all the buyers in the market would be willing and able to buy at various prices. We find the market demand curve by adding horizontally the individual demand curves. For example, when the price of coffee is \$2 per pound, consumers in the market collectively would be willing and able to buy 8,000 pounds per year. At \$1 per pound, the amount collectively demanded would be 12,000 pounds per year.

SECTION QUIZ

- If the demand for milk is downward sloping, then an increase in the price of milk will result in a(n)
 - increase in the demand for milk.
 - decrease in the demand for milk.
 - increase in the quantity of milk demanded.
 - decrease in the quantity of milk demanded.
 - decrease in the supply of milk.
- Which of the following is true?
 - The law of demand states that when the price of a good falls (rises), the quantity demanded rises (falls), *ceteris paribus*.
 - An individual demand curve is a graphical representation of the relationship between the price and the quantity demanded.
 - The market demand curve shows the amount of a good that all buyers in the market would be willing and able to buy at various prices.
 - All of the above are true.
- Which of the following is true?
 - The relationship between price and quantity demanded is inverse or negative.
 - The market demand curve is the vertical summation of individual demand curves.
 - A change in a good's price causes a movement along its demand curve.
 - All of the above are true.
 - Answers (a) and (c) are true.

(continued)

SECTION QUIZ (Cont.)



1. What is an inverse relationship?
2. How do lower prices change buyers' incentives?
3. How do higher prices change buyers' incentives?
4. What is an individual demand schedule?
5. What is the difference between an individual demand curve and a market demand curve?
6. Why does the amount of dating on campus tend to decline just before and during final exams?

Answers: 1. d 2. d 3. e.

Shifts in the Demand Curve

4.3

- What is the difference between a change in demand and a change in quantity demanded?
- What are the determinants of demand?
- What are substitutes and complements?
- What are normal and inferior goods?
- How does the number of buyers affect the demand curve?
- How do changes in taste affect the demand curve?
- How do changing expectations affect the demand curve?

A Change in Demand versus a Change in Quantity Demanded

Understanding the relationship between price and quantity demanded is so important that economists make a clear distinction between it and the various other factors that can influence consumer behavior. A change in a good's own price is said to lead to a **change in quantity demanded**. That is, it "moves you along" a given demand curve. The demand curve is the answer to the question: "What happens to the quantity demanded when the price of the good changes?" The demand curve is drawn under the assumption that all other things are held constant, except the price of the good. However, economists know that price is not the only thing that affects the quantity of a good that people buy. The other variables that influence the demand curve are called *determinants of demand*, and a change in these other factors *shifts the entire demand curve*. These determinants of demand are called demand shifters and they lead to **shifts in the demand curve**.

change in quantity demanded

a change in a good's own price leads to a change in quantity demanded, a movement along a given demand curve

shifts in the demand curve

A change in one of the variables, other than the price of the good itself, that affects the willingness of consumers to buy.

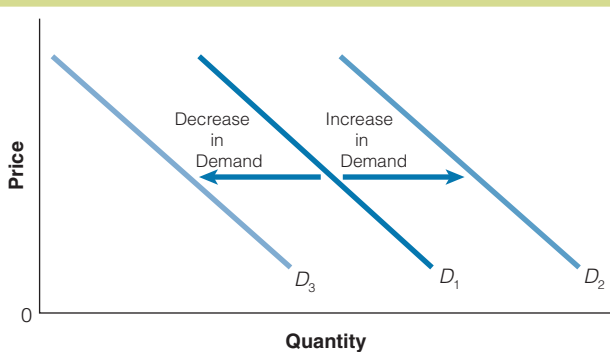
Shifts in Demand ("PYNTE")

As illustrated in Exhibit 1, any event that increases the quantity demanded at every price shifts the demand curve to the right. Any event that decreases the quantity demanded at every price, shifts the demand curve to the left.

There are a number of variables that can shift the demand curve but here are some of the most important. It might be helpful to remember the old English spelling of the word pint—PYNTE. This acronym can help you remember the five principle factors that shift the demand curve for a good or service.

section 4.3
exhibit 1

Demand Shifts



An increase in demand shifts the demand curve to the right, leading to an increase in quantity demanded at any given price. A decrease in demand shifts the demand curve to the left, leading to a decrease in quantity demanded at any given price.

- Changes in the Prices of Related Goods and Services (P)
- Changes in Income (Y)
- Changes in the Number of Buyers (N)
- Changes in Tastes (T)
- Changes in Expectations (E)

Changes in the Prices of Related Goods and Services (P)

In deciding how much of a good or service to buy, consumers are influenced by the price of that good or service, a relationship summarized in the law of demand. However, sometimes consumers are also influenced by the prices of *related* goods and services—substitutes and complements.

Substitutes

Substitutes are generally goods for which one could be used in place of the other. To many, substitutes would include

muffins and bagels, Crest and Colgate toothpaste, domestic and foreign cars, movie tickets and video rentals, jackets and sweaters, Exxon and Shell gasoline, and Nikes and Reeboks.

Two goods are **substitutes** if an increase (a decrease) in the price of one good makes consumers more (less) willing to buy another good. So two goods are substitutes if an increase (decrease) in the price of one good causes the demand curve for another good to shift to the right (left).

Complements

However, there are times when the price of a good may fall (rise), and it makes consumers more (less) willing to buy another good. If this relationship holds, the pair are complement goods. Complements are goods that “go together,” often consumed and used simultaneously, such as skis and bindings, peanut butter and jelly, hot dogs and buns, digital music players and downloadable music, and printers and ink cartridges. For example, if the price of motorcycles falls, the quantity of motorcycles demanded will rise—a movement down along the demand curve for motorcycles. As more people buy motorcycles, they will demand more motorcycle helmets—the demand curve for motorcycle helmets shifts to the right. In short,



Does a movement along the demand curve illustrate a change in demand or a change in quantity demanded?

substitutes

two good are substitutes if an increase (decrease) in the price of one good causes the demand curve for another good to shift to the right (left)

USE

what you've learned

Substitute Goods

Q Can you describe the change we would expect to see in the demand curve for Pepsi if the relative price for Coca-Cola increased significantly?

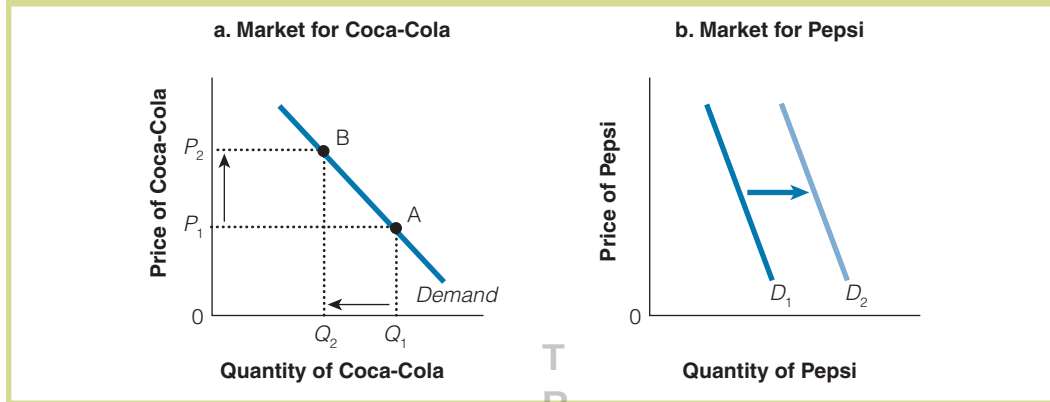
A If the price of one good increases and, as a result, an individual buys more of another good, the two related goods are substitutes. That is, buying

more of one reduces purchases of the other. In Exhibit 2(a), we see that as the price of Coca-Cola increases—a movement up along the demand curve for Coca-Cola, from point A to point B. The price increase for Coca-Cola causes a reduction in the quantity demanded of Coca-Cola. If the two goods are substitutes, the higher price for Coca-Cola will cause an increase in the demand for Pepsi (a rightward shift), as seen in Exhibit 2(b).

section 4.3
exhibit 2

Substitute Goods

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two goods are **complements**, if an increase (decrease) in the price of one good shifts the demand curve for another good to the left (right).

complements

two goods are complements if an increase (decrease) in the price of one good shifts the demand curve for another good to the left (right)

Changes in Income (Y)

Why (Y)? The reason is because Macroeconomists use the letter (I) for investment, so Microeconomist often use the letter (Y) to denote income. Economists have observed that generally the consumption of goods and services is positively related to the income available to consumers. Empirical studies support the notion that as individuals receive more income,

use

what you've learned

Complementary Goods

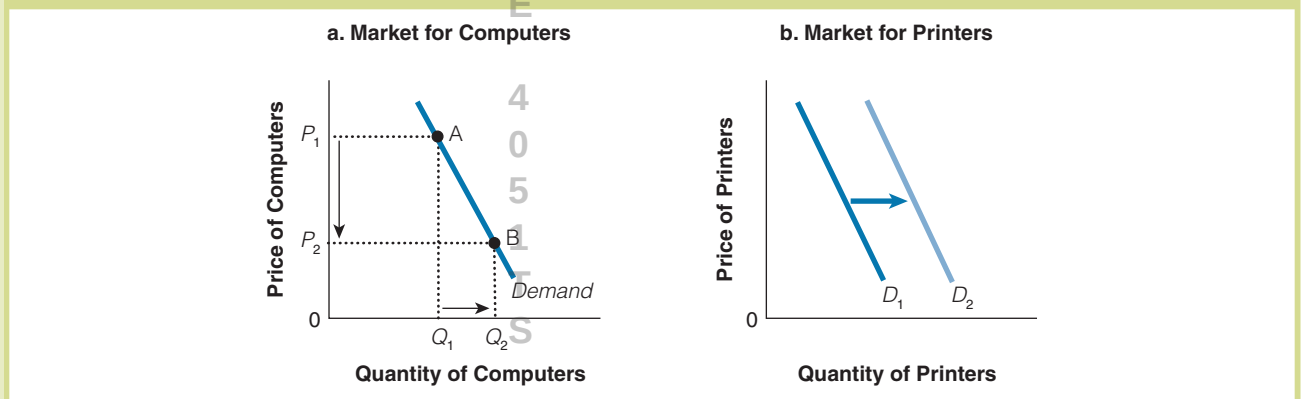
Q If the price of computers fell markedly, what do you think would happen to the demand for printers?

A If computers and printers are complements, the decrease in the price of computers will lead to

more computers purchased (a movement down along the demand curve from point A to point B) and an increase in the demand for printers (a rightward shift). Of course, the opposite is true, too—an increase in the price of computers will lead to fewer people purchasing computers (a movement up along the demand curve for computers from point B to point A) and a lower demand for printers (a leftward shift).

section 4.3
exhibit 3

Complementary Goods



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they tend to increase their purchases of most goods and services. Other things held equal, rising income usually leads to an increase in the demand for goods (a rightward shift of the demand curve), and decreasing income usually leads to a decrease in the demand for goods (a leftward shift of the demand curve).

Normal and Inferior Goods

If demand for a good increases when incomes rise and decreases when incomes fall, the good is called a **normal good**. Most goods are normal goods. Consumers will typically buy more CDs, clothes, pizzas, and trips to the movies as their incomes rise. However, if demand for a good decreases when incomes rise or if demand increases when incomes fall, the good is called an **inferior good**. These goods include inexpensive cuts of meat, second-hand clothing, or retread tires, which customers generally buy only because they cannot afford more expensive substitutes. As incomes rise, buyers shift to preferred substitutes and decrease their demand for the inferior goods. Suppose most individuals prefer hamburger to beans, but low-income families buy beans because they are less expensive. As incomes rise, many consumers may switch from buying beans to buying hamburgers. Hamburger may be inferior too; as incomes rise still further, consumers may substitute steak or chicken for hamburger. The term *inferior* in this sense does not refer to the quality of the good in question but shows that demand decreases when income increases and demand increases when income decreases. So beans are inferior not because they are low quality, but because you buy less of them as income increases.

Or if people's incomes rise and they increase their demand for movie tickets, we say that movie tickets are a normal good. But if people's incomes fall and they increase their demand for bus rides, we say bus rides are an inferior good. Whether goods are normal or inferior,

normal good

if income increases, the demand for a good increases; if income decreases, the demand for a good decreases

inferior good

if income increases, the demand for a good decreases; if income decreases, the demand for a good increases

Use

what you've learned

Normal and Inferior Goods

Q Chester Field owns a high-quality furniture shop. If a boom in the economy occurs (higher average income per person and fewer people unemployed), can Chester expect to sell more high-quality furniture?

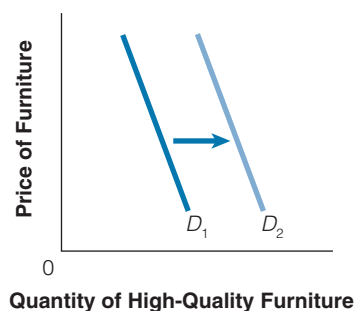
A Yes. Furniture is generally considered a normal good, so a rise in income will increase the

demand for high-quality furniture, as shown in (a). However, if Chester sells unfinished, used, or low-quality furniture, the demand for his products might fall, as higher incomes allow customers to buy furniture that is finished, new, or of higher quality. Chester's furniture would then be an inferior good, as shown in Exhibit 4(b).

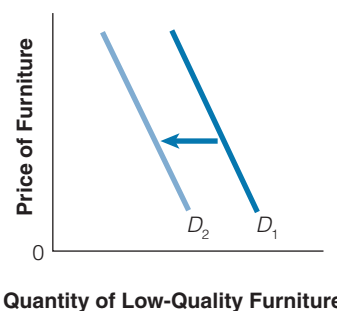
section 4.3
exhibit 4

Normal and Inferior Goods

a. Rising Income and a Normal Good



b. Rising Income and an Inferior Good



the point here is that income influences demand—usually positively, but sometimes negatively.

Changes in the Number of Buyers (N)

The demand for a good or service will vary with the size of the potential consumer population. The demand for wheat, for example, rises as population increases, because the added population wants to consume wheat products, such as bread or cereal. Marketing experts, who closely follow the patterns of consumer behavior regarding a particular good or service, are usually vitally concerned with the *demographics* of the product—the vital statistics of the potential consumer population, including size, race, income, and age characteristics. For example, market researchers for baby food companies keep a close watch on the birth rate.



ISTOCKPHOTO.COM/PETE TRIPP

In the midst of a recession, is it possible that many people will increase their demand for fast-food restaurants like McDonald's? It is not only possible, it actually happened! If declining income causes demand for a good to rise, is it a normal good or an inferior good?

Changes in Tastes (T)

The demand for a good or service may increase or decrease with changes in people's tastes or preferences. Changes in taste may be triggered by advertising or promotion, by a news story, by the behavior of some popular public figure, and so on. Changes in taste are particularly noticeable in apparel. Skirt lengths, coat lapels, shoe styles, and tie sizes change frequently.

Changes in preferences naturally lead to changes in demand. A person may grow tired of one type of recreation or food and try another type. People may decide they want more organic food; consequently, we will see more stores and restaurants catering to this change in taste. Changes in occupation, number of dependents, state of health, and age also tend to alter preferences. The birth of a baby might cause a family to spend less on recreation and more on food and clothing. Illness increases the demand for medicine and lessens purchases of other goods. A cold winter increases the demand for heating oil. Changes in customs and traditions also affect preferences, and the development of new products draws consumer preferences away from other goods. Compact discs replaced record albums, just as DVD players replaced VCRs. A change in information can also impact consumers' demand. For example, a breakout of *E. coli* or new information about a defective and/or dangerous product, such as a baby crib, can reduce demand.



INNERVISIONART/SHUTTERSTOCK.COM

Body piercing and tattoos have risen in popularity in recent years. The demand for these services has been pushed to the right. According to the Pew Research Center 36 percent of 18- to 25-year-olds have at least one tattoo.

Changes in Expectations (E)

Sometimes the demand for a good or service in a given period will increase or decrease because consumers expect the good to change in price or availability at some future date. If people expect the future price to be higher, they will purchase more of the good now before the price increase. If people expect the future price to be lower, they will purchase less of the good now and wait for the

price decrease. For example, if you expect the price of computers to fall soon, you may be less willing to buy one today. Or, if you expect to earn additional income next month, you may be more willing to dip into your current savings to buy something this month.

Changes in Demand versus Changes in Quantity Demanded—Revisited

Economists put particular emphasis on the impact on consumer behavior of a change in the price of a good. We are interested in distinguishing between consumer behavior related to the price of a good itself (movements *along* a demand curve) and behavior related to changes in other factors (shifts of the demand curve).

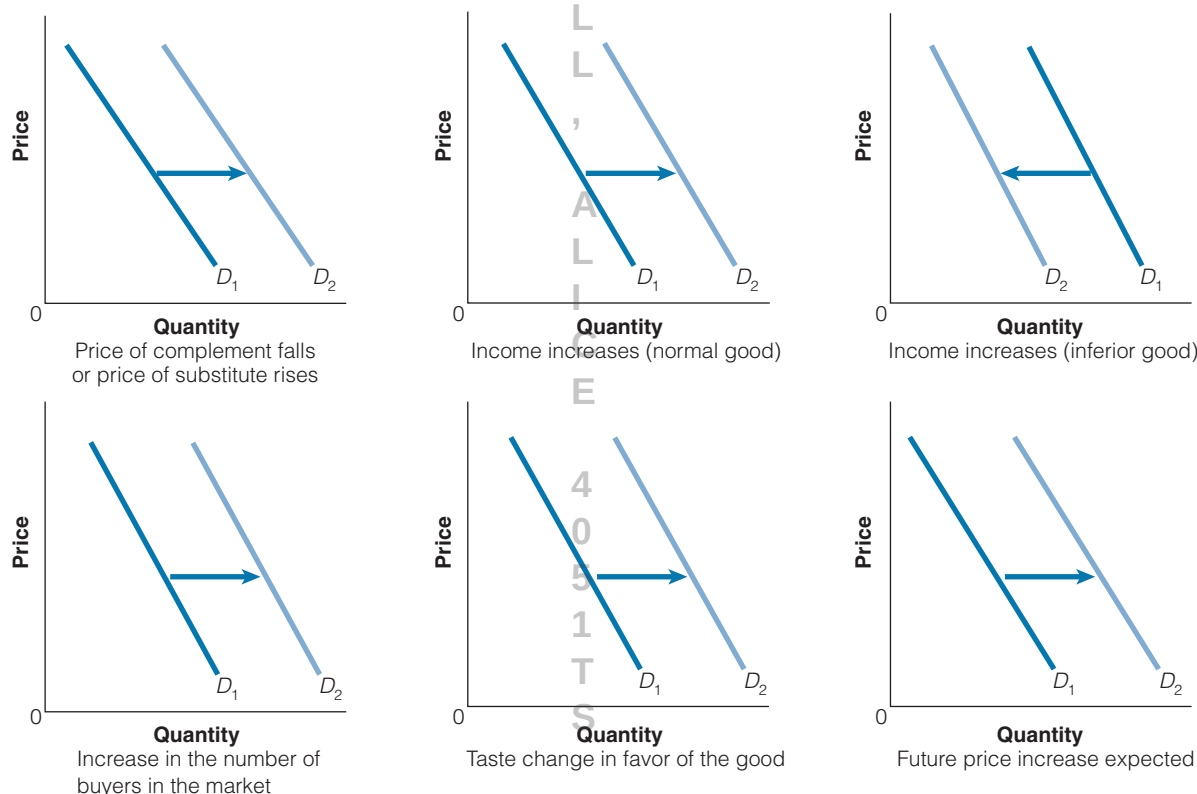
As indicated earlier, if the price of a good changes, it causes a *change in quantity demanded*. If one of the other factors (determinants) influencing consumer behavior changes, it results in a *change in demand*. The effects of some of the determinants that cause changes in demand (shifters) are reviewed in Exhibit 5. For example, there are two different ways to curb teenage smoking: raise the price of cigarettes (a reduction in the quantity of cigarettes demanded) or decrease the demand for cigarettes (a leftward shift in the demand curve for cigarettes). Both would reduce the amount of smoking. Specifically, to increase the price of cigarettes, the government could impose a higher tax on manufacturers. Most of this would be passed on to consumers in the form of higher prices (more on this in Chapter 6). Or to shift the demand curve leftward, the government could adopt policies to discourage smoking, such as advertising bans and increasing consumer awareness of the harmful side effects of smoking—disease and death.



How is a change in demand different than a change in quantity demanded?

section 4.3 exhibit 5

Possible Demand Shifters



use

what you've learned

Changes in Demand versus Changes in Quantity Demanded

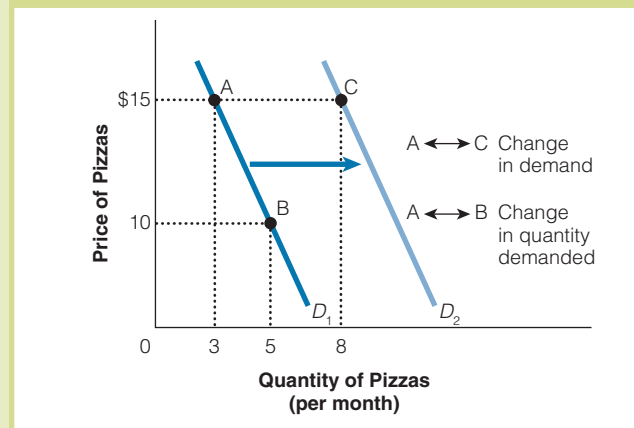
Q How would you use a graph to demonstrate the two following scenarios? (1) Someone buys more pizzas because the price of pizzas has fallen; and (2) a student buys more pizzas because she just received a 20 percent raise at work, giving her additional income.

A In Exhibit 6, the movement from A to B is called an increase in quantity demanded; the movement from B to A is called a decrease in quantity demanded. Economists use the phrase “increase or decrease in quantity demanded” to describe movements along a given demand curve. However, the change from A to C is called an increase in demand, and the change from C to A is called a decrease in demand. The phrase “increase or decrease in demand” is reserved for a shift in the whole curve. So if an individual buys more pizzas because the price fell, we call it an increase in quantity demanded. However, if she buys more

pizzas even at the current price, say \$15, we say it is an increase in demand. In this case, the increase in income was responsible for the increase in demand, because she chose to spend some of her new income on pizzas.

section 4.3 exhibit 6

Change in Demand versus Change in Quantity Demanded



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SECTION QUIZ

- Which of the following would be most likely to increase the demand for jelly?
 - an increase in the price of peanut butter, which is often used with jelly
 - an increase in income; jelly is a normal good
 - a decrease in the price of jelly
 - medical research that finds that daily consumption of jelly makes people live 10 years *less*, on average
- Which of the following would *not* cause a change in the demand for cheese?
 - an increase in the price of crackers, which are consumed with cheese
 - an increase in the income of cheese consumers
 - an increase in the population of cheese lovers
 - an increase in the price of cheese
- Whenever the price of Good A decreases, the demand for Good B increases. Goods A and B appear to be
 - complements.
 - substitutes.
 - inferior goods.
 - normal goods.
 - inverse goods.

(continued)

SECTION QUIZ (Cont.)



4. Whenever the price of Good A increases, the demand for Good B increases as well. Goods A and B appear to be
 - a. complements.
 - b. substitutes.
 - c. inferior goods.
 - d. normal goods.
 - e. inverse goods.
5. The difference between a change in quantity demanded and a change in demand is that a change in
 - a. quantity demanded is caused by a change in a good's own price, while a change in demand is caused by a change in some other variable, such as income, tastes, or expectations.
 - b. demand is caused by a change in a good's own price, while a change in quantity demanded is caused by a change in some other variable, such as income, tastes, or expectations.
 - c. quantity demanded is a change in the amount people actually buy, while a change in demand is a change in the amount they want to buy.
 - d. This is a trick question. A change in demand and a change in quantity demanded are the same thing.
6. Suppose CNN announces that bad weather in Central America has greatly reduced the number of cocoa bean plants and for this reason the price of chocolate is expected to rise soon. As a result,
 - a. the current market demand for chocolate will decrease.
 - b. the current market demand for chocolate will increase.
 - c. the current quantity demanded for chocolate will decrease.
 - d. no change will occur in the current market for chocolate.
7. If incomes are rising, in the market for an inferior good,
 - a. demand will rise.
 - b. demand will fall.
 - c. supply will rise.
 - d. supply will fall.

-
1. What is the difference between a change in demand and a change in quantity demanded?
 2. If the price of zucchini increases, causing the demand for yellow squash to rise, what do we call the relationship between zucchini and yellow squash?
 3. If incomes rise and, as a result, demand for jet skis increases, how do we describe that good?
 4. How do expectations about the future influence the demand curve?
 5. Would a change in the price of ice cream cause a change in the demand for ice cream? Why or why not?
 6. Would a change in the price of ice cream likely cause a change in the demand for frozen yogurt, a substitute?
 7. If plane travel is a normal good and bus travel is an inferior good, what will happen to the demand curves for plane and bus travel if people's incomes increase?

Answers: 1. b 2. d 3. a 4. b 5. a 6. b 7. b

Supply

4.4

What is the law of supply?

What is a market supply curve?

What is an individual supply curve?

The Law of Supply

In a market, the answer to the fundamental question, “What do we produce, and in what quantities?” depends on the interaction of both buyers and sellers. Demand is only half the story. The willingness and ability of sellers to provide goods are equally important factors that must be weighed by decision makers in all societies. As with demand, the price of the good is an important factor. And just as with demand, factors other than the price of the good are also important to sellers, such as the cost of inputs or advances in technology. While behavior will vary among individual sellers, economists expect that, other things being equal, the quantity supplied will vary directly with the price of the good, a relationship called the **law of supply**. According to the law of supply, the higher the price of the good (P), the greater the quantity supplied (Q_s), and the lower the price of the good, the smaller the quantity supplied, *ceteris paribus*.

$$P \uparrow \Rightarrow Q_s \uparrow \text{ and } P \downarrow \Rightarrow Q_s \downarrow$$

The relationship described by the law of supply is a direct, or positive, relationship, because the variables move in the same direction.

A Positive Relationship between Price and Quantity Supplied

Firms supplying goods and services want to increase their profits, and the higher the price per unit, the greater the profitability generated by supplying more of that good. For example, if you were a coffee grower, wouldn't you much rather be paid \$5 a pound than \$1 a pound, *ceteris paribus*?

When the price of coffee is low, the coffee business is less profitable and less coffee will be produced. Some sellers may even shut down, reducing their quantity supplied to zero if the price is low enough.

There is another reason that supply curves are upward sloping. In Chapter 3, the law of increasing opportunity cost demonstrated that when we hold technology and input prices constant, producing additional units of a good will require increased opportunity costs. That is, when we produce something, we use the most efficient resources first (those with the lowest opportunity cost) and then draw on less efficient resources (those with a higher opportunity cost) as more of the good is produced. Because costs per unit are rising as they produce more, sellers must receive a higher price to increase the quantity supplied, *ceteris paribus*.

An Individual Supply Curve

To illustrate the concept of an **individual supply curve**, consider the amount of coffee that an individual seller, Juan Valdés, is willing and able to supply in one year. The law of supply can be illustrated, like the law of demand, by a table or graph. Juan's supply schedule for



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To get more oil, drillers must sometimes drill deeper or go into unexplored areas, and they still may come up dry. If it costs more to increase oil production, then oil prices would have to rise for producers to increase their output—the quantity supplied.

law of supply

the higher (lower) the price of the good, the greater (smaller) the quantity supplied, *ceteris paribus*



economic
content
standards

Higher prices for a good or service provide incentives for producers to make or sell more of it. Lower prices for a good or service provide incentives for producers to make or sell less of it.

individual supply curve

a graphical representation that shows the positive relationship between the price and quantity supplied

section 4.4
exhibit 1

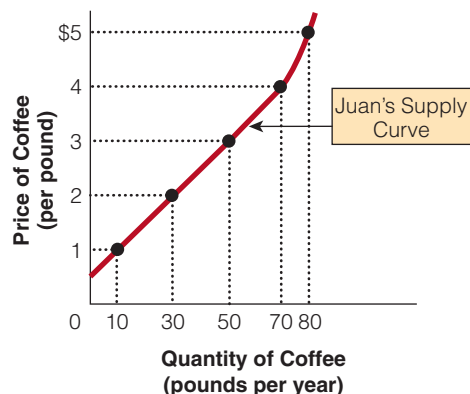
An Individual Supply Curve

a. Juan's Supply Schedule for Coffee

Price (per pound)	Quantity Supplied (pounds per year)
\$5	80
4	70
3	50
2	30
1	10

Other things being equal, the quantity supplied will vary directly with the price of the good. As the price rises (falls), the quantity supplied increases (decreases).

b. Juan's Supply Curve for Coffee



ECS

economic
content
standards

An increase in the price of a good or service enables producers to cover higher costs, ceteris paribus, causing the quantity supplied to increase, and vice versa.

market supply curve

a graphical representation of the amount of goods and services that sellers are willing and able to supply at various prices

coffee is shown in Exhibit 1(a). The combinations of price and quantity supplied were then plotted and joined to create the individual supply curve shown in Exhibit 1(b). Note that the individual supply curve is upward sloping as you move from left to right. At higher prices, it will be more attractive to increase production. Existing firms or growers will produce more at higher prices than at lower prices.

The Market Supply Curve

The **market supply curve** may be thought of as the horizontal summation of the supply curves for individual firms. The market supply curve shows how the total quantity supplied varies positively with the price of a good, while holding constant all other factors that affect how much producers are able and willing to supply. The market supply schedule, which reflects the total quantity supplied at each price by all of the coffee producers, is shown in Exhibit 2(a). Exhibit 2(b) illustrates the resulting market supply curve for this group of coffee producers.

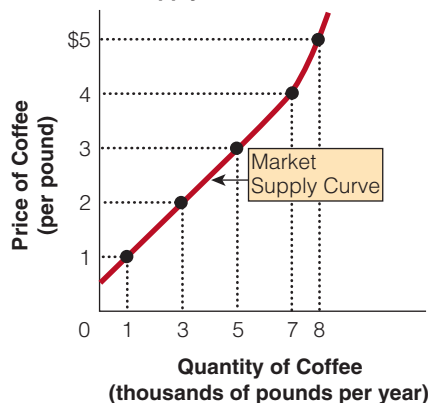
section 4.4
exhibit 2

A Market Supply Curve

a. Market Supply Schedule for Coffee

Price (per pound)	Quantity Supplied (pounds per year)				Market Supply
	Juan	+	Other Producers	=	
\$5	80	+	7,920	=	8,000
4	70	+	6,930	=	7,000
3	50	+	4,950	=	5,000
2	30	+	2,970	=	3,000
1	10	+	990	=	1,000

b. Market Supply Curve for Coffee



The dots on this graph indicate different quantities of coffee that sellers would be willing and able to supply at various prices. The line connecting those combinations is the market supply curve.

SECTION QUIZ



1. An upward-sloping supply curve shows that
 - a. buyers are willing to pay more for particularly scarce products.
 - b. sellers expand production as the product price falls.
 - c. sellers are willing to increase production of their goods if they receive higher prices for them.
 - d. buyers are willing to buy more as the product price falls.
2. Along a supply curve,
 - a. supply changes as price changes.
 - b. quantity supplied changes as price changes.
 - c. supply changes as technology changes.
 - d. quantity supplied changes as technology changes.
3. A supply curve illustrates a(n) _____ relationship between _____ and _____.
 - a. direct; price; supply
 - b. direct; price; quantity demanded
 - c. direct; price; quantity supplied
 - d. introverted; price; quantity demanded
 - e. inverse; price; quantity supplied
4. Which of the following is true?
 - a. The law of supply states that the higher (lower) the price of a good, the greater (smaller) the quantity supplied.
 - b. The relationship between price and quantity supplied is positive because profit opportunities are greater at higher prices and because the higher production costs of increased output mean that suppliers will require higher prices.
 - c. The market supply curve is a graphical representation of the amount of goods and services that suppliers are willing and able to supply at various prices.
 - d. All of the above are true.

-
1. What are the two reasons why a supply curve is positively sloped?
 2. What is the difference between an individual supply curve and a market supply curve?

Answers: 1. c 2. b 3. c 4. d

Shifts in the Supply Curve

4.5

- 📁 What is the difference between a change in supply and a change in quantity supplied?
- 📁 What are the determinants of supply?
- 📁 How does the number of suppliers affect the supply curve?
- 📁 How does technology affect the supply curve?
- 📁 How do taxes affect the supply curve?

A Change in Quantity Supplied versus a Change in Supply

Changes in the price of a good lead to changes in the quantity supplied by sellers, just as changes in the price of a good lead to changes in the quantity demanded by buyers. Similarly, a change in supply, whether an increase or a decrease, can occur for reasons

other than changes in the price of the product itself, just as changes in demand may be due to factors (determinants) other than the price of the good. In other words, a change in the price of the good in question is shown as a movement along a given supply curve, leading to a change in quantity supplied. A change in any other factor that can affect seller behavior (seller's input prices, the prices of related products, expectations, number of sellers, and technology) results in a *shift in the entire supply curve*, leading to a change in quantity supplied at every price.



Why is a change in supply different than a change in quantity supplied?

Shifts in Supply (“SPENT”)

An increase in supply shifts the supply curve to the right; a decrease in supply shifts the supply curve to the left, as shown in Exhibit 1. Anything that affects the costs of production will influence supply and the position of the supply curve. We will now look at some of the possible determinants of supply—factors that determine the position of the supply curve—in greater depth.

There are a number of variables that can shift the supply curve but here are some of the most important. It might be helpful to remember the word “SPENT.” This acronym can help you remember the five principle factors that shift the supply curve for a good or service.

- Changes in seller's input prices (S)
- Changes in the prices of related goods and services (P)
- Changes in expectations (E)
- Changes in the number of sellers (N)
- Changes in technology (T)

Changes in Seller's Input Prices (S)

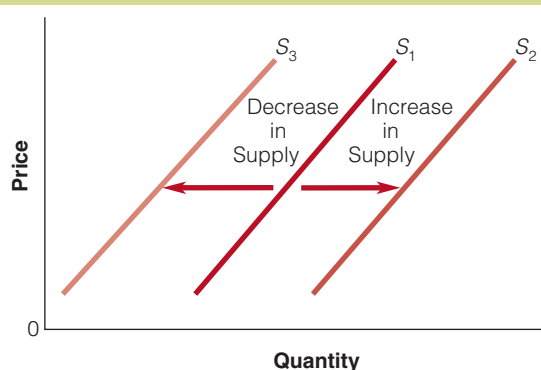
Sellers are strongly influenced by the costs of inputs used in the production process, such as steel used for automobiles or microchips used in computers. For example, higher labor, materials, energy, or other input costs increase the costs of production, causing the supply curve to shift to the left at each and every price. If input prices fall, the costs of production decrease, causing the supply curve to shift to the right—more will be supplied at each and every price.

Changes in the Prices of Related Goods and Services (P)

The supply of a good increases if the price of one of its substitutes in production falls; and the supply of a good decreases if the price of one of its substitutes in production rises. Suppose you own your own farm, on which you plant cotton and wheat. One year, the price of wheat falls, and farmers reduce the quantity of wheat supplied, as shown in Exhibit 2(a). What effect does the lower price of wheat have on your cotton production? It increases the supply of cotton. You want to produce relatively less of the crop that has fallen in price (wheat) and relatively more of the now more attractive other crop (cotton). Cotton and wheat are *substitutes in production* because both goods can be produced using the same resources. Producers tend to substitute the production of more profitable products for that of less profitable products. So the decrease in the price in the wheat market has caused an increase in supply (a rightward shift) in the cotton market, as seen in Exhibit 2(b).

section 4.5 exhibit 1

Supply Shifts



An increase in supply shifts the supply curve to the right. A decrease in supply shifts the supply curve to the left.

If the price of wheat, a substitute in production, increases, then that crop becomes more profitable. This leads to an increase in the quantity supplied of wheat. Consequently, farmers will shift their resources out of the relatively lower-priced crop (cotton); the result is a decrease in supply of cotton.

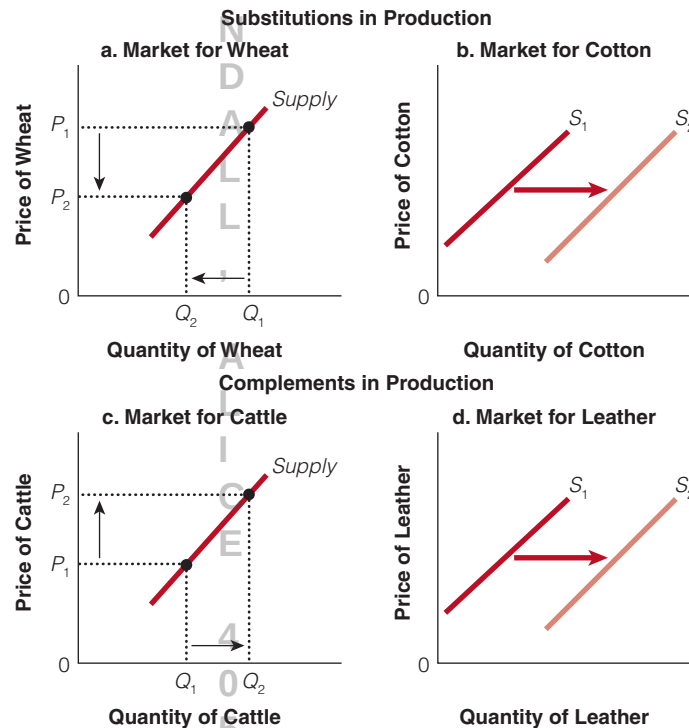
Other examples of substitutes in production include automobile producers that have to decide between producing sedans and pick-ups or construction companies that have to choose between building single residential houses or commercial buildings.

Some goods are *complements in production*. Producing one good does not prevent the production of the other, but actually enables production of the other. For example, leather and beef are complements in production. Suppose the price of a beef rises and, as a result, cattle ranchers increase the quantity supplied of beef, moving up the supply curve for beef, as seen in Exhibit 2(c). When cattle ranchers produce more beef, they automatically produce more leather. Thus, when the price of beef increases, the supply of the related good, leather, shifts to the right, as seen in Exhibit 2(d). Suppose the price of beef falls, and as a result, the quantity supplied of beef falls; this leads to a decrease (a leftward shift) in the supply of leather.

Other examples of complements in production where goods are produced simultaneously from the same resource include: a lumber mill that produces lumber and sawdust or an oil refinery that can produce gasoline and heating oil from the same resource—crude oil.

section 4.5
exhibit 2

Substitutes and Complements in Production



If land can be used for either wheat or cotton, a decrease in the price of wheat causes a decrease in the quantity supplied; a movement down along the supply curve in Exhibit 2(a). This may cause some farmers to shift out of the production of wheat and into the substitute in production—cotton—shifting the cotton supply curve to the right in Exhibit 2(b). If the price of the complement in production increases (cattle), it becomes more profitable and as a result cattle ranchers increase the quantity supplied of beef, moving up the supply curve for beef, as seen in Exhibit 2(c). When cattle ranchers produce more beef, they also produce more leather. Thus, when the price of beef increases, the supply of the related good, leather, shifts to the right, as seen in Exhibit 2(d).

Changes in Expectations (E)

Another factor shifting supply is sellers' expectations. If producers expect a higher price in the future, they will supply less now than they otherwise would have, preferring to wait and sell when their goods will be more valuable. For example, if a cotton producer expected the future price of cotton to be higher next year, he might decide to store some of his current production of cotton for next year when the price will be higher. Similarly, if producers expect now that the price will be lower later, they will supply more now. Oil refiners will often store some of their spring supply of gasoline for summer because gasoline prices typically peak in summer. In addition, some of the heating oil for the fall is stored to supply it in the winter when heating oil prices peak.

Changes in the Number of Sellers (N)

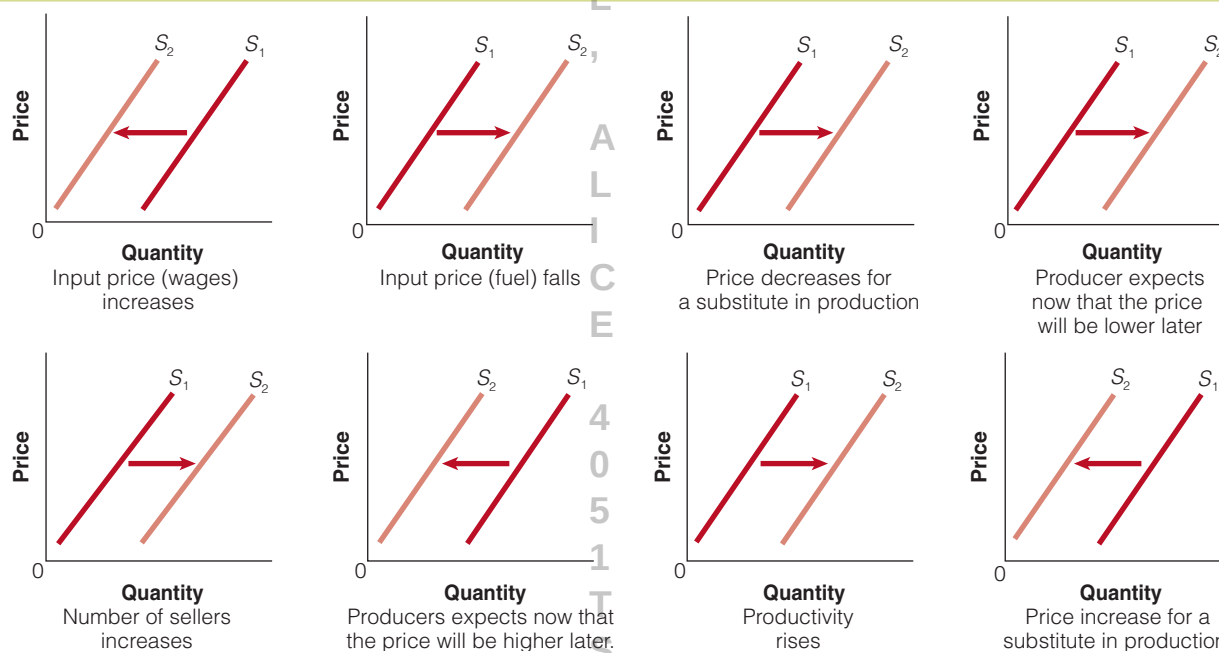
We are normally interested in market demand and supply (because together they determine prices and quantities) rather than in the behavior of individual consumers and firms. As we discussed earlier in the chapter, the supply curves of individual suppliers can be summed horizontally to create a market supply curve. An increase in the number of sellers leads to an increase in supply, denoted by a rightward shift in the supply curve. For example, think of the number of gourmet coffee shops that have sprung up over the last 15 to 20 years, shifting the supply curve of gourmet coffee to the right. An exodus of sellers has the opposite impact, a decrease in supply, which is indicated by a leftward shift in the supply curve.

Changes in Technology (T)

Technological change can lower the firm's costs of production through productivity advances. These changes allow the firm to spend less on inputs and produce the same level of output. Human creativity works to find new ways to produce goods and services using

section 4.5 exhibit 3

Possible Supply Shifts



fewer or less costly inputs of labor, natural resources, or capital. Because the firm can now produce the good at a lower cost it will supply more of the good at each and every price—the supply curve shifts to the right.

Change in Supply versus Change in Quantity Supplied—Revisited

If the price of a good changes, it leads to a change in the quantity supplied. If one of the other factors influences sellers' behavior, we say it results in a change in supply. For example, if production costs rise because of a wage increase or higher fuel costs, other things remaining constant, we would expect a decrease in supply—that is, a leftward shift in the supply curve. Alternatively, if some variable, such as lower input prices, causes the costs of production to fall, the supply curve will shift to the right. Exhibit 3 illustrates the effects of some of the determinants that cause shifts in the supply curve.

USE what you've learned

Change in Supply versus Change in Quantity Supplied

Q How would you graph the following two scenarios: (1) the price of wheat per bushel rises; and (2) good weather causes an unusually abundant wheat harvest?

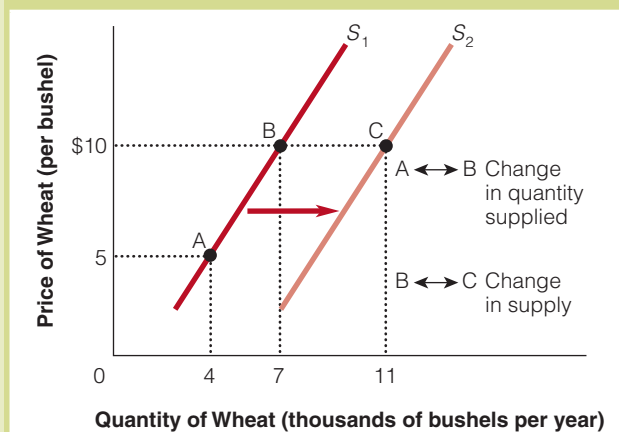
A In the first scenario, the price of wheat (per bushel) increases, so the quantity supplied changes (i.e., a movement along the supply curve). In the second scenario, the good weather causes the supply curve for wheat to shift to the right, which is called a change in supply (not quantity supplied). A shift in the whole supply curve is caused by one of the other variables, not by a change in the price of the good in question.

As shown in Exhibit 4, the movement from A to B is called an increase in quantity supplied, and the movement from B to A is called a decrease in quantity supplied. However, the change from B to C

is called an increase in supply, and the movement from C to B is called a decrease in supply.

section 4.5 exhibit 4

Change in Supply vs. Change in Quantity Supplied



SECTION QUIZ



1. All of the following factors will affect the supply of shoes except one. Which will *not* affect the supply of shoes?
 - a. higher wages for shoe factory workers
 - b. higher prices for leather
 - c. a technological improvement that reduces waste of leather and other raw materials in shoe production
 - d. an increase in consumer income
 2. The difference between a change in quantity supplied and a change in supply is that a change in
 - a. quantity supplied is caused by a change in a good's own price, while a change in supply is caused by a change in some other variable, such as input prices, prices of related goods, expectations, or taxes.
 - b. supply is caused by a change in a good's own price, while a change in the quantity supplied is caused by a change in some other variable, such as input prices, prices of related goods, expectations, or taxes.
 - c. quantity supplied is a change in the amount people want to sell, while a change in supply is a change in the amount they actually sell.
 - d. supply and a change in the quantity supplied are the same thing.
 3. Antonio's makes the greatest pizza and delivers it hot to all the dorms around campus. Last week Antonio's supplier of pepperoni informed him of a 25 percent increase in price. Which variable determining the position of the supply curve has changed, and what effect does it have on supply?
 - a. future expectations; supply decreases
 - b. future expectations; supply increases
 - c. input prices; supply decreases
 - d. input prices; supply increases
 - e. technology; supply increases
 4. Which of the following is *not* a determinant of supply?
 - a. input prices
 - b. technology
 - c. tastes
 - d. expectations
 - e. the prices of related goods
 5. A leftward shift in supply could be caused by
 - a. an improvement in productive technology.
 - b. a decrease in income.
 - c. some firms leaving the industry.
 - d. a fall in the price of inputs to the industry.
-
1. What is the difference between a change in supply and a change in quantity supplied?
 2. If a seller expects the price of a good to rise in the near future, how will that expectation affect the current supply curve?
 3. Would a change in the price of wheat change the supply of wheat? Would it change the supply of corn, if wheat and corn can be grown on the same type of land?
 4. If a guitar manufacturer increased its wages in order to keep its workers, what would happen to the supply of guitars as a result?
 5. What happens to the supply of baby-sitting services in an area when many teenagers get their driver's licenses at about the same time?

Answers: 1. d 2. d 3. c 4. c 5. c

Market Equilibrium Price and Quantity

4.6

- What is the equilibrium price?
- What is the equilibrium quantity?

- What is a shortage?
- What is a surplus?

Equilibrium Price and Quantity

The **market equilibrium** is found at the point at which the market supply and market demand curves intersect. The price at the intersection of the market supply curve and the market demand curve is called the **equilibrium price**, and the quantity is called the **equilibrium quantity**. At the equilibrium price, the amount that buyers are willing and able to buy is exactly equal to the amount that sellers are willing and able to produce. The equilibrium market solution is best understood with the help of a simple graph. Let's return to the coffee example we used in our earlier discussions of supply and demand. Exhibit 1 combines the market demand curve for coffee with the market supply curve. At \$3 per pound, buyers are willing to buy 5,000 pounds of coffee and sellers are willing to supply 5,000 pounds of coffee. Neither may be "happy" about the price; the buyers would probably like a lower price and the sellers would probably like a higher price. But both buyers and sellers are able to carry out their purchase and sales plans at the \$3 price. At any other price, either suppliers or demanders would be unable to trade as much as they would like.

market equilibrium

the point at which the market supply and market demand curves intersect

equilibrium price

the price at the intersection of the market supply and demand curves; at this price, the quantity demanded equals the quantity supplied

equilibrium quantity

the quantity at the intersection of the market supply and demand curves; at the equilibrium quantity, the quantity demanded equals the quantity supplied

surplus

a situation where quantity supplied exceeds quantity demanded

shortage

a situation where quantity demanded exceeds quantity supplied

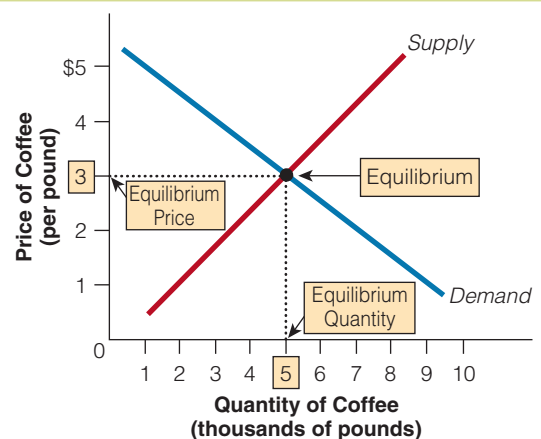
Shortages and Surpluses

What happens when the market price is not equal to the equilibrium price? Suppose the market price is above the equilibrium price, as seen in Exhibit 2(a). At \$4 per pound, the quantity of coffee demanded would be 3,000 pounds, but the quantity supplied would be 7,000 pounds. At this price, a **surplus**, or excess quantity supplied, would exist. That is, at this price, growers would be willing to sell more coffee than demanders would be willing to buy. To get rid of the unwanted surplus, frustrated sellers would cut their price and cut back on production. And as price falls, consumers would buy more, ultimately eliminating the unsold surplus and returning the market to the equilibrium level.

What would happen if the market price of coffee were below the equilibrium price? As seen in Exhibit 2(b), at \$2 per pound, the yearly quantity demanded of 7,000 pounds would be greater than the 3,000 pounds that producers would be willing to supply at that low price. So at \$2 per pound, a **shortage** or excess quantity demanded of 4,000 pounds would exist. Some consumers are lucky enough to find coffee, but others are not able to find any sellers who are willing to sell them coffee at \$2 per pound. Some frustrated consumers may offer to pay sellers more than \$2. In addition, sellers noticing that there are disappointed consumers raise their prices. These actions by buyers and sellers cause the market price to rise. As the market price rises, the amount that sellers want to supply increases and the amount that

section 4.6
exhibit 1

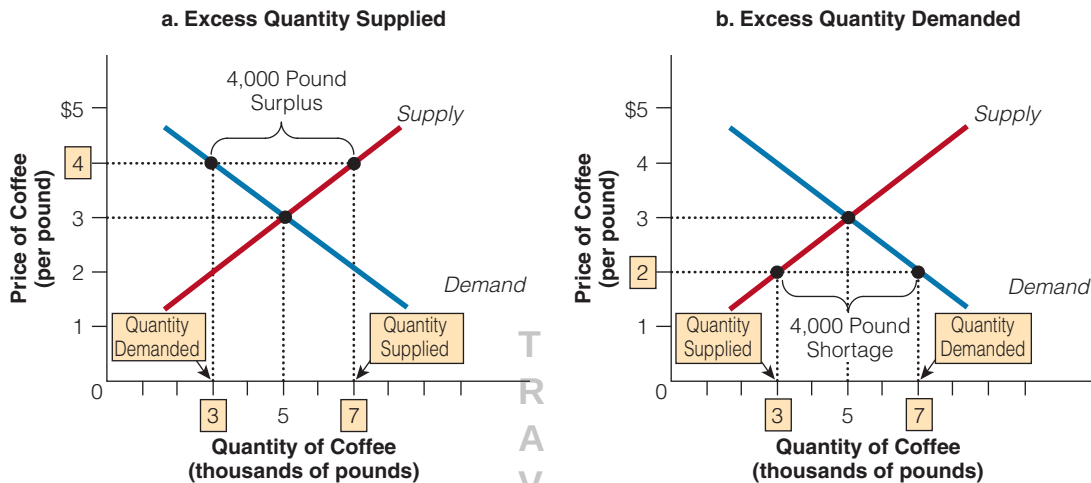
Market Equilibrium



The equilibrium is found at the intersection of the market supply and demand curves. The equilibrium price is \$3 per pound, and the equilibrium quantity is 5,000 pounds of coffee. At the equilibrium quantity, the quantity demanded equals the quantity supplied.

section 4.6
exhibit 2

Market in Temporary Disequilibrium



In (a), the market price is above the equilibrium price. At \$4, the quantity supplied (7,000 pounds) exceeds the quantity demanded (3,000 pounds), resulting in a surplus of 4,000 pounds. To get rid of the unwanted surplus, suppliers cut their prices. As prices fall, consumers buy more, eliminating the surplus and moving the market back to equilibrium. In (b), the market price is below the equilibrium price. At \$2, the quantity demanded (8,000 pounds) exceeds the quantity supplied (4,000 pounds), and a shortage of 4,000 pounds is the result. The many frustrated buyers compete for the existing supply, offering to buy more and driving the price up toward the equilibrium level. Therefore, with both shortages and surpluses, market prices tend to pull the market back to the equilibrium level.

what you've learned Shortages

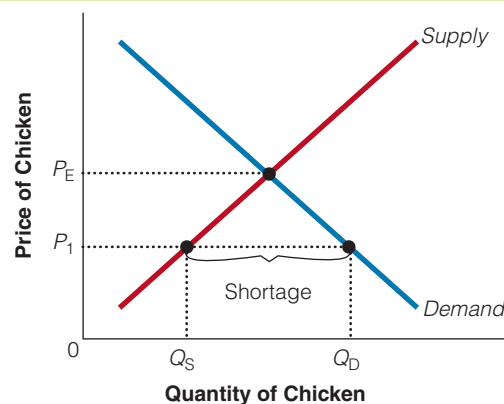
Q Imagine that you own a butcher shop. Recently, you have noticed that at about noon, you run out of your daily supply of chicken. Puzzling over your predicament, you hypothesize that you are charging less than the equilibrium price for your chicken. Should you raise the price of your chicken? Explain using a simple graph.

A If the price you are charging is below the equilibrium price (P_E), you can draw a horizontal line from that price straight across Exhibit 3 and see where it intersects the supply and demand curves. The point where this horizontal line intersects the demand curve indicates how much chicken consumers are willing to buy at the below-equilibrium price (P_1). Likewise, the intersection of this horizontal line with the supply curve indicates how much chicken producers are willing to supply at P_1 . From this, it is clear that a shortage (or excess quantity demanded) exists, because consumers want more chicken (Q_D) than producers are willing to supply (Q_S) at this

relatively low price. This excess quantity demanded results in competition among buyers, which will push prices up and reduce or eliminate the shortage. That is, it would make sense to raise your price on chicken. As the price moves up toward the equilibrium price, consumers will be willing to purchase less (some will substitute fish, steak, or ground round), and producers will have an incentive to supply more chicken.

section 4.6
exhibit 3

Shortages



buyers want to buy decreases. The upward pressure on price continues until equilibrium is reached at \$3.

Scarcity and Shortages

People often confuse scarcity with shortages. Remember most goods are scarce—desirable but limited. A shortage occurs when the quantity demanded is greater than the quantity supplied at the current price. We can eliminate shortages by increasing the price but we cannot eliminate scarcity.



A market exists when buyers and sellers interact. This interaction between supply and demand curves determines market prices and thereby allocates scarce goods and services.

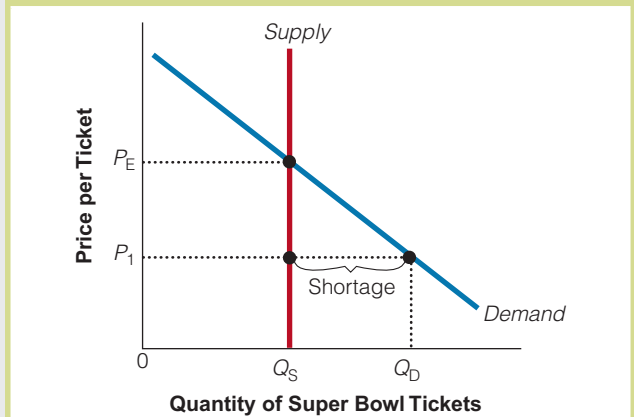
in the news **Scalping and the Super Bowl**

The Super Bowl is a high demand, limited supply sports event. The face value for general admission Super Bowl tickets, depending on what level, range from \$600 to \$800 and club seats go for \$1,200. Many of the recipients of the tickets are corporate sponsors or are affiliated with the teams playing in the game. There are also some tickets that are allocated through a lottery. However, at the face value for the tickets at P_1 , the quantity demanded far exceeds the quantity supplied as seen in Exhibit 4. In other words, the National Football League (NFL) has not priced their tickets equal to what the market will bear. Consequently, some fans are willing to pay much more, sometimes \$6,000 to \$7,000, for these tickets from scalpers, who buy the tickets at face value and try to sell them for a higher price. While ticket scalping is illegal in many states, scalpers will still descend on the host city to make a profit, even though the probability of arrest and conviction are substantial.

But is ticket scalping for athletic events and concerts really so objectionable? Could scalpers be transferring tickets into the hands of those who value them the most? The buyer must value attending the event more than the scalped price of the ticket or he would not buy the ticket. The seller would not sell her ticket unless she valued the money from the ticket more than attending the event. That is, the scalper has helped transfer tickets from those placing lower values on them to those placing higher values on them. The sponsors of the event are the losers, in the form of lost profits, for failing to charge the higher equilibrium market price. Why would the NFL not charge the higher price? Perhaps it sends a sign of goodwill to NFL fans, even if they have no appreciable chance of getting a ticket. That is, maybe the NFL is willing to take a hit on short-run profits to make sure they keep their base of fans (long-run profits).

section 4.6 exhibit 4

The Market for Super Bowl Tickets



At the face value for Super Bowl tickets (P_1), there is a shortage. That is, at P_1 , the quantity demanded (Q_D) is greater than the quantity supplied (Q_S).

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SECTION QUIZ



- A market will experience a _____ in a situation where quantity supplied exceeds quantity demanded and a _____ in a situation where quantity demanded exceeds quantity supplied.
 - shortage; shortage
 - surplus; surplus
 - shortage; surplus
 - surplus; shortage
 - The price of a good will tend to rise when
 - a temporary shortage at the current price occurs (assuming no price controls are imposed).
 - a temporary surplus at the current price occurs (assuming no price controls are imposed).
 - demand decreases.
 - supply increases.
 - Which of the following is true?
 - The intersection of the supply and demand curves shows the equilibrium price and equilibrium quantity in a market.
 - A surplus is a situation where quantity supplied exceeds quantity demanded.
 - A shortage is a situation where quantity demanded exceeds quantity supplied.
 - Shortages and surpluses set in motion actions by many buyers and sellers that will move the market toward the equilibrium price and quantity unless otherwise prevented.
 - All of the above are true.
-
- How does the intersection of supply and demand indicate the equilibrium price and quantity in a market?
 - What can cause a change in the supply and demand equilibrium?
 - What must be true about the price charged for a shortage to occur?
 - What must be true about the price charged for a surplus to occur?
 - Why do market forces tend to eliminate both shortages and surpluses?
 - If tea prices were above their equilibrium level, what force would tend to push tea prices down? If tea prices were below their equilibrium level, what force would tend to push tea prices up?

Answers: 1. d 2. a 3. e

Interactive Summary

Fill in the blanks:

- A(n) _____ is the process of buyers and sellers _____ goods and services.
- The important point about a market is what it does—it facilitates _____.
- _____, as a group, determine the demand side of the market. _____, as a group, determine the supply side of the market.
- A(n) _____ market consists of many buyers and sellers, no single one of whom can influence the market price.
- According to the law of demand, other things being equal, when the price of a good or service falls, the _____ increases.
- An individual _____ curve reveals the different amounts of a particular good a person would be willing and able to buy at various possible prices in a particular time interval, other things being equal.
- The _____ curve for a product is the horizontal summing of the demand curves of the individuals in the market.

8. A change in _____ leads to a change in quantity demanded, illustrated by a(n) _____ demand curve.
9. A change in demand is caused by changes in any of the other factors (besides the good's own price) that would affect how much of the good is purchased: the _____, _____, the _____ of buyers, _____, and _____.
10. An increase in demand is represented by a _____ shift in the demand curve; a decrease in demand is represented by a(n) _____ shift in the demand curve.
11. Two goods are called _____ if an increase in the price of one causes the demand curve for another good to shift to the _____.
12. For normal goods an increase in income leads to a(n) _____ in demand, and a decrease in income leads to a(n) _____ in demand, other things being equal.
13. An increase in the expected future price of a good or an increase in expected future income may _____ current demand.
14. According to the law of supply, the higher the price of the good, the greater the _____, and the lower the price of the good, the smaller the _____.
15. The quantity supplied is positively related to the price because firms supplying goods and services want to increase their _____ and because increasing _____ costs mean that the sellers will require _____ prices to induce them to increase their output.
16. An individual supply curve is a graphical representation that shows the _____ relationship between the price and the quantity supplied.
17. The market supply curve is a graphical representation of the amount of goods and services that sellers are _____ and _____ to supply at various prices.
18. Possible supply determinants (factors that determine the position of the supply curve) are _____ prices; _____; _____ of sellers and _____.
19. A fall in input prices will _____ the costs of production, causing the supply curve to shift to the _____.
20. The supply of a good _____ if the price of one of its substitutes in production falls.
21. The supply of a good _____ if the price of one of its substitutes in production rises.
22. The price at the intersection of the market demand curve and the market supply curve is called the _____ price, and the quantity is called the _____ quantity.
23. A situation where quantity supplied is greater than quantity demanded is called a(n) _____.
24. A situation where quantity demanded is greater than quantity supplied is called a(n) _____.
25. At a price greater than the equilibrium price, a(n) _____, or excess quantity supplied, would exist. Sellers would be willing to sell _____ than demanders would be willing to buy. Frustrated suppliers would _____ their price and _____ on production, and consumers would buy _____, returning the market to equilibrium.

Answers: 1. market; exchanging 2. trade 3. Buyers; Sellers 4. competitive 5. quantity demanded 6. demand 7. market demand 8. a good's price; movement along 9. prices of related goods; income; number; tastes; expectations 10. rightward; leftward 11. substitutes; right 12. increase; decrease 13. increase 14. quantity supplied; quantity supplied; higher 15. profit; production; higher 16. positive 17. willing; able 18. seller's input; expectations; number of sellers; technology and the prices of related goods 19. lower; right 20. increases 21. decreases 22. equilibrium; equilibrium 23. surplus 24. shortage 25. surplus; more; lower; cut back; more

Key Terms and Concepts

market 99
competitive market 100
law of demand 101
diminishing marginal utility 101
individual demand schedule 102
individual demand curve 102
market demand curve 103

change in quantity demanded 105
shifts in the demand curve 105
substitutes 106
complements 107
normal good 108
inferior good 108
law of supply 113

individual supply curve 113
market supply curve 114
market equilibrium 121
equilibrium price 121
equilibrium quantity 121
surplus 121
shortage 121

Section Quiz Answers

4.1 Markets

1. Why is it difficult to define a market precisely?

Every market is different. An incredible variety of exchange arrangements arise for different types of products, different degrees of organization, different geographical extents, and so on.

2. Why do you get your produce at a supermarket rather than directly from farmers?

Supermarkets act as middlepersons between growers of produce and consumers of produce. You hire them to do this task for you when you buy produce from them, rather than directly from growers, because they conduct those transactions at lower costs than you could. (If you could do it more cheaply than supermarkets, you would buy directly rather than from supermarkets.)

3. Why do the prices people pay for similar items at garage sales vary more than for similar items in a department store?

Items for sale at department stores are more standardized, easier to compare, and more heavily advertised, which makes consumers more aware of the prices at which they could get a particular good elsewhere, reducing the differences in price that can persist among department stores. Garage sale items are nonstandardized, costly to compare, and not advertised, which means people are often quite unaware of how much a given item could be purchased for elsewhere, so that price differences for similar items at different garage sales can be substantial.

4.2 Demand

1. What is an inverse relationship?

An inverse, or negative, relationship is one where one variable changes in the opposite direction from the other—if one increases, the other decreases.

2. How do lower prices change buyers' incentives?

A lower price for a good means that the opportunity cost to buyers of purchasing it is lower than before, and self-interest leads buyers to buy more of it as a result.

3. How do higher prices change buyers' incentives?

A higher price for a good means that the opportunity cost to buyers of purchasing it is higher than before, and self-interest leads buyers to buy less of it as a result.

4. What is an individual demand schedule?

An individual demand schedule reveals the different amounts of a good or service a person would be willing to buy at various possible prices in a particular time interval.

5. What is the difference between an individual demand curve and a market demand curve?

The market demand curve shows the total amounts of a good or service all the buyers as a group are willing to buy at various possible prices in a particular time interval. The market quantity demanded at a given price is just the sum of the quantities demanded by each individual buyer at that price.

6. Why does the amount of dating on campus tend to decline just before and during final exams?

The opportunity cost of dating—in this case, the value to students of the studying time forgone—is higher just before and during final exams than during most of the rest of an academic term. Because the cost is higher, students do less of it.

4.3 Shifts in the Demand Curve

1. What is the difference between a change in demand and a change in quantity demanded?

A change in demand shifts the entire demand curve, while a change in quantity demanded refers to a movement along a given demand curve, caused by a change in the good's price.

2. If the price of zucchini increases, causing the demand for yellow squash to rise, what do we call the relationship between zucchini and yellow squash?

Whenever an increased price of one good increases the demand for another, they are substitutes. The fact that some people consider zucchini an alternative to yellow squash explains in part why zucchini becomes more costly. Therefore, some people substitute into buying relatively cheaper yellow squash now instead.

3. If incomes rise and, as a result, demand for jet skis increases, how do we describe that good?

If income rises and, as a result, demand for jet skis increases, we call jet skis a normal good, because for most (or normal) goods, we would rather have more of them than less, so an increase in income would lead to an increase in demand for such goods.

4. How do expectations about the future influence the demand curve?

Expectations about the future influence the demand curve because buying a good in the future is an alternative to buying it now. Therefore, the higher future prices are expected to be compared to the present, the less attractive future purchases become, and the greater the current demand for that good, as people buy more now when it is expected to be cheaper, rather than later, when it is expected to be more costly.

5. Would a change in the price of ice cream cause a change in the demand for ice cream? Why or why not?

No. The demand for ice cream represents the different quantities of ice cream that would be purchased at different prices. In other words, it represents the relationship between the price of ice cream and the quantity of ice cream demanded. Changing the price of ice cream does not change this relationship, so it does not change demand.

6. Would a change in the price of ice cream likely cause a change in the demand for frozen yogurt, a substitute?

Yes. Changing the price of ice cream, a substitute for frozen yogurt, would change the quantity of frozen yogurt demanded at a given price. This change in price means that the whole relationship between the price and quantity of frozen yogurt demanded has changed, which means the demand for frozen yogurt has changed.

7. If plane travel is a normal good and bus travel is an inferior good, what will happen to the demand curves for plane and bus travel if people's incomes increase?

The demand for plane travel and all other normal goods will increase if incomes increase, while the demand for bus travel and all other inferior goods will decrease if incomes increase.

4.4 Supply

1. What are the two reasons why a supply curve is positively sloped?

A supply curve is positively sloped because (1) the benefits to sellers from selling increase as the price they receive increases, and (2) the opportunity costs of supplying additional output rise with output (the law of increasing opportunity costs), so it takes a higher price to make increasing output in the self-interest of sellers.

2. What is the difference between an individual supply curve and a market supply curve?

The market supply curve shows the total amounts of a good all the sellers as a group are willing to sell at

various prices in a particular time period. The market quantity supplied at a given price is just the sum of the quantities supplied by each individual seller at that price.

4.5 Shifts in the Supply Curve

1. What is the difference between a change in supply and a change in quantity supplied?

A change in supply shifts the entire supply curve, while a change in quantity supplied refers to a movement along a given supply curve.

2. If a seller expects the price of a good to rise in the near future, how will that expectation affect the current supply curve?

Selling a good in the future is an alternative to selling it now. Therefore, the higher the expected future price relative to the current price, the more attractive future sales become, and the less attractive current sales become. This will lead sellers to reduce (shift left) the current supply of that good, as they want to sell later, when the good is expected to be more valuable, rather than now.

3. Would a change in the price of wheat change the supply of wheat? Would it change the supply of corn, if wheat and corn can be grown on the same type of land?

The supply of wheat represents the different quantities of wheat that would be offered for sale at different prices. In other words, it represents the relationship between the price of wheat and the quantity of wheat supplied. Changing the price of wheat does not change this relationship, so it does not change the supply of wheat. However, a change in the price of wheat changes the relative attractiveness of raising wheat instead of corn, which changes the supply of corn.

4. If a guitar manufacturer increased its wages in order to keep its workers, what would happen to the supply of guitars as a result?

An increase in wages, or any other input price, would decrease (shift left) the supply of guitars, making fewer guitars available for sale at any given price, by raising the opportunity cost of producing guitars.

5. What happens to the supply of baby-sitting services in an area when many teenagers get their driver's licenses at about the same time?

When teenagers get their driver's licenses, their increased mobility expands their alternatives to baby-sitting substantially, raising the opportunity cost of baby-sitting. This change decreases (shifts left) the supply of baby-sitting services.

4.6 Market Equilibrium Price and Quantity

1. How does the intersection of supply and demand indicate the equilibrium price and quantity in a market?

The intersection of supply and demand indicates the equilibrium price and quantity in a market because at higher prices, sellers would be frustrated by their inability to sell all they would like, leading sellers to compete by lowering the price they charge; at lower prices, buyers would be frustrated by their inability to buy all they would like, leading buyers to compete by increasing the price they offer to pay.

2. What can cause a change in the supply and demand equilibrium?

Changes in any of the demand curve shifters or the supply curve shifters will change the supply and demand equilibrium.

3. What must be true about the price charged for a shortage to occur?

The price charged must be less than the equilibrium price, with the result that buyers would like to buy more at that price than sellers are willing to sell.

4. What must be true about the price charged for a surplus to occur?

The price charged must be greater than the equilibrium price, with the result that sellers would like

to sell more at that price than buyers are willing to buy.

5. Why do market forces tend to eliminate both shortages and surpluses?

Market forces tend to eliminate both shortages and surpluses because of the self-interest of the market participants. A seller is better off successfully selling at a lower equilibrium price than not being able to sell at a higher price (the surplus situation) and a buyer is better off successfully buying at a higher equilibrium price than not being able to buy at a lower price (the shortage situation). Therefore, we expect market forces to eliminate both shortages and surpluses.

6. If tea prices were above their equilibrium level, what force would tend to push tea prices down? If tea prices were below their equilibrium level, what force would tend to push tea prices up?

If tea prices were above their equilibrium level, sellers frustrated by their inability to sell as much tea as they would like at those prices would compete the price of tea down, as they tried to make more attractive offers to tea buyers. If tea prices were below their equilibrium level, buyers frustrated by their inability to buy as much tea as they would like at those prices would compete the price of tea up, as they tried to make more attractive offers to tea sellers.

Problems

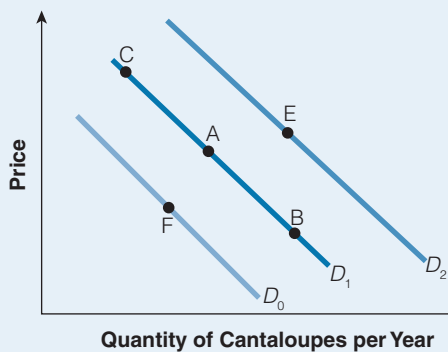
1. Is the market for laptop computers local, national, or global?
2. Sid moves from New York City, where he lived in a small condominium, to rural Minnesota, where he buys a big house on five acres of land. Using the law of demand, what do you think is true of land prices in New York City relative to those in rural Minnesota?
3. The following table shows Hillary's demand schedule for Cherry Blossom Makeup. Graph Hillary's demand curve.

Price (dollars per ounce)	Quantity Demanded (ounces per week)
\$15	5 oz.
12	10
9	15
6	20
3	25

4. The following table shows Cherry Blossom Makeup demand schedules for Hillary's friends, Barbara and Nancy. If Hillary, Barbara, and Nancy constitute the whole market for Cherry Blossom Makeup, complete the market demand schedule and graph the market demand curve.

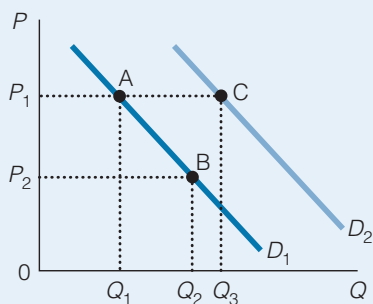
Price (dollars per ounce)	Quantity Demanded (ounces per week)			Market
	Hillary	Barbara	Nancy	
\$15	5	0	15	
12	10	5	20	
9	15	10	25	
6	20	15	30	
3	25	20	35	

5. What would be the effects of each of the following on the demand for hamburger in Hilo, Hawaii? In each case, identify the responsible determinant of demand.
- The price of chicken falls.
 - The price of hamburger buns doubles.
 - Scientists find that eating hamburger prolongs life.
 - The population of Hilo doubles.
6. What would be the effect of each of the following on the demand for Chevrolets in the United States? In each case, identify the responsible determinant of demand.
- The price of Fords plummets.
 - Consumers believe that the price of Chevrolets will rise next year.
 - The incomes of Americans rise.
 - The price of gasoline falls dramatically.
7. The following graph shows three market demand curves for cantaloupe. Starting at point A,
- which point represents an increase in quantity demanded?
 - which point represents an increase in demand?
 - which point represents a decrease in demand?
 - which point represents a decrease in quantity demanded?



8. Using the demand curve, show the effect of the following events on the market for beef:
- Consumer income increases.
 - The price of beef increases.
 - An outbreak of "mad cow" disease occurs.
 - The price of chicken (a substitute) increases.
 - The price of barbecue grills (a complement) increases.
9. Draw the demand curves for the following goods. If the price of the first good listed rises, what will happen to the demand for the second good, and why?
- hamburger and ketchup
 - Coca-Cola and Pepsi
 - camera and film
 - golf clubs and golf balls
 - skateboard and razor scooter

10. If the price of ice cream increased,
- what would be the effect on the demand for ice cream?
 - what would be the effect on the demand for frozen yogurt?
11. Using the graph below, answer the following questions.
- What is the shift from D_1 to D_2 called?
 - What is the movement from B to A called?
 - What is the movement from A to B called?
 - What is the shift from D_2 to D_1 called?



12. Felix is a wheat farmer who has two fields he can use to grow wheat. The first field is right next to his house and the topsoil is rich and thick. The second field is 10 miles away in the mountains and the soil is rocky. At current wheat prices, Felix just produces from the field next to his house because the market price for wheat is just high enough to cover his costs of production including a reasonable profit. What would have to happen to the market price of wheat for Felix to have the incentive to produce from the second field?
13. Show the impact of each of the following events on the oil market.
- OPEC becomes more effective in limiting the supply of oil.
 - OPEC becomes less effective in limiting the supply of oil.
 - The price for natural gas (a substitute for heating oil) rises.
 - New oil discoveries occur in Alaska.
 - Electric and hybrid cars become subsidized and their prices fall.
14. The following table shows the supply schedule for Rolling Rock Oil Co. Plot Rolling Rock's supply curve on a graph.

Price (dollars per barrel)	Quantity Supplied (barrels per month)
\$ 5	10,000
10	15,000
15	20,000
20	25,000
25	30,000

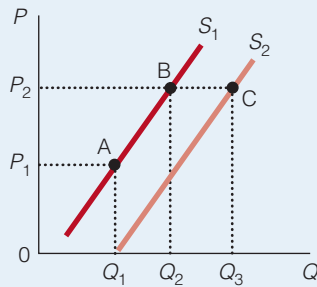
15. The following table shows the supply schedules for Rolling Rock and two other petroleum companies. Armadillo Oil and Pecos Petroleum. Assuming these three companies make up the entire supply side of the oil market, complete the market supply schedule and draw the market supply curve on a graph.

Price (dollars per barrel)	Quantity Supplied (barrels per month)			
	Rolling Rock	Armadillo Oil	Pecos Petroleum	Market
\$ 5	10,000	8,000	2,000	_____
10	15,000	10,000	5,000	_____
15	20,000	12,000	8,000	_____
20	25,000	14,000	11,000	_____
25	30,000	16,000	14,000	_____

16. If the price of corn rose,
- what would be the effect on the supply of corn?
 - what would be the effect on the supply of wheat?

17. Using the graph below, answer the following questions:

- What is the shift from S_1 to S_2 called?
- What is the movement from A to B called?
- What is the movement from B to A called?
- What is the shift from S_2 to S_1 called?



18. What would be the effect of each of the following on the supply of salsa in the United States? In each case, identify the responsible determinant of supply.

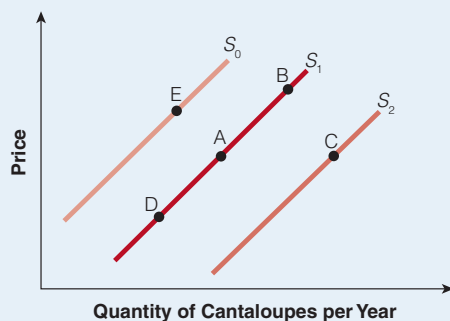
- Tomato prices skyrocket.
- Congress places a 26 percent tax on salsa.
- Ed Scissorhands introduces a new, faster vegetable chopper.
- J. Lo, Beyonce, and Adam Sandler each introduce a new brand of salsa.

19. What would be the effects of each of the following on the supply of coffee worldwide? In each case, identify the responsible determinant of supply.

- Freezing temperatures wipe out half of Brazil's coffee crop.
- Wages of coffee workers in Latin America rise as unionization efforts succeed.
- Indonesia offers big subsidies to its coffee producers.
- Genetic engineering produces a super coffee bean that grows faster and needs less care.
- Coffee suppliers expect prices to be higher in the future.

20. The following graph shows three market supply curves for cantaloupe. Compared to point A, which point represents

- an increase in quantity supplied?
- an increase in supply?
- a decrease in quantity supplied?
- a decrease in supply?



21. The following table shows the hypothetical monthly demand and supply schedules for cans of macadamia nuts in Hawaii.

Price	Quantity Demanded (cans)	Quantity Supplied (cans)
\$ 6	700	100
7	600	200
8	500	300
9	400	400
10	300	500

- a. What is the equilibrium price of macadamia nuts in Hawaii?
 - b. At a price of \$7 per can, is there equilibrium, a surplus, or a shortage? If it is a surplus or shortage, how large is it?
 - c. At a price of \$10, is there equilibrium, a surplus, or a shortage? If it is a surplus or shortage, how large is it?
22. When asked about the reason for a lifeguard shortage that threatened to keep one-third of the city's beaches closed for the summer, the Deputy Parks Commissioner of New York responded that "Kids seem to want to do work that's more in tune with a career. Maybe they prefer carpal tunnel syndrome to sunburn." What do you think is causing the shortage? What would you advise the Deputy Parks Commissioner to do in order to alleviate the shortage?
23. If a price is above the equilibrium price, explain the forces that bring the market back to the equilibrium price and quantity. If a price is below the equilibrium price, explain the forces that bring the market back to the equilibrium price and quantity.
24. The market for baseball tickets at your college stadium, which seats 2,000, is the following:

Price	Quantity Demanded	Quantity Supplied
\$2	4,000	2,000
4	2,000	2,000
6	1,000	2,000
8	500	2,000

- a. What is the equilibrium price?
 - b. What is unusual about the supply curve?
 - c. At what prices would a shortage occur?
 - d. At what prices would a surplus occur?
 - e. Suppose that the addition of new students (all big baseball fans) next year will add 1,000 to the quantity demanded at each price. What will this increase do to next year's demand curve? What is the new equilibrium price?
25. Assume the following information for the demand and supply curves for good Z.

Demand		Supply	
Price	Quantity Demanded	Price	Quantity Supplied
\$10	10	\$1	10
9	20	2	15
8	30	3	20
7	40	4	25
6	50	5	30
5	60	6	35
4	70	7	40
3	80	8	45
2	90	9	50
1	100	10	55

- a. Draw the corresponding supply and demand curves.
- b. What are the equilibrium price and quantity traded?
- c. Would a price of \$9 result in a shortage or a surplus? How large?
- d. Would a price of \$3 result in a shortage or a surplus? How large?
- e. If the demand for Z increased by 15 units at every price, what would the new equilibrium price and quantity traded be?
- f. Given the original demand for Z, if the supply of Z were increased by 15 units at every price, what would the new equilibrium price and quantity traded be?

Markets in Motion and Price Controls

5.1 Changes in Market Equilibrium

5.2 Price Controls

When four floors of his building caved in, killing three of his neighbors, Uttamchand K. Sojatwala, owner of a successful textile business, refused to leave his two-bedroom, rent-controlled apartment in Mumbai, India. The city then cut off his electricity and water and threatened to arrest his wife, but he still wouldn't leave. In all, fifty-eight tenants refused to leave a rent-controlled apartment building that was considered too dangerous by city officials. Why did these residents take the risk? Cheap rent—\$8.50 a month.

SAM HOLLENSHEAD/POLARIS



There is tremendous tension in “the market” for Mumbai rent-controlled properties between landlords who can’t afford to keep up their properties and tenants who will go to extraordinary lengths to keep their units.

In the words of the great economist Alfred Marshall, “Like scissors that function by the interaction of two distinct blades, supply and demand interact to determine the price and quantity exchanged.” In this chapter, we will study the impact of a change in one or more of the determinants of supply and demand and see how it impacts the market price and quantity exchanged. That is, if you want to know how an event or policy may affect the economy, you must know supply and demand. We will then explore the impact of price controls, which are government mandates to set a price above or below the equilibrium price. We will also see that policies can have unintended effects—adverse effects that the policy makers did not anticipate.

5.1

Changes in Market Equilibrium

What happens to equilibrium price and quantity when the demand curve shifts?

What happens when both supply and demand shift in the same time period?

What happens to equilibrium price and quantity when the supply curve shifts?

What is an indeterminate solution?



What causes the changes in the equilibrium price and equilibrium quantity?

When one of the many determinants of demand or supply (input prices, prices of related products, number of suppliers, expectations, technology, and so on) changes, the demand and/or supply curves will shift, leading to changes in the equilibrium price and equilibrium quantity. We first consider a change in demand.

A Change in Demand

A shift in the demand curve—caused by a change in the price of a related good (substitutes or complements), income, the number of buyers, tastes, or expectations—results in a change in both equilibrium price and equilibrium quantity, assuming the supply curve has not changed. But how and why does this relationship happen? The answer can be most clearly explained by means of an example. Suppose a new study claimed that two cups of coffee per day had significant health benefits. We would expect an increase in the demand for coffee. That is, at any given price, buyers want more coffee than before. At the original equilibrium, E_1 , consumers want to buy Q_3 but sellers only want to sell Q_1 , as seen in Exhibit 1. Market pressure drives the price up to a new equilibrium, E_2 at P_2 . Both the equilibrium price and quantity rise because of the increase in demand. Notice that the rightward shift in the demand curve causes a movement up along the supply curve, causing an increase in quantity supplied.



If demand is greater than the current production schedule, then there will be shortages at the current price. Consequently some dealers were charging prices much higher than the sticker price for the 2010 Camaro when it first hit the showroom.

A Change in Supply

Like a shift in demand, a shift in the supply curve will also influence both equilibrium price and equilibrium quantity, assuming that demand for the product has not changed. For

example, what impact would unfavorable weather conditions have in coffee-producing countries? Such conditions could cause a reduction in the supply of coffee. At any given price, sellers now want to sell less coffee. At the original equilibrium price of P_1 , consumers still want to buy Q_1 , but sellers are now only willing to supply Q_3 . Thus, a shortage develops. Market pressure forces the price of coffee up until it reaches the new equilibrium at E_2 , where the equilibrium price is P_2 , and the equilibrium quantity is Q_2 . A decrease in supply, *ceteris paribus*, will lead to a higher equilibrium price and a lower equilibrium quantity, as shown in Exhibit 2. Notice that the decrease in supply causes a *leftward shift in the supply curve*, resulting in a movement *up along the demand curve* causing a decrease in quantity demanded.

Changes in Both Supply and Demand

We have discussed that, as part of the continual process of adjustment that occurs in the marketplace, supply and demand can each shift in response to many different factors, with the market then adjusting toward the new equilibrium. We have, so far, only considered what happens when just one such change occurs at a time. In these cases, we learned that the results of the adjustments in supply and demand on the equilibrium price and quantity are predictable. However, both supply and demand will often shift in the same time period. Can we predict what will happen to equilibrium prices and equilibrium quantities in these situations?

As you will see, when supply and demand move at the same time, we can predict the change in one variable (price or quantity), but we are unable to predict the direction of the



CHRISTOPHER ELWELL/SHUTTERSTOCK.COM

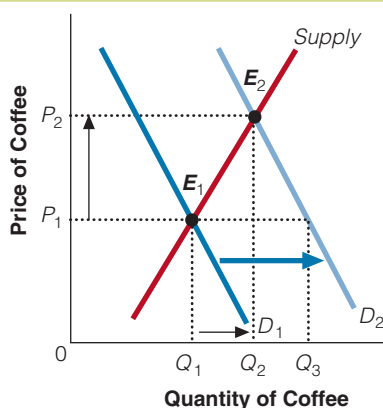
In the summer of 2010, a severe drought and wildfires in Russia, the world's fourth largest wheat producer, destroyed roughly 20 percent of the country's wheat crop and sent prices soaring. From June of 2010 to August 2010, wheat prices more than doubled. The world wheat market was also impacted by unusually wet weather in Canada which prevented seeding and destroyed crops. The price of orange juice also rose probably thanks to bets placed on the likelihood of tropical storms. Coffee prices were also at a 13-year high, as a result of poor harvests. Taken together, the cost of breakfast rose over 20 percent in just two months.

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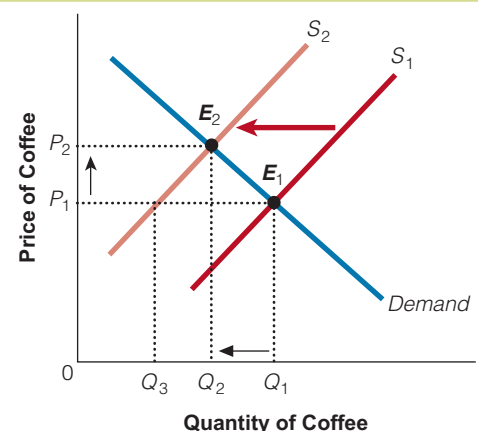
Changes in supply or demand cause prices to change; in turn, buyers and sellers adjust their purchases and sales decisions.

section 5.1 exhibit 1 An Increase in Demand



An increase in demand leads to a higher equilibrium price and a greater equilibrium quantity, *ceteris paribus*.

section 5.1 exhibit 2 A Decrease in Supply



A decrease in supply leads to an increase in equilibrium price and a decrease in equilibrium quantity.

use

what you've learned

Change in Demand

Q In ski resorts such as Aspen and Sun Valley, hotel prices are higher in February (in-season when more skiers want to ski) than in May (off-season when fewer skiers want to ski). If the May hotel prices were charged in February, what problem would arise? What if we charged February's price in May?

A In the (likely) event that supply is not altered significantly, demand is chiefly responsible for the higher prices in the prime skiing months. In Exhibit 3(a), if prices were maintained at the off-season rates (P_{MAY}) all year long, a shortage would exist—the difference between points A and B in Exhibit 3(a). This excess demand at the off-peak prices causes prime-season rates to be higher. After all, why would a self-interested resort owner rent you a room for less than its opportunity cost (what someone else would be willing to pay)? For example, at the Hotel Jerome in Aspen, the price per night of a Deluxe King room is almost six times higher

in late December (in-season) than it is in mid-May (off-season). In Exhibit 3(b), we see that if hotels were to charge the in-season price (P_{FEB}) during the off-season (May), a surplus would result—the difference between points C and D. Now, it would be this excess supply during the off-season (at in-season prices) that would cause the price to fall. Who needs all the empty rooms?



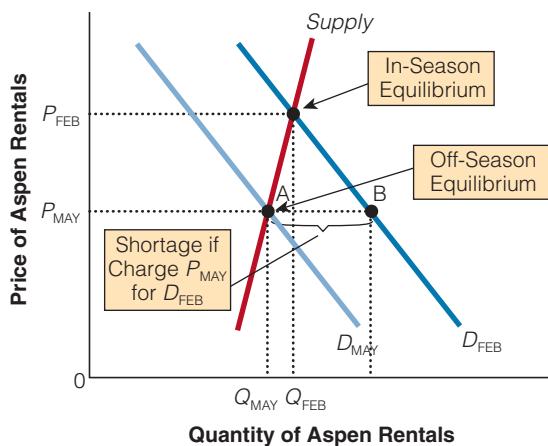
AP PHOTO/ED KOSMICK

What would happen if the Hotel Jerome, pictured above, charged the lower out-of-season rate for resort rentals during peak ski season?

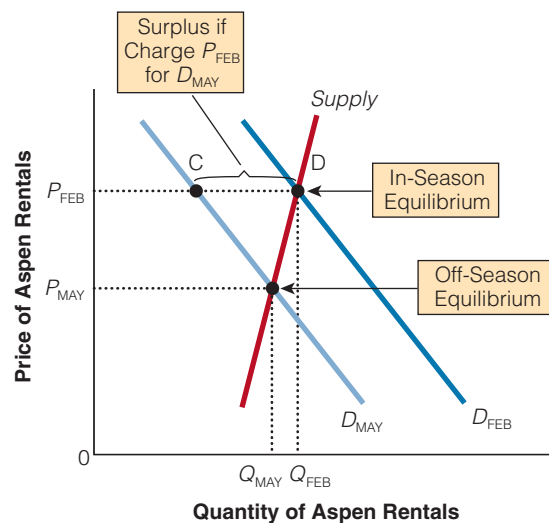
section 5.1 exhibit 3

The Market for Aspen Rentals

a. Charging May (Off-Season) Prices in February (In-Season)



b. Charging February (In-Season) Prices in May (Off-Season)



in the news

The Role of Prices in the Aftermath of Hurricane Katrina

The fallout from Hurricane Katrina has featured a lot of ignorance and demagoguery about prices. Let's look at some of it. One undeniable fact is that the hurricane disaster changed scarcity conditions. There are fewer stores, fewer units of housing, less gasoline, and a shortage of many other goods and services used on a daily basis. Rising prices are not only a manifestation of these changed scarcity conditions, they help us cope, adjust and get us on the road to recovery.

Here's a which-is-better question for you. Suppose a hotel room rented for \$79 a night prior to Hurricane Katrina's devastation. Based on that price, an evacuating family of four might rent two adjoining rooms. When they arrive at the hotel, they find the rooms rent for \$200; they decide to make do with one room. In my book, that's wonderful. The family voluntarily opted to make a room available for another family who had to evacuate or whose home was destroyed. Demagogues will call this price-gouging, but I ask you, which is preferable: a room available at \$200 or a room unavailable at \$79? Rising prices get people to voluntarily economize on goods and services rendered scarcer by the disaster.

After Hurricane Katrina struck, gasoline prices shot up almost a dollar nearly overnight. Some people have been quick to call this price-gouging, particularly since wholesalers and retailers were charging the higher price for gasoline already purchased and in their tanks prior to the hurricane. The fact of business is that what a seller paid for some-

thing doesn't necessarily determine its selling price. Put in a bit more sophisticated way: Historical costs have nothing to do with selling price. For example, suppose you maintained a 10-pound inventory of coffee in your cupboard. When I ran out, you'd occasionally sell me a pound for \$2. Suppose there's a freeze in Brazil destroying much of the coffee crop, driving coffee prices to \$5 a pound. Then I come around to purchase coffee. Are you going to charge me \$2 a pound, what you paid for it, or \$5, what it's going to cost you to restock your coffee inventory?

What about the house that you might have purchased for \$50,000 in 1970 that you're selling today? If you charged me \$250,000 for it, today's price for its replacement, as opposed to what you paid for it, are you guilty of price-gouging?

Recovering from Katrina means resources will have to be moved to the Gulf Coast. I ask you, how does one get electricians, plumbers and other artisans to give up their comfortable homes and livelihoods in Virginia and Pennsylvania and travel to Mobile and New Orleans to help in the recovery? If you said pay them higher prices, go to the head of the class. Higher prices, along with windfall profits, are economic signals of unmet human wants. As such, they encourage producers to meet those human wants. . . .

SOURCE: Walter Williams, "The Role of Prices in the Aftermath of Hurricane Katrina," September 14, 2005, © 2005, Creators Syndicate, Inc.

effect on the other variable with any certainty. The change in the second variable, then, is said to be *indeterminate*, because it cannot be determined without additional information about the size of the relative shifts in supply and demand. This concept will become clearer to you as we work through the following example.

An Increase in Supply and a Decrease in Demand

In Exhibits 4(a) and 4(b), we have an increase in supply and a decrease in demand. These changes will clearly result in a decrease in the equilibrium price, because both the increase in supply and the decrease in demand work to push this price down. This drop in equilibrium price (from P_1 to P_2) is shown in the movement from E_1 to E_2 in Exhibits 4(a) and 4(b).

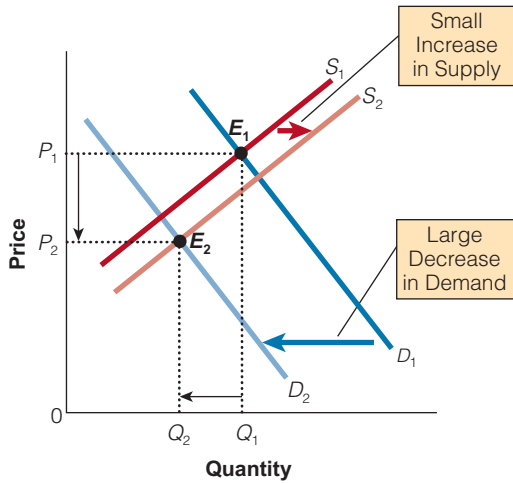


What does it mean when it says that one of the variables is indeterminate?

section 5.1
exhibit 4

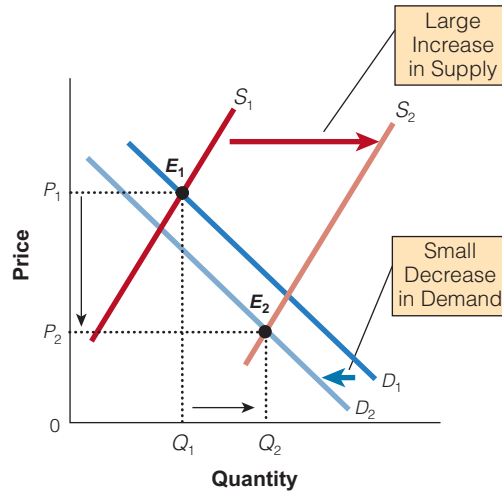
Shifts in Supply and Demand

a. A Small Increase in Supply and a Large Decrease in Demand



If the decrease in demand (leftward shift) is greater than the increase in supply (rightward shift), the equilibrium price and equilibrium quantity will fall.

b. A Large Increase in Supply and a Small Decrease in Demand

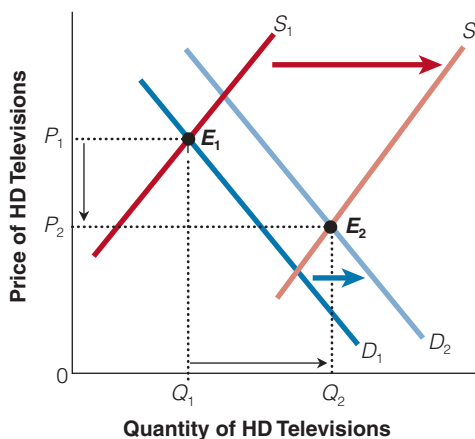


If the increase in supply (rightward shift) is greater than the decrease in demand (leftward shift), the equilibrium price will fall and the equilibrium quantity will rise.

The effect of these changes on equilibrium price is clear, but how does the equilibrium quantity change? The impact on equilibrium quantity is indeterminate because the increase in supply increases the equilibrium quantity and the decrease in demand decreases it. In this scenario, the change in the equilibrium quantity will vary depending on the relative changes in supply and demand. If, as shown in Exhibit 4(a), the decrease in demand is greater than the increase in supply, the equilibrium quantity will decrease. If, however, as shown in Exhibit 4(b), the increase in supply is greater than the decrease in demand, the equilibrium quantity will increase.

section 5.1
exhibit 5

An Increase in the Demand and Supply of HD Televisions



The increase in supply and demand caused an increase in the equilibrium quantity. Price is the indeterminate variable. Because the supply of HD televisions shifted more than the demand for HD televisions, the price of HD televisions has fallen.

An Increase in Demand and Supply

It is also possible that both supply and demand will increase (or decrease). This situation, for example, has happened with high-definition (HD) televisions (and with DVDs, laptops, cell phones, digital cameras, and other electronic equipment, too). As a result of technological breakthroughs and new factories manufacturing HD televisions, the supply curve for HD televisions shifted to the right. That is, at any given price, more HD televisions were offered than before. But with rising income and an increasing number of buyers in the market, the demand for HD televisions increased as well. As shown in Exhibit 5, both the increased demand and the increased supply caused an increase in the equilibrium quantity—more HD televisions were sold. The equilibrium price could

have gone either up (because of increased demand) or down (because of increased supply), depending on the relative sizes of the demand and supply shifts. In this case, price is the indeterminate variable. However, in the case of HD televisions, we know that the supply curve shifted more than the demand curve, so that the effect of increased supply pushing prices down outweighed the effect of increased demand pushing prices up. As a result, the equilibrium price of HD televisions has fallen (from P_1 to P_2) over time.

section 5.1
exhibit 6

The Effect of Changing Demand and/or Supply

	Supply Unchanged	An Increase in Supply	A Decrease in Supply
Demand unchanged	P unchanged Q unchanged	$P \downarrow$ $Q \uparrow$	$P \uparrow$ $Q \downarrow$
An increase in demand	$P \uparrow$ $Q \uparrow$	P indeterminate* $Q \uparrow$	$P \uparrow$ Q indeterminate*
A decrease in demand	$P \downarrow$ $Q \downarrow$	$P \downarrow$ Q indeterminate*	P indeterminate* $Q \downarrow$

*Indeterminate means it may increase, decrease, or remain the same, depending on the size of the change in demand relative to the change in supply.

The Combinations of Supply and Demand Shifts

The possible changes in demand and/or supply shifts are presented in Exhibit 6, along with the resulting changes in equilibrium quantity and equilibrium price in Exhibit 7. Even though you could memorize the impact of the various possible changes in demand and supply, it would be more profitable to draw a graph, as shown in Exhibit 7, whenever a situation of changing demand and/or supply arises. Remember that an increase in either demand or supply means a rightward shift in the curve, while a decrease in either means a leftward shift. Also, when both demand and supply change, one of the two equilibrium values, price or quantity, will change in an indeterminate manner (increase or decrease), depending on the relative magnitude of the changes in supply and demand.

Supply, Demand, and the Market Economy

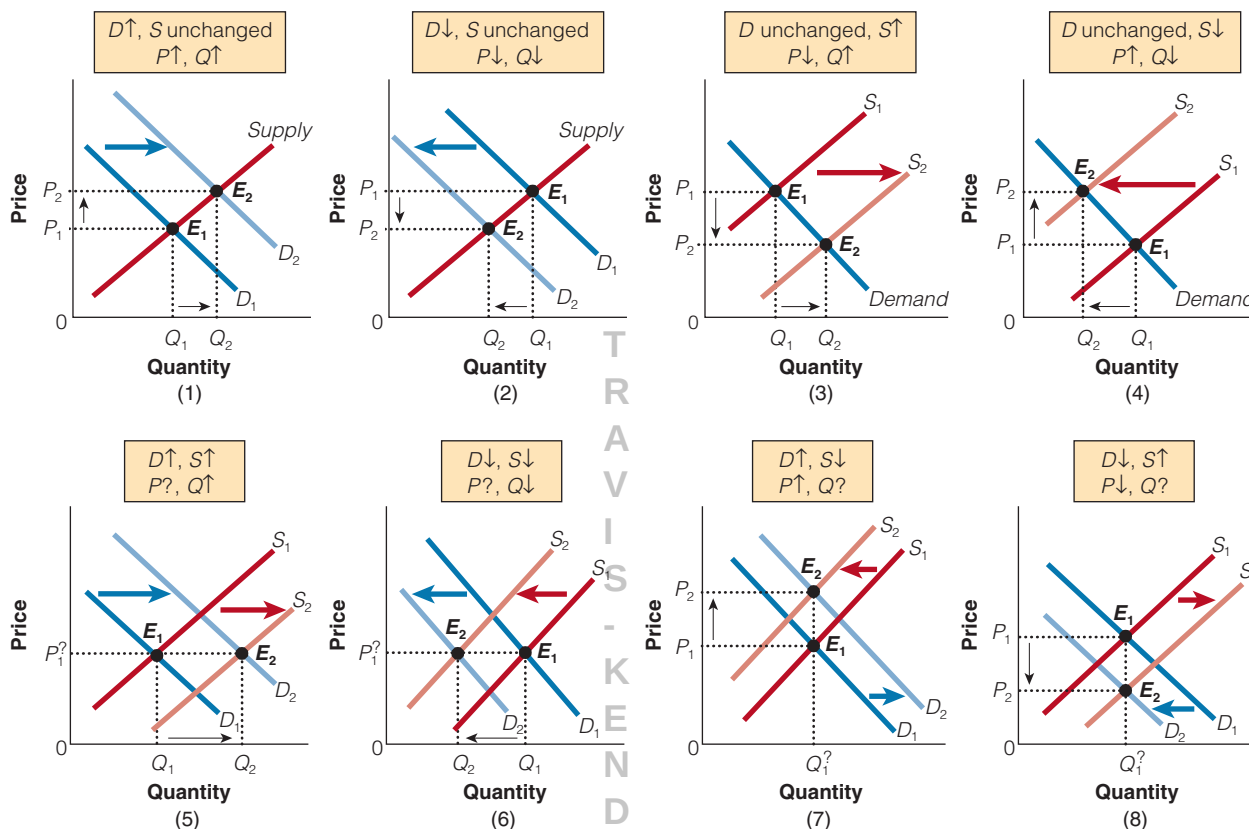
Supply and demand are at the very foundation of the market system. They determine the prices of goods and services and determine how our scarce resources are allocated. What is truly amazing is how producers respond to the complex wants of the population without having tremendous shortages or surpluses, despite the fact that in a “free market,” no single individual or agency makes decisions about what to produce. The market system provides a way for millions of producers and consumers to allocate scarce resources. Buyers and sellers indicate their wants through their actions and inactions in the marketplace, and this collective “voice” determines how resources are allocated. But how is this information communicated? Market prices serve as the language of the market system.

We often say the decision is made by “the market” or “market forces,” but this is of little help in pinpointing the name and the place of the decision maker. In fact, no single person makes decisions about the quantity and quality of television, cars, beds, or any other goods or services consumed in the economy. Literally millions of people, both producers and consumers, participate in the decision-making process. To paraphrase a statement made popular by the first great modern economist, Adam Smith, it is as if an invisible hand works to coordinate the efforts of millions of diverse participants in the complex process of producing and distributing goods and services.

Market prices communicate important information to both buyers and sellers. They reveal information about the relative availability of products to buyers, and they provide sellers with critical information about the relative value that consumers place on those products. In effect, market prices provide a way for both buyers and sellers to communicate about the relative value of resources. This communication results in a shifting of resources from those uses that are less valued to those that are more valued.

section 5.1
exhibit 7

The Combination of Supply and Demand Shifts



news

College Enrollment and the Price of Going to College

Q How is it possible that the price of a college education has increased significantly over the past 37 years, yet many more students are attending college? Does this relationship defy the law of demand?

A If we know the price of a college education (adjusted for inflation) and the number of students enrolled in college for the two years 1970 and 2010, we can tell a plausible story using the analysis of supply and demand. In Exhibit 8(a), suppose that we have data for points A and B: the price of a

college education and the quantity (the number of college students enrolled in the respective years, 1970 and 2010). In Exhibit 8(b), we connect the two points with supply and demand curves and see a decrease in supply and an increase in demand. Demand increased between 1970 and 2010 for at least two reasons. First, on the demand side, as population grows, a greater number of buyers want a college education. Second, a college education is a normal good; as income increases, buyers increase their demand for a college education. Third, demand has increased because of the availability of student loans. Between 1999 and 2009, total federal aid to college students rose from \$61.1 billion to \$116.8 billion. If you include state aid, total

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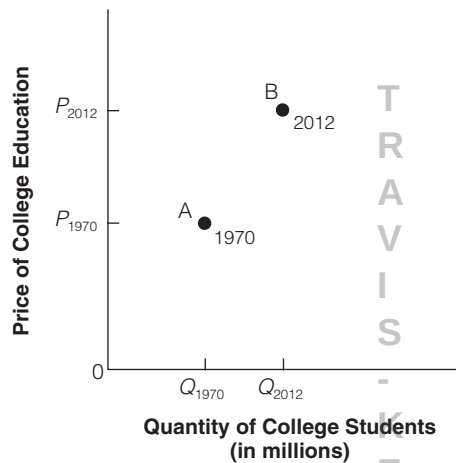
in the news

College Enrollment and the Price of Going to College (Cont.)

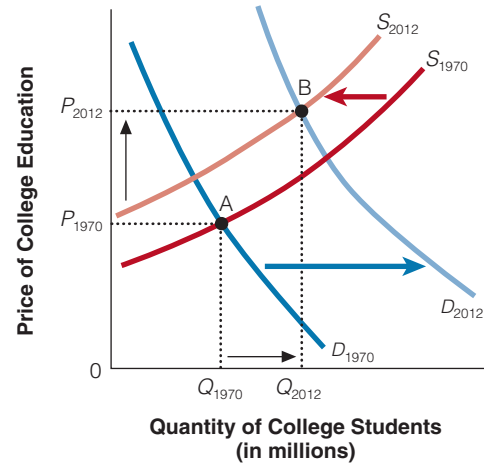
section 5.1
exhibit 8

Market for College Education

a. Price of College Education and Quantity of College Students



b. Simultaneous Increase in Demand and Decrease in Supply



government subsidies nearly doubled from \$66.6 billion to \$126.2 billion. The average amount of a federal student loan increased 180 percent from 1990 to 2008, after adjusting for inflation. On the supply side, several factors caused the supply curve for education to shift to the left: the cost of hiring new staff and faculty (and increases in their salaries), new equipment (computers, lab equipment, and library supplies), and buildings (additional classrooms, labs, cafeteria expansions, and dormitory space).

This situation does not defy the law of demand that states that there is an inverse relationship between price and quantity demanded, *ceteris paribus*. The truth is that supply and demand curves are shifting constantly. In this case, the demand (increasing) and supply (decreasing) caused price and quantity to rise.



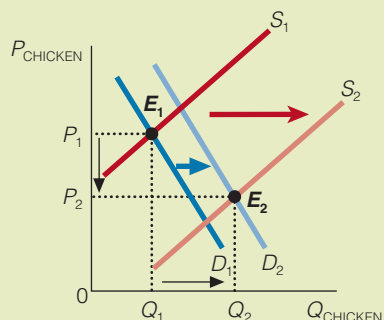
USE

what you've learned

Supply and Demand Applications

Q During the second half of the twentieth century, demand for chicken increased because of rising income and the purported health benefits. However, as the demand for chicken increased, the price fell. Why? (*Hint: Remember it is supply and demand.*)

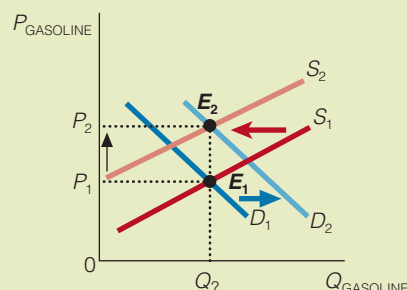
A Even though the demand for chicken did increase (a small rightward shift), the supply of chicken increased even more—technological advances in the poultry industry and many new suppliers caused the supply curve to shift rightward. In order for the price to fall, the supply must have shifted further to the right than the demand curve. The result is more chickens consumed at a lower price.



Q Suppose the demand for gasoline increases because of world economic growth and higher incomes. At the same time, supply decreases because of hostilities in the Middle East and refinery problems. What can we predict would happen to the price and quantity of gasoline?

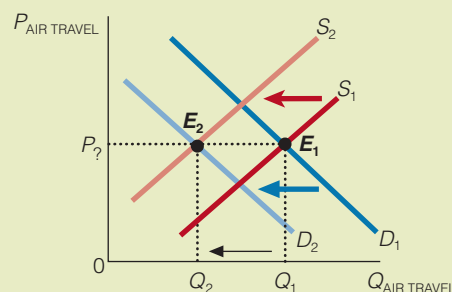
A The increase in demand (rightward shift) and the decrease in supply (leftward shift) would lead to an increase in price. We are not sure about the quantity of gasoline consumed—it depends on the magnitude of the shifts in the

demand and supply curves. That is, quantity is indeterminate.



Q Suppose the demand for air travel decreases because of air safety concerns. At the same time, the price of jet fuel increases. What do you think will happen to the price and quantity of air travel?

A Safety concerns would result in a decrease in demand (leftward shift) for air travel and the higher input cost of jet fuel would lead to a decrease in supply (leftward shift). These factors reduce the quantity of air travel. The price change will depend on the magnitude of the shifts in the demand and supply curves. That is, price is indeterminate.



Q Hypothetically, suppose a new study reveals that sugar can have “huge” negative health consequences, causing a large decrease in demand. In addition, a slight reduction in the sugar yield occurs because of bad weather in sugar-producing areas. What do you think will happen to the price and quantity of sugar?

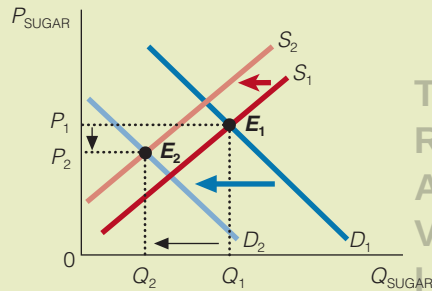
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use

what you've learned

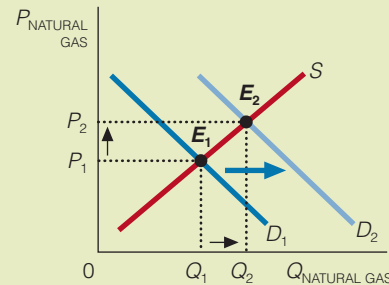
Supply and Demand Applications (Cont.)

A A large decrease in demand (leftward shift) for sugar and a small decrease in supply (leftward shift) because of bad weather lead to a reduction in price and a large reduction in quantity.



Q As the price of oil rises, many may switch to burning natural gas to save money. Can buyers of natural gas expect any surprises?

A If oil and natural gas are substitutes, then the higher price for oil will cause an increase in demand for natural gas (rightward shift). As a result, the price and quantity of natural gas will rise.



SECTION QUIZ

- Other things equal, a decrease in consumer income would
 - increase the price and increase the quantity of autos exchanged.
 - increase the price and decrease the quantity of autos exchanged.
 - decrease the price and increase the quantity of autos exchanged.
 - decrease the price and decrease the quantity of autos exchanged.
- An increase in the expected future price of a good by consumers would, other things equal,
 - increase the current price and increase the current quantity exchanged.
 - increase the current price and decrease the current quantity exchanged.
 - decrease the current price and increase the current quantity exchanged.
 - decrease the current price and decrease the current quantity exchanged.
- Assume that airline travel is a normal good. Higher incomes would
 - increase both the price and the quantity of airline travel.
 - decrease both the price and quantity of airline travel.
 - increase the price and decrease the quantity of airline travel.
 - decrease the price and increase the quantity of airline travel.
- If you observed the price of a good increasing and the quantity exchanged decreasing, it would be most likely caused by a(n)
 - increase in demand.
 - decrease in demand.
 - increase in supply.
 - decrease in supply.

(continued)

SECTION QUIZ (Cont.)



5. If you observed the price of a good decreasing and the quantity exchanged decreasing, it would be most likely caused by a(n)
 - a. increase in demand.
 - b. decrease in demand.
 - c. increase in supply.
 - d. decrease in supply.
6. If both supply and demand decreased, but supply decreased more than demand, the result would be
 - a. a higher price and a lower equilibrium quantity.
 - b. a lower price and a lower equilibrium quantity.
 - c. no change in the price and a lower equilibrium quantity.
 - d. a higher price and a greater equilibrium quantity.
 - e. a lower price and a greater equilibrium quantity.
7. Which of the following are true statements?
 - a. Changes in demand will cause a change in the equilibrium price and/or quantity, *ceteris paribus*.
 - b. Changes in supply will cause a change in the equilibrium price and/or quantity, *ceteris paribus*.
 - c. Supply and demand curves can shift simultaneously in response to changes in both supply and demand determinants.
 - d. When simultaneous shifts occur in both supply and demand curves, we will be able to determine one, but not both, of the variables.
 - e. All of the above are true.

1. Does an increase in demand create a shortage or surplus at the original price?
2. What happens to the equilibrium price and quantity as a result of a demand increase?
3. Does an increase in supply create a shortage or surplus at the original price?
4. Assuming the market is already at equilibrium, what happens to the equilibrium price and quantity as a result of a supply increase?
5. Why are evening and weekend long-distance calls cheaper than weekday long-distance calls?
6. What would have to be true for both supply and demand to shift in the same time period?
7. When both supply and demand shift, what added information do we need to know in order to determine in which direction the indeterminate variable changes?
8. If both buyers and sellers of grapes expect grape prices to rise in the near future, what will happen to grape prices and sales today?
9. If demand for peanut butter increases and supply decreases, what will happen to equilibrium price and quantity?

Answers: 1. d 2. a 3. a 4. d 5. b 6. a 7. e

Price Controls

5.2

What are price controls?

What are price ceilings?

What are price floors?

What is the law of unintended consequences?

Price Controls

Although nonequilibrium prices can occur naturally in the private sector, reflecting uncertainty, they seldom last for long. Governments, however, may impose nonequilibrium prices for significant periods. Price controls involve the use of the power of the state to establish prices different from the equilibrium prices that would otherwise prevail. The motivations for price controls vary with the market under consideration. For example, a **price ceiling**, a legal maximum price, is often set for goods deemed important to low-income households, such as housing. Or a **price floor**, a legal minimum price, may be set on wages because wages are the primary source of income for most people.

Price controls are not always implemented by the federal government. Local governments (and more rarely, private companies) can and do impose local price controls. One fairly well-known example is rent control. The inflation of the late 1970s meant rapidly rising rents; and some communities, such as Santa Monica, California, decided to do something about it. In response, they limited how much landlords could charge for rental housing.

price ceiling

a legally established maximum price

price floor

a legally established minimum price



economic content standards

Government-enforced price ceilings set below the market clearing price and government enforced price floors set above the market clearing price distort price signals and incentives to producers and consumers. The price ceilings cause persistent shortages, while price floors cause persistent surpluses.

Price Ceilings: Rent Controls

Rent control experiences can be found in many cities across the country. San Francisco, Berkeley, and New York City all have had some form of rent control. Although the rules may vary from city to city and over time, generally the price (or rent) of an apartment remains fixed over the tenure of an occupant, except for allowable annual increases tied to the cost of living or some other price index. When an occupant moves out, the owners can usually, but not always, raise the rent to a near-market level for the next occupant. The controlled rents for existing occupants, however, are generally well below market rental rates.

Results of Rent Controls

Most people living in rent-controlled apartments are getting a good deal, one that they would lose by moving as their family circumstances or income changes. Tenants thus are reluctant to give up their governmentally granted right to a below-market-rent apartment. In addition, because the rents received by landlords are constrained and below market levels, the rate of return (roughly, the profit) on housing investments falls compared with that on other forms of real estate not subject to rent controls, such as office rents or mortgage payments on condominiums. Hence, the incentive to construct new housing is reduced.

Further, when landlords are limited in the rents they can charge, they have little incentive to improve or upgrade apartments—by putting in new kitchen appliances or new carpeting, for instance. In fact, rent controls give landlords some incentive to avoid routine maintenance, thereby lowering the cost of apartment ownership to a figure approximating the controlled rental price, although the quality of the housing stock will deteriorate over time.

Another impact of rent controls is that they promote housing discrimination. Where rent controls do not exist, prejudiced landlords might willingly rent to people they believe are undesirable simply because the undesirables are the only ones willing to pay the requested rents (and the landlords are not willing to lower their rents substantially to get desirable renters because of the possible loss of thousands of dollars in income). With rent controls, each rent-controlled apartment is likely to attract many possible renters, some desirable and

global
watch

Zimbabwe Price Controls Spark Food Shortages

ZIMBABWE'S government and the country's businesses have clashed over prices of basic commodities, now blamed for widespread shortages days after disputed polls won by President Robert Mugabe's ruling party.

Prices shot up by as much as 100 percent after the March 31 parliamentary elections in which Mugabe's ZANU-PF government defeated the opposition Movement for Democratic Change (MDC), but the government swiftly moved in, ordering businesses to reverse the increases.

"Increases were actually delayed to avoid harsh criticism of the government ahead of the elections but now the government is saying you can not increase prices without consulting us . . . that's not what we agreed," a spokesman for the Confederation of Zimbabwe Industries told Reuters.

The staple maize-meal, sugar and cooking oil have disappeared from most shops in Harare's city centre and suburbs while most pumps at fuel stations have run dry, forcing motorists to brace for long queues.

Maize-meal supplies were already erratic in the country in recent months with supermarkets out of stocks for days on end and long queues quickly form where the commodity is available.

consider this:

In July of 2007, Zimbabwe's government threatened to seize any business that did not roll their prices back. But many shop-keepers and manufacturers threatened to shut down and lay off workers rather than produce at a loss. Gasoline was disappearing from the pumps and many workers were forced to walk to work. Shoppers were told to queue (wait in line) for whatever products were left on the shelf. Police were sent in to enforce the price controls, which resulted in hundreds of shop owners being arrested for not lowering



AP PHOTO/KAREL PRINSLOO

prices enough. In short, price controls and the resulting shortages can turn into social unrest. This is not the first time Zimbabwe has tried price controls; they are usually short-lived and poorly enforced. In 2009, the finance minister Patrick Chinamasa announced the government is abandoning price controls. Mr. Chinamasa told parliament "that price controls would be abandoned because they had 'unintentionally' harmed businesses and added to Zimbabwe's hyperinflation."

SOURCE: Macdonald Dzirutwe, newzimbabwe.com, retrieved 12/01/2008.
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some undesirable as judged by the landlord, simply because the rent is at a below-equilibrium price. Landlords can indulge in their “taste” for discrimination without any additional financial loss beyond that required by the controls. Consequently, they will be more likely to choose to rent to desirable people, perhaps a family without children or pets, rather than to undesirable ones, perhaps a family with lower income and so a greater risk of nonpayment.

Exhibit 1 shows the impact of rent controls. If the price ceiling (P_{RC}) is set below the equilibrium price (P_E), consumers are willing to buy Q_D , but producers are only willing to supply Q_S . The rent control policy will therefore create a persistent shortage, the difference between Q_D and Q_S .



Can rent controls promote housing discrimination?

Price Floors: The Minimum Wage

The argument for a minimum wage is simple: Existing wages for workers in some types of labor markets do not allow for a very high standard of living, and a minimum wage allows those workers to live better than before. Ever since 1938, when the first minimum wage was established (at 25 cents per hour), the federal government has, by legislation, made it illegal to pay most workers an amount below the current legislated minimum wage. As of July of 2009, the federal minimum wage was set at \$7.25. A number of states also have minimum-wage laws. In cases where an employee is subject to both state and federal minimum-wage laws, the employee is entitled to the higher minimum wage.

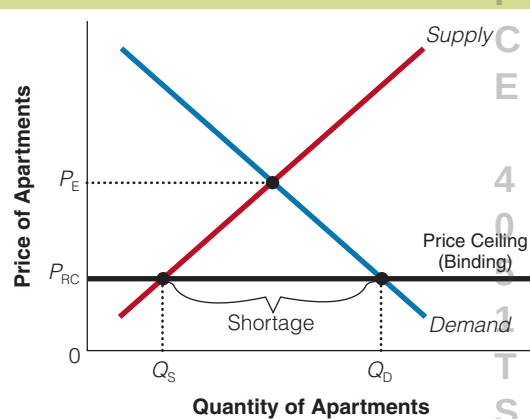
Let's examine graphically the impact of a minimum wage on low-skilled workers. In Exhibit 2, suppose the government sets the minimum wage, W_{MIN} , above the market equilibrium wage, W_E . In Exhibit 2, we see that the price floor is binding. That is, there is a surplus of low-skilled workers at W_{MIN} , because the quantity of labor supplied is greater than the quantity of labor demanded. The reason for the surplus of low-skilled workers (unemployment) at W_{MIN} is that more people are willing to work than employers are willing and able to hire.

What does a binding price ceiling or binding price floor mean?

Notice that not everyone loses from a minimum wage. Workers who continue to hold jobs have higher incomes—those between 0 and Q_D in Exhibit 2. However, many low-skilled workers suffer from a minimum wage—those between Q_D and Q_S in Exhibit 2—because they either lose their jobs or are unable to get them in the first place. Although studies

section 5.2
exhibit 1

Rent Controls



The impact of a rent ceiling set below the equilibrium price is a persistent shortage.

section 5.2
exhibit 2

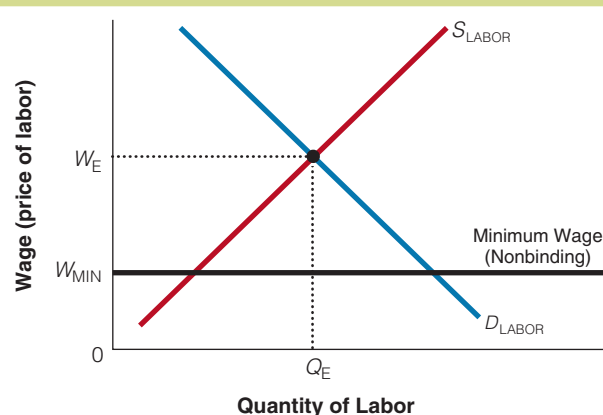
Unemployment Effects of a Minimum Wage on Low-Skilled Workers



The impact of a price floor (a minimum wage) set above the equilibrium price is a surplus—in this case, a surplus of low-skilled workers.

section 5.2
exhibit 3

Unemployment Effects of a Minimum Wage on Skilled Workers



There is no impact of a price floor on the market for skilled workers. In this market, the price floor (the minimum wage) is not binding.



*Who loses and who wins
with higher minimum wages?*

*Are consumers hurt by a
higher minimum wage?*

have found the effect on employment to be much larger. In fact, most empirical studies indicate that a 10 percent increase in the minimum wage would reduce employment of teenagers between 1 and 3 percent. Second, some might believe that the cost of unemployment resulting from a minimum wage is a reasonable price to pay for ensuring that those with jobs get a “decent” wage. However, opponents of minimum wage argue that it might induce teenagers to drop out of school. Less than one-third of minimum-wage earners are from families with incomes below the poverty line. In fact, many recipients of the minimum wage are part-time teenage workers from middle-income families. More efficient methods transfer income to low-wage workers, such as a wage subsidy like the earned income tax credit. This is a government program that supplements low-wage-workers. Of course, there are no free lunches so subsidies in the form of wages, income, or rent ultimately cost taxpayers. We will revisit this topic in upcoming chapters.

However, the analysis does point out there is a cost to having a minimum wage: The burden of the minimum wage falls not only on low-skilled workers and employers but also on consumers of products made more costly by the minimum wage.

Price Ceilings: Price Controls on Gasoline

Another example of price ceilings leading to shortages is the price controls imposed on gasoline in 1974. In 1973, the Organization of Petroleum Exporting Nations (OPEC) reduced the supply of oil. Because crude oil is the most important input in the production of gasoline, this reduction in the supply of oil caused a shift in the supply curve for gasoline leftward from S_1 to S_2 in Exhibit 4. In an effort to prevent sharply rising prices, the government imposed price controls



In 1974, the government imposed price ceilings on gasoline. The result was shortages. In some cities, such as Chicago, Portland, and New York, drivers waited over an hour to fill up their tanks. As you know, the value of your time has an opportunity cost.

on gasoline in 1974. The government told gasoline stations they could not charge more than P_C for gasoline. But people wanted to buy more gasoline than was available at the controlled price, P_C . That is, a shortage developed at P_C , as you can see in Exhibit 4. Some customers were lucky enough to get their gasoline at P_C (0 to Q_S), but others were left wanting (Q_S to Q_D). The price ceiling was binding. Consequently, people wasted hours waiting in line for gasoline. Some gas stations sold their gas on a first-come, first-served basis. Some states implemented an even/odd license plate system. If your license plate ended in an odd number, you could buy gas on only odd numbered days. In addition, quantity restrictions meant that some stations would only allow you to buy a few gallons a day; when they ran out of gas, they closed for the day. Many gas stations were closed in the evenings and on weekends.

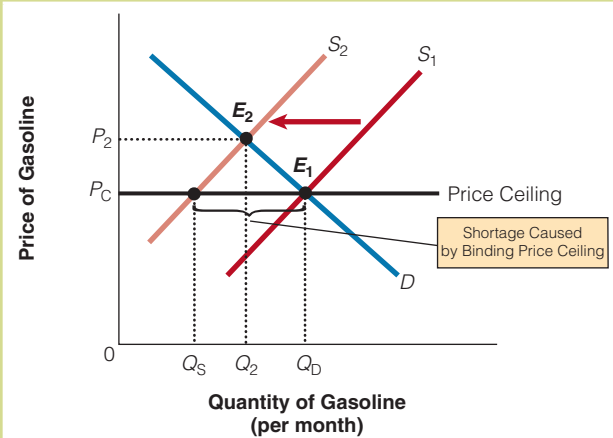
A number of government officials wanted to put the blame on OPEC, but if prices were allowed to rise to their equilibrium at E_2 , shortages would have been avoided. Instead, it would have meant higher prices at P_2 and a greater quantity sold, Q_2 rather than Q_S . Of course, not everybody was unhappy with the price ceiling. Recall our discussion of opportunity cost in Chapter 2. People place different values on their time. People with a low opportunity cost of time but who cannot as easily afford the higher price per gallon (e.g., poor retired senior citizens) would be more likely to favor the controls. Surgeons, lawyers, and others who have high hourly wages and salaries would view the controls less favorably, because the time spent waiting in line may be worth more to them than paying the higher price for gasoline.

Unintended Consequences

When markets are altered for policy reasons, it is wise to remember that actions do not always have the results that were initially intended—in other words, actions can have **unintended consequences**. As economists, we must always look for the secondary effects of an action, which may occur along with the initial effects. For example, the government is often well intentioned when it adopts price controls to help low-skilled workers or tenants in search of affordable housing; however, such policies may also cause unintended consequences that could completely undermine the intended effects. For example, rent controls may have the immediate effect of lowering rents, but secondary effects may well include low vacancy rates, discrimination against low-income and large families, deterioration of the quality of rental units, and black markets. Similarly, a sizable increase in the minimum wage may help many low-skilled workers or apprentices but may also result in higher unemployment and/or a reduction in fringe benefits, such as vacations and discounts to employees. Society has to make tough decisions, and if the government subsidizes some programs or groups of people in one area, then something must always be given up somewhere else. The “law of scarcity” cannot be repealed!

section 5.2 exhibit 4

Gasoline Price Ceiling



The higher price of crude oil (a major input for gasoline) caused the supply curve to shift leftward from S_1 to S_2 . Without price controls, the price would have risen to P_2 . However, with the binding price ceiling consumers were able and willing to buy Q_D but producers were able and willing to sell Q_S . Therefore, a shortage of $Q_D - Q_S$ occurred at P_C .

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What do you think would happen to the number of teenagers getting jobs if we raised the minimum wage to \$50 an hour?

unintended consequences

the secondary effects of an action that may occur as well as the initial effects

Use

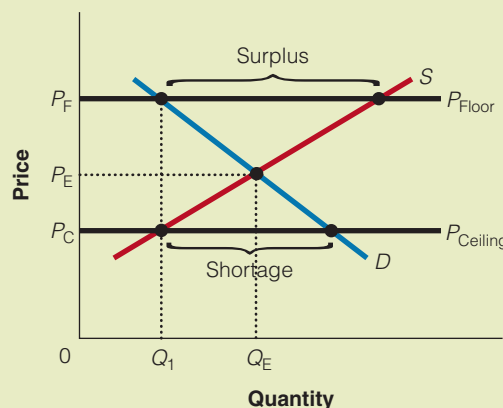
what you've learned

Binding Price Controls

Q If binding price controls are imposed by the government at levels that are either above or below the equilibrium price, is the quantity of goods bought (and sold) less than the equilibrium quantity?

A If a price ceiling (a legally established maximum price) is set below the equilibrium price, quantity demanded will be greater than quantity supplied, resulting in a shortage at that price. Because producers will only increase the quantity supplied at higher prices, *ceteris paribus*, only Q_1 will be bought and sold. Alternatively, if a price floor (a legally established minimum price) is set above the equilibrium price, quantity supplied

will be greater than quantity demanded, causing a surplus at that price. Because consumers will only increase their quantity demanded, *ceteris paribus*, at lower prices, only Q_1 will be bought and sold.



SECTION QUIZ

- If the equilibrium price of wheat is \$3 per bushel and then a price floor of \$2.50 per bushel is imposed by the government,
 - there will be no effect on the wheat market.
 - there will be a shortage of wheat.
 - there will be a surplus of wheat.
 - the price of wheat will decrease.
- Which of the following is true?
 - A price ceiling reduces the quantity exchanged in the market, but a price floor increases the quantity exchanged in the market.
 - A price ceiling increases the quantity exchanged in the market, but a price floor decreases the quantity exchanged in the market.
 - Both price floors and price ceilings reduce the quantity exchanged in the market.
 - Both price floors and price ceilings increase the quantity exchanged in the market.
- If a price floor was set at the current equilibrium price, which of the following would cause a surplus as a result?
 - an increase in demand
 - a decrease in demand
 - an increase in supply
 - a decrease in supply
 - either (b) or (c)

(continued)

SECTION QUIZ (Cont.)



4. A current shortage is due to a price ceiling. If the price ceiling is removed,
 - a. price would increase, quantity supplied would increase, and quantity demanded would decrease.
 - b. price would increase, quantity supplied would decrease, and quantity demanded would increase.
 - c. price would decrease, quantity supplied would increase, and quantity demanded would decrease.
 - d. price would decrease, quantity supplied would decrease, and quantity demanded would increase.
5. A current surplus is due to a price floor. If the price floor is removed,
 - a. price would increase, quantity demanded would increase, and quantity supplied would increase.
 - b. price would increase, quantity demanded would decrease, and quantity supplied would decrease.
 - c. price would decrease, quantity demanded would increase, and quantity supplied would decrease.
 - d. price would decrease, quantity demanded would decrease, and quantity supplied would increase.
6. Which of the following will most likely occur with a 20 percent increase in the minimum wage?
 - a. higher unemployment rates among experienced and skilled workers
 - b. higher unemployment rates among young and low-skilled workers
 - c. lower unemployment rates for young and low-skilled workers
 - d. the price floor (minimum wage) will be binding in the young and low-skilled labor market but not in the experienced and skilled labor market
 - e. both (b) and (d)

1. How is rent control an example of a price ceiling?
2. What predictable effects result from price ceilings such as rent control?
3. How is the minimum-wage law an example of a price floor?
4. What predictable effects result from price floors such as the minimum wage?
5. What may happen to the amount of discrimination against groups such as families with children, pet owners, smokers, or students when rent control is imposed?
6. Why does rent control often lead to condominium conversions?
7. What is the law of unintended consequences?
8. Why is the law of unintended consequences so important in making public policy?

Answers: 1. a 2. c 3. e 4. a 5. c 6. e

Interactive Summary

Fill in the blanks:

1. An increase in demand results in a(n) _____ equilibrium price and a(n) _____ equilibrium quantity.
2. A decrease in supply results in a(n) _____ equilibrium price and a(n) _____ equilibrium quantity.
3. If demand decreases and supply increases, but the decrease in demand is greater than the increase in supply, the equilibrium quantity will _____.
4. If supply decreases and demand increases, the equilibrium price will _____ and the equilibrium quantity will be _____.

5. A price _____ is a legally established maximum price; a price _____ is a legally established minimum price.
6. Rent controls distort market signals and lead to _____ of rent-controlled apartments.
7. The quality of rent-controlled apartments would tend to _____ over time.
8. An increase in the minimum wage would tend to create _____ unemployment for low-skilled workers.
9. The secondary effects of an action that may occur after the initial effects are called _____.

Answers: 1. greater; greater 2. higher; lower 3. decrease 4. increase; indeterminate 5. ceiling; floor 6. shortages 7. decline 8. additional 9. unintended consequences

Key Terms and Concepts

price ceiling 145

price floor 145

unintended consequences 149

Section Quiz Answers

5.1 Changes in Market Equilibrium

1. Does an increase in demand create a shortage or surplus at the original price?

An increase in demand increases the quantity demanded at the original equilibrium price, but it does not change the quantity supplied at that price, meaning that it would create a shortage at the original equilibrium price.

2. What happens to the equilibrium price and quantity as a result of a demand increase?

Frustrated buyers unable to buy all they would like at the original equilibrium price will compete the market price higher, and that higher price will induce suppliers to increase their quantity supplied. The result is a higher market price and a larger market output.

3. Does an increase in supply create a shortage or surplus at the original price?

An increase in supply increases the quantity supplied at the original equilibrium price, but it does not change the quantity demanded at that price, meaning that it would create a surplus at the original equilibrium price.

4. Assuming the market is already at equilibrium, what happens to the equilibrium price and quantity as a result of a supply increase?

Frustrated sellers unable to sell all they would like at the original equilibrium price will compete the market

price lower, and that lower price will induce demanders to increase their quantity demanded. The result is a lower market price and a larger market output.

5. Why do heating oil prices tend to be higher in the winter?

The demand for heating oil is higher in cold weather winter months. The result of this higher winter heating oil demand, for a given supply curve, is higher prices for heating oil in the winter.

6. What would have to be true for both supply and demand to shift in the same time period?

For both supply and demand to shift in the same time period, one or more of both the supply curve shifters and the demand curve shifters would have to change in that same time period.

7. When both supply and demand shift, what added information do we need to know in order to determine in which direction the indeterminate variable changes?

When both supply and demand shift, we need to know which of the shifts is of greater magnitude, so we can know which of the opposing effects in the indeterminate variable is larger; whichever effect is larger will determine the direction of the net effect on the indeterminate variable.

8. If both buyers and sellers of grapes expect grape prices to rise in the near future, what will happen to grape prices and sales today?

If grape buyers expect grape prices to rise in the near future, it will increase their current demand to

buy grapes, which would tend to increase current prices and increase the current quantity of grapes sold. If grape sellers expect grape prices to rise in the near future, it will decrease their current supply of grapes for sale, which would tend to increase current prices and decrease the current quantity of grapes sold. Because both these effects tend to increase the current price of grapes, grape prices will rise. However, the supply and demand curve shifts tend to change current sales in opposing directions, so without knowing which of these shifts was of a greater magnitude, we do not know what will happen to current grape sales. They could go up, go down, or even stay the same.

9. If demand for peanut butter increases and supply decreases, what will happen to equilibrium price and quantity?

An increase in the demand for peanut butter increases the equilibrium price and quantity of peanut butter sold. A decrease in the supply of peanut butter increases the equilibrium price and decreases the quantity of peanut butter sold. The result is an increase in peanut butter prices and an indeterminate effect on the quantity of peanut butter sold.

5.2 Price Controls

1. How is rent control an example of a price ceiling?

A price ceiling is a maximum price set below the equilibrium price by the government. Rent control is an example because the controlled rents are held below the market equilibrium rent level.

2. What predictable effects result from price ceilings such as rent control?

The predictable effects resulting from price ceilings include shortages, reduced amounts of the controlled good being made available by suppliers, reductions in the quality of the controlled good, and increased discrimination among potential buyers of the good.

3. How is the minimum-wage law an example of a price floor?

A price floor is a minimum price set above the equilibrium price by the government. The minimum-wage law is an example because the minimum is set above the market equilibrium wage level for some low-skill workers.

4. What predictable effects result from price floors such as the minimum wage?

The predictable effects resulting from price floors include surpluses, reduced amounts of the controlled good being purchased by demanders, increases in the quality of the controlled good, and increased discrimination among potential sellers of the good.

5. What may happen to the amount of discrimination against groups such as families with children, pet owners, smokers, or students when rent control is imposed?

Rent control laws prevent prospective renters from compensating landlords through higher rents for any characteristic landlords find less attractive, whether it is bothersome noise from children or pets, odors from smokers, increased numbers of renters per unit, risks of nonpayment by lower income tenants such as students, and so on. As a result, it lowers the cost of discriminating against anyone with what landlords consider unattractive characteristics, because other prospective renters without those characteristics are willing to pay the same controlled rent.

6. Why does rent control often lead to condominium conversions?

Rent control applies to rental apartments, but not to apartments owned by their occupants. Therefore, one way to get around rent control restrictions on apartment owners' ability to receive the market value of their apartments is to convert those apartments to condominiums by selling them to tenants instead (what was once a controlled rent becomes part of an uncontrolled mortgage payment).

7. What is the law of unintended consequences?

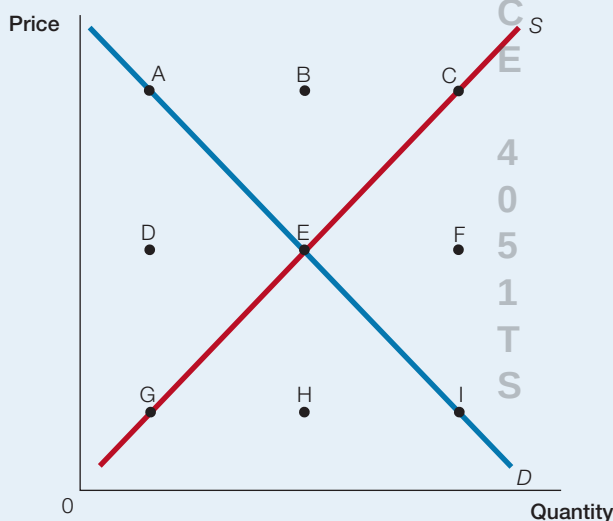
The law of unintended consequences is the term used to indicate that the results of actions are not always as clear as they appear. The secondary effects of an action may cause its results to include many consequences that were not part of what was intended.

8. Why is the law of unintended consequences so important in making public policy?

It is impossible to change just one incentive to achieve a particular result through a government policy. A policy will change the incentives facing multiple individuals making multiple decisions, and changes in all those affected choices will result. Sometimes, the unintended consequences can be so substantial that they completely undermine the intended effects of a policy.

Problems

- Using supply and demand curves, show the effect of each of the following events on the market for wheat.
 - The midwestern United States (a major wheat-producing area) suffers a flood.
 - The price of corn decreases (assume that many farmers can grow either corn or wheat).
 - The Midwest has great weather.
 - The price of fertilizer declines.
 - More individuals start growing wheat.
- Beginning from an initial equilibrium, draw the effects of the changes in the following list in terms of the relevant supply and demand curves.
 - an increase in the price of hot dogs on the hamburger market
 - a decrease in the number of taxicab companies in New York City on cab trips
 - effect of El Niño rain storms destroying the broccoli crop in two California counties
- Use supply and demand curves to show:
 - simultaneous increases in supply and demand, with a large increase in supply and a small increase in demand.
 - simultaneous increases in supply and demand, with a small increase in supply and a large increase in demand.
 - simultaneous decreases in supply and demand, with a large decrease in supply and a small decrease in demand.
 - simultaneous decrease in supply and demand, with a small decrease in supply and a large decrease in demand.
- What would be the impact of a rental price ceiling set above the equilibrium rental price for apartments? below the equilibrium rental price?
- What would be the impact of a price floor set above the equilibrium price for dairy products? below the equilibrium price?
- Giving in to pressure from voters who charge that local theater owners are gouging their customers with ticket prices as high as \$10 per movie, the city council of a Midwestern city imposes a price ceiling of \$2 on all movies. What effect is this likely to have on the market for movies in this particular city? What will happen to the quantity of tickets demanded? What will happen to the quantity supplied? Who gains? Who loses?
- Why do price floors and price ceilings both reduce the quantity of goods traded in those markets?
- Why do 10 A.M. classes fill up before 8 A.M. classes during class registration? Use supply and demand curves to help explain your answer.
- What would happen to the equilibrium price and quantity exchanged in the following cases?
 - an increase in income and a decreasing price of a complement, for a normal good
 - a technological advance and lower input prices
 - an increase in the price of a substitute and an increase in income, for an inferior good
 - producers' expectations that prices will soon fall, and increasingly costly government regulations
- Refer to the following supply and demand curve diagram.



- a. Starting from an initial equilibrium at E, what shift or shifts in supply and/or demand could move the equilibrium price and quantity to each of points A through I?
- b. Starting from an initial equilibrium at E, what would happen if both a decrease in the price of a substitute in production and an increase in income occurred, if it is a normal good?
- c. Starting from an initial equilibrium at E, what would happen if both an increase in the price of an input and an advance in technology occurred?
- d. If a price floor is imposed above the equilibrium price, which of A through I would tend to be the quantity supplied, and which would tend to be the quantity demanded? Which would be the new quantity exchanged?
- e. If a price ceiling is imposed below the equilibrium price, which of A through I would tend to be the quantity supplied, and which would tend to be the quantity demanded? Which would be the new quantity exchanged?

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