CHAPTER 3 | Where Prices Come From: The Interaction of Demand and Supply

Brief Chapter Summary and Learning Objectives

3.1 The Demand Side of the Market (pages 74–82)

List and describe the variables that influence demand.

- The most important factor affecting the demand for a product is its price. Other factors include income, prices of related goods, tastes, population and demographics, and expected future prices.

3.2 The Supply Side of the Market (pages 82–86)

List and describe the variables that influence supply.

- The most important factor affecting the supply for a product is its price. Other factors include prices of inputs, technological change, prices of related goods in production, the number of firms in the market, and expected future prices.

3.3 Market Equilibrium: Putting Demand and Supply Together (pages 86–89)

Use a graph to illustrate market equilibrium.

- The intersection of demand and supply curves results in an equilibrium price and an equilibrium quantity.
- A surplus exists when the market price is above the equilibrium price. A shortage exists when the market price is below the equilibrium price.

3.4 The Effect of Demand and Supply Shifts on Equilibrium (pages 90–97)

Use demand and supply graphs to predict changes in prices and quantities.

- An increase in demand increases the equilibrium price and equilibrium quantity. A decrease in demand decreases the equilibrium price and equilibrium quantity.
- An increase in supply decreases equilibrium price and increases the equilibrium quantity. A decrease in supply increases equilibrium price and decreases the equilibrium quantity.

Key Terms

***Ceteris paribus* ("all else equal") condition**, p. 76. The requirement that when analyzing the relationship between two variables—such as price and quantity demanded—other variables must be held constant.

Competitive market equilibrium, p. 87. A market equilibrium with many buyers and sellers.

Complements, p. 78. Goods and services that are used together.

Demand curve, p. 74. A curve that shows the relationship between the price of a product and the quantity of the product demanded.

Demand schedule, p. 74. A table that shows the relationship between the price of a product and the quantity of the product demanded.

Demographics, p. 78. The characteristics of a population with respect to age, race, and gender.

Income effect, p. 75. The change in the quantity demanded of a good that results from the effect of a change in the good's price on consumers' purchasing power.

Inferior good, p. 77. A good for which the demand increases as income falls and decreases as income rises.

Law of demand, p. 75. The rule that states that, holding everything else constant, when the price of a product falls, the quantity demanded of the product will increase, and when the price of a product rises, the quantity demanded of the product will decrease.

Law of supply, p. 83. The rule that states that, holding everything else constant, increases in price cause increases in the quantity supplied, and decreases in price cause decreases in the quantity supplied.

Market demand, p. 74. The demand by all the consumers of a given good or service.

Market equilibrium, p. 86. A situation in which quantity demanded equals quantity supplied.

Normal good, p. 76. A good for which the demand increases as income rises and decreases as income falls.

Perfectly competitive market, p. 74. A market that meets the conditions of (1) many buyers and sellers, (2) all firms selling identical products, and (3) no barriers to new firms entering the market.

Quantity demanded, p. 74. The amount of a good or service that a consumer is willing and able to purchase at a given price.

Quantity supplied, p. 82. The amount of a good or service that a firm is willing and able to supply at a given price.

Shortage, p. 88. A situation in which the quantity demanded is greater than the quantity supplied.

Substitutes, p. 77. Goods and services that can be used for the same purpose.

Substitution effect, p. 75. The change in the quantity demanded of a good that results from a change in price, making the good more or less expensive relative to other goods that are substitutes.

Supply curve, p. 83. A curve that shows the relationship between the price of a product and the quantity of the product supplied.

Supply schedule, p. 83. A table that shows the relationship between the price of a product and the quantity of the product supplied.

Surplus, p. 88. A situation in which the quantity supplied is greater than the quantity demanded.

Technological change, p. 84. A positive or negative change in the ability of a firm to produce a given level of output with a given quantity of inputs.

Chapter Outline

How Smart Is Your Water?

Between 2004 and 2016, sales of carbonated beverages such as Coke and Pepsi declined by more than 25 percent, while sales of bottled water increased by more than 50 percent. In 1994, Pepsi responded to increased demand for bottled water by introducing Aquafina water. In 1999, Coke introduced Dasani water. Other companies in the bottled water market have limited Coke and Pepsi to less than 20 percent of that market. By 2017, Pepsi introduced LIFEWTR and Coke introduced smartwater, premium waters that sell for higher prices than other brands. But the firms faced competition from brands such as Nestlé's Perrier and Danone's Evian. Although competition is not good news for firms such as Coke and Pepsi, it increases choices of available products and lowers prices for consumers.

3.1 The Demand Side of the Market (pages 74–82)

Learning Objective: List and describe the variables that influence demand.

A **perfectly competitive market** is a market that meets the conditions of (1) many buyers and sellers, (2) all firms selling identical products, and (3) no barriers to new firms entering the market.

For most consumers, the primary factor in their buying decisions is the price of the product. The study of demand considers not what a consumer wants to buy, but what a consumer is willing and able to buy.

A. Demand Schedules and Demand Curves

A **demand schedule** is a table that shows the relationship between the price of a product and the quantity of the product demanded. The amount of a good or service that a consumer is willing and able to purchase at a given price is called the **quantity demanded.** A graph is often used to plot the numbers from a demand schedule; this graph is called a demand curve. A **demand curve** shows the relationship between the price of a product and the quantity of the product demanded. **Market demand** refers to the demand by all the consumers of a given good or service.

B. The Law of Demand

The **law of demand** is a rule that states that, holding everything else constant, when the price of a product falls, the quantity demanded of the product will increase, and when the price of a product rises, the quantity demanded of the product will decrease. The law of demand holds for any market demand curve.

C. What Explains the Law of Demand?

The law of demand is explained by the substitution and income effects of a change in price. The **substitution effect** is the change in the quantity demanded of a good that results from a change in price, making the good more or less expensive relative to other goods that are substitutes. The **income effect** is the change in the quantity demanded of a good that results from the effect of a change in the good's price on consumers' purchasing power. When the price of a good falls, the increased purchasing power of consumers' incomes will usually lead them to purchase a larger quantity of the good. The substitution and income effects happen simultaneously whenever a price changes.

D. Holding Everything Else Constant: The *Ceteris Paribus* Condition

The ***ceteris paribus* ("all else equal") condition** is the requirement that when analyzing the relationship between two variables—such as price and quantity demanded—other variables must be held constant. If we allowed a variable other than price to change that might affect the willingness of consumers to buy a product consumers would change the quantity they demand at each price. We can illustrate this by shifting the market demand curve.

E. Variables That Shift Market Demand

Other than price, the five most important variables that affect demand are as follows: income, prices of related goods, tastes, population and demographics, and expected future prices. The income that consumers have to spend affects their willingness and ability to buy a good. A **normal good** is a good for which the demand increases as income rises and decreases as income falls. An **inferior good** is a good for which the demand increases as income falls and decreases as income rises. **Substitutes** are goods and services that can be used for the same purpose. When two goods are substitutes, the more you buy of one, the less you will buy of the other. A decrease in the price of a substitute causes the demand curve for a good to shift to the left. An increase in the price of a substitute causes the demand curve for a good to shift to the right. **Complements** are goods and services that are used together. When two goods are complements, the more you buy of one, the more you will buy of the other. A decrease in the price of a complement causes the demand curve for a good to shift to the right. An increase in the price of a complement causes the demand curve for a good to shift to the left.

Consumers can also be influenced by an advertising campaign for a product. Economists would say that the advertising campaign has affected consumers' tastes for the product. Taste is a catchall category that refers to many subjective elements that enter into a consumer's decision to buy a product. When consumers' tastes for a product increases, the demand curve will shift to the right, and when consumers' tastes for a product decreases, the demand curve for the product will shift to the left.

Demographics refer to the characteristics of a population with respect to age, race, and gender. As the demographics of a country or region change, the demand for particular goods will increase or decrease because different categories of people tend to have different preferences for those goods. Expected future prices can also affect demand. For example, if enough consumers become convinced that houses will be selling for lower prices in three months, the demand for houses will decrease now. If enough consumers become convinced that the price of houses will be higher in three months, the demand for houses will increase now as some consumers try to beat the expected price increase.

F. A Change in Demand versus a Change in Quantity Demanded

A change in demand refers to a shift in the demand curve. A shift will occur if there is a change in one of the variables, other than the price of the product, that affects the willingness of consumers to buy the product. A change in quantity demanded refers to a movement along the demand curve as a result of a change in the product's price.

Teaching Tips

There is no magic formula for making students understand the difference between a change in quantity demanded and a change in demand. This difference needs to be reinforced through classroom discussion, use of examples of these changes, and homework assignments. Even good students mistake a movement along a demand curve with an increase or a decrease in demand. One way to help students avoid this error is to explain that only one variable can cause a change in quantity demanded (price), whereas a change in any of the non-price factors results in a change in demand.

Extra Solved Problem 3.1

Welcome to the ~~Tostitos~~ ~~BattleFrog~~ PlayStation Fiesta Bowl

For many years, corporations have purchased commercial time during college football bowl games to promote their products. During the latter part of the twentieth century, a new form of sponsorship emerged, as corporations purchased naming rights to most of these bowl games. The Sugar Bowl, Orange Bowl, and Fiesta Bowl are now known as the Allstate Sugar Bowl, the Capital One Orange Bowl (Capital One previously purchased naming rights to the Citrus Bowl), and the PlayStation Fiesta Bowl (previously

called the Tostitos Fiesta Bowl and the BattleFrog Fiesta Bowl). More than two dozen football bowl games have been named after corporate sponsors. Although many diehard football fans complain about the practice, bowl organizers welcome the revenue generated through the sale of naming rights.

a. How does corporate sponsorship affect the demand for the sponsor's product?
b. Why have many companies purchased naming rights to college football bowl games?

Solving the Problem

Step 1: Review the chapter material.
This problem refers to a variable that shifts a market demand curve, so you may want to review the section "Variables That Shift Market Demand," which begins on page 76 in the textbook.

Step 2: How does corporate sponsorship affect the demand for the sponsor's product?
Consumers can be influenced by an advertising campaign to buy a sponsor's product. Consumers' tastes are affected by advertising. Taste refers to a composite category that represents many subjective factors.

Step 3: Why have many companies purchased naming rights to college football bowl games?
Cable and satellite television offer consumers many more programming choices than were available to viewers in the 1950s and 1960s. Remote controls are now included with all new television sets. The controls allow viewers to change channels during commercial breaks without leaving their seats; mute buttons can silence commercial messages with the touch of a finger. Advertisers cannot be guaranteed that viewers will see their commercials, but remote controls do not affect exposure to sponsors who purchase naming rights. Newspaper and magazine articles refer to the sponsor's name whenever the bowl game's title is used, and company logos appear on screen during broadcasts of the games.

Extra Apply the Concept

Are Quiznos Sandwiches Normal Goods and Subway Sandwiches Inferior Goods?

In recent years, as American families juggle busy schedules, they have increasingly relied on eating out rather than preparing meals at home. According to a survey by *Restaurants and Institutions* magazine, adults eat an average of nearly four meals per week outside the home. Nearly one-third of consumers frequently eat lunch away from home, and on weekdays more than 15 percent frequently eat dinner away from home, a proportion that rises to more than 35 percent on weekends.

Does this behavior change during a recession? We might expect that it would because recessions result in declining incomes, as some people lose their jobs and others are forced to work fewer hours or have their wages reduced. Dining out is more expensive than preparing meals at home, so one way to save during a recession is to cut back on restaurant meals. In fact, during the 2007–2009 recession, many restaurants had a difficult time. Particularly hard hit were "casual dining" restaurants that provide table service and serve moderately priced food. Among other restaurants, Ruby Tuesday, Olive Garden, Red Lobster, and LongHorn Steakhouse all experienced declining demand, while Bennigan's and Steak and Ale filed for bankruptcy.

However, the recession hurt some restaurants more than others. McDonald's restaurants experienced increased sales during 2008 and 2009. In the market for fast-food sandwiches, Subway reported increasing sales, while sales of Quiznos sandwiches, which are higher-priced, fell. So, Big Macs and Subway sandwiches seem to fit the economic definition of an inferior good because demand increases as

income falls, while Quiznos sandwiches fit the definition of a normal good. But remember that inferior goods are not necessarily of low quality; they are just goods for which consumers increase their demand as their incomes fall.

Sources: Julie Jargon and Mike Spector, "LBO, Recession Singe Quiznos," *Wall Street Journal*, July 21, 2011; Melodie Warner, "McDonald's Profit Rises 15%," *Wall Street Journal*, July 22, 2011; and "The New American Diner," *Restaurants and Institutions*, January 1, 2008.

Question
A student makes the following argument:

> The chapter says that for consumers as a group, Quiznos sandwiches are normal goods, and Subway sandwiches are inferior goods. But I like the taste of Subway sandwiches better than I like the taste of Quiznos sandwiches, so for me Quiznos sandwiches are inferior goods, and Subway sandwiches are normal goods.

Do you agree with the student's reasoning? Briefly explain.

Answer
You should disagree with the reasoning. Inferior and normal goods are not about quality or taste, but about how consumers change their demand for the goods when income changes. The issue for the student would be whether he increases or decreases his demand for Quiznos sandwiches or Subway sandwiches when his income increases or decreases.

Extra Apply the Concept

Are Smartwatches Substitutes for Smartphones?

Two products are rarely perfect substitutes because consumers may find them more or less useful for some purposes. As Apple and other firms began selling smartwatches, a key question they needed to answer was whether consumers considered smartwatches close substitutes for smartphones. You can use either a smartwatch or a smartphone to check the time, send a text, keep a list of appointments, or use a GPS map. But you need a smartphone if you want to surf the Web or watch a movie, while you are better off buying a smartwatch if you want to monitor your heartbeat or keep track of how many calories you are burning while exercising.

So, smartwatches and smartphones are substitutes—but they aren't *perfect* substitutes. To correctly forecast sales and produce the correct quantity of smartwatches, firms that sell them need to evaluate how similar consumers consider smartwatches and smartphones to be. Many people who might consider buying a smartwatch already own a smartphone. So, the closer consumers consider the two products to be as substitutes, the less likely they are to buy a smartwatch in addition to a smartphone.

When Apple introduced the Apple Watch in 2015, sales were initially very strong, which would seem to indicate that many consumers believed that the unique features of the smartwatch made it worth buying, even if they owned a smartphone. Some analysts, though, wondered how large future sales would be after people who buy each new electronic device soon after it hits the market—early adopters—had made their purchases. One early reviewer of the Apple Watch noted that he was unsure "that I need this thing on my wrist every day." Similarly, the *Economist* magazine offered the opinion, "Apple seems unlikely to turn its watch into the next big must-have gadget. … People are unlikely to want to shell out … $350 … for something with so few extra functions."

Other industry observers were more optimistic about the size of the market for smartwatches. Writing in the *Wall Street Journal*, one analyst argued that smartwatches performed several functions faster or more conveniently than smartphones. He concluded, "Billions of consumers who own a smartphone are likely to consider purchasing a smartwatch." In the end, as with most new products, the success of smartwatches depends on whether consumers see them as filling a need that other products don't meet. In other words, if consumers believe that smartwatches are very different from smartphones, they are more likely to buy smartwatches.

Sources: Joshua Topolsky, "Apple Watch Review: You'll Want One, but You Don't Need One," bloomberg.com, April 8, 2015; "The Time Machine," *Economist*, March 9, 2015; and Daniel Matte and Kevin McCullagh, "Will Smartwatches Be a Hit?" *Wall Street Journal*, May 10, 2015.

Extra Apply the Concept

Forecasting the Demand for iPhones

One of the most important decisions that managers of any large firm face is choosing which new products to develop. A firm must devote people, time, and money to design a new product, negotiate with suppliers, create a marketing campaign, and perform many other tasks. But any firm has only limited resources and so faces a trade-off: Resources used to develop one product will not be available to develop another product. Ultimately, the products a firm chooses to develop will be those that it believes will be the most profitable. So, to decide which products to develop, firms need to forecast the demand for those products.

David Sobotta, who worked at Apple for 20 years and eventually became its national sales manager, has described discussions at Apple during 2002 about whether to develop a tablet computer. According to Sobotta, representatives of the U.S. National Institutes of Health urged Apple to develop a tablet computer, arguing that it would be particularly useful to doctors, nurses, and hospitals. In 2001, Bill Gates, chairman of Microsoft, had predicted that "within five years … [tablet PCs] will be the most popular form of PC sold in America." Apple's managers decided not to develop a tablet computer, however, because they believed the technology available at that time was too complex for an average computer user, and they also believed that the demand from doctors and nurses would be small. Apple's forecast was correct. Despite Bill Gates's prediction, in 2006, tablet computers made up only 1 percent of the computer market. According to Sobotta, "Apple executives had a theory that the route to success will not be through selling thousands of relatively expensive things, but millions of very inexpensive things like iPods."

Apple continued to work on smartphones, developing the technology to eliminate keyboards in favor of touchscreen displays. Rather than proceed immediately to building a tablet computer, Steve Jobs, then Apple's CEO, realized he could use this technology in a different way: "I thought 'My God we can build a phone out of this.'" From its introduction in 2007, the iPhone was an immediate success. By mid-2015, Apple had sold more than 600 million iPhones worldwide.

As Apple attempts to forecast demand for its iPhone, it needs to consider two factors: competition from other firms producing smartphones and competition from substitute goods, including tablets and smartwatches. By 2015, industry analysts were divided as to whether Apple would be able to maintain its share of the smartphone market in the face of increasing competition from other firms. The outlook for substitute goods was also mixed. Smartphones were an increasing share of the overall worldwide cellphone market, so there are relatively few consumers left to switch to smartphones from basic cellphones. The increasing availability of apps, including mobile payment apps like Apple Pay that can be used in place of credit cards, was increasing the usefulness of smartphones. But some consumers preferred to use tablets, with their larger screens, for checking e-mail and surfing the Web. With apps like FaceTime or Skype, a tablet can be used to make phone calls. Another unknown was the extent to which sales of smartwatches might eventually cut into smartphone sales.

As any firm does in forecasting demand, Apple faced a trade-off: If it were too cautious in expanding capacity or buying components for smartphones, other firms might seize a large share of the market. But, if Apple was too optimistic, it ran the risk of spending on capacity to produce more units than it could actually sell—an outcome that might turn potential profits into losses. Apple has spent billions of dollars buying large quantities of motion sensors, screens, and other components from suppliers. That will be money well spent … if the forecast of demand turns out to be accurate. Time will tell whether the future demand for smartphones will be as large as Apple and other firms were forecasting.

Sources: Daisuke Wakabayashi, "Apple Earnings Surge 33% on iPhone Sales," *Wall Street Journal*, April 27, 2015; David Sobotta, "What Jobs Told Me on the iPhone," (London) *Guardian*, January 3, 2007; "Jobs Says iPad Idea Came before iPhone," *Associated Press*, January 2, 2010; and "More Smartphones Were Shipped in Q1 2013 Than Feature Phones, an Industry First According to IDC," *www.idc.com*, April 25, 2013.

3.2 The Supply Side of the Market (pages 82–86)

Learning Objective: List and describe the variables that influence supply.

The most important of the variables that influence the willingness and ability of firms to sell a good or service is price. **Quantity supplied** is the amount of a good or service that a firm is willing and able to supply at a given price. Holding other variables constant, when the price of a good rises, producing the good is more profitable and the quantity supplied will increase. When the price of a good falls, the good is less profitable and the quantity supplied will decrease. Devoting more resources to the production of a good results in increasing marginal costs. With higher marginal costs, firms will supply a larger quantity only if the price is higher.

A. Supply Schedules and Supply Curves

A **supply schedule** is a table that shows the relationship between the price of a product and the quantity of the product supplied. A **supply curve** is a curve that shows the relationship between the price of a product and the quantity of the product supplied.

B. The Law of Supply

The **law of supply** is a rule that states that, holding everything else constant, increases in price cause increases in the quantity supplied, and decreases in price cause decreases in the quantity supplied. If only the price of a product changes, there is a movement along the supply curve, which is an increase or decrease in the quantity supplied. If any other variable that affects the willingness of firms to supply a good changes, then the supply curve will shift; this results in an increase or decrease in supply. When firms increase the quantity of a product they wish to sell at a given price, the supply curve shifts to the right. When firms decrease the quantity of a product they wish to sell at a given price, the supply curve shifts to the left.

C. Variables That Shift Market Supply

The most important variables that shift market supply are as follows: prices of inputs, technological change, prices of related goods in production, the number of firms in the market, and expected future prices. The factor most likely to cause a supply curve to shift is a change in the price of an input. If the price of an input rises, the supply curve will shift to the left. If the price of an input declines, the supply curve will shift to the right. **Technological change** is a positive or negative change in the ability of a firm to produce a given level of output with a given quantity of inputs. A positive technological change will shift a firm's supply curve to the right; a negative technological change will shift a firm's supply curve to the left.

Alternative products that a firm could produce are called substitutes in production. If the price of a substitute in production increases, the supply of the product will shift to the left. Goods that are produced together are called complements in production. An increase in the price of a product will cause the supply curve for its complement to shift to the right.

When firms enter a market, the supply curve shifts to the right; when firms exit a market, the supply curve shifts to the left. If a firm expects that the price of its product will be higher in the future, the firm has an incentive to decrease supply in the present and increase supply in the future.

D. A Change in Supply versus a Change in Quantity Supplied

A change in supply refers to a shift in the supply curve. The supply curve will shift when there is a change in one of the variables, other than the price of the product, that affects the willingness of suppliers to sell the product. A change in quantity supplied refers to a movement along the supply curve as a result of a change in the product's price.

Teaching Tips

Be careful not to refer to an increase in supply as "a downward shift" or a decrease in supply as "an upward shift." An increase in supply should be referred to as a "shift to the right." Because demand curves are downward sloping, an increase in demand appears in a graph as an "upward shift." Students will associate "upward" with "increase." Little harm is done with respect to demand curves, but because supply curves are upward-sloping, a *decrease* in supply appears in a graph as an "upward shift." Referring to both changes in demand and supply as being "shifts to the right" and "shifts to the left" will help to avoid confusion.

Encourage students to study Table 3.2, which lists the variables that shift market supply curves, and Figure 3.6, which illustrates the difference between a change in supply and a change in quantity supplied.

3.3 Market Equilibrium: Putting Demand and Supply Together (pages 86–89)

Learning Objective: Use a graph to illustrate market equilibrium.

The purpose of markets is to bring buyers and sellers together. The interaction of buyers and sellers in markets results in firms producing goods and services most desired by consumers. **Market equilibrium** is a situation in which quantity demanded equals quantity supplied. A **competitive market equilibrium** is a market equilibrium with many buyers and sellers.

A. How Markets Eliminate Surpluses and Shortages

A **surplus** is a situation in which the quantity supplied is greater than the quantity demanded. When there is a surplus, firms have unsold goods piling up, which gives them an incentive to increase their sales by cutting the price. Cutting the price simultaneously increases the quantity demanded and decreases the quantity supplied. A **shortage** is a situation in which the quantity demanded is greater than the quantity supplied. When a shortage occurs, some consumers will be unable to obtain the product, and firms will realize they can raise the price without losing sales. A higher price will simultaneously increase the quantity supplied and decrease the quantity demanded. At a competitive market equilibrium, all consumers willing to pay the market price will be able to buy as much as they want, and all firms willing to accept the market price will be able to sell as much of the product as they want. There will be no reason for the price to change unless either the demand curve or the supply curve shifts.

B. Demand and Supply Both Count

Neither consumers nor firms can dictate what the equilibrium price will be. No firm can sell anything at any price unless it can find a willing buyer, and no consumer can buy anything at any price without finding a willing seller.

3.4 The Effect of Demand and Supply Shifts on Equilibrium (pages 90–97)

Learning Objective: Use demand and supply graphs to predict changes in prices and quantities.

A. The Effect of Shifts in Demand on Equilibrium

For a normal good, an increase in income will shift the market demand curve to the right, causing a shortage at the original equilibrium price. To eliminate the shortage, the equilibrium price and quantity rise. If the price of a substitute good were to fall, the demand for the good would decrease. This change would cause the demand curve to shift to the left, and both the equilibrium price and quantity would decrease.

B. The Effect of Shifts in Supply on Equilibrium

When the market supply curve shifts to the right, there will be a surplus at the original equilibrium price. The surplus is eliminated as the price falls to the new equilibrium and the quantity rises to a new equilibrium. If an existing firm exits the market, the supply curve will shift to the left, causing the equilibrium price to rise and the equilibrium quantity to fall.

C. The Effect of Shifts in Demand and Supply over Time

If both the demand and supply curves increase, whether the equilibrium price in a market rises or falls over time depends on whether demand shifts to the right more than supply does. When demand shifts more than supply, the equilibrium price rises. When supply shifts to the right more than demand, the equilibrium price falls.

D. Shifts in a Curve versus Movements along a Curve

When a shift in a demand curve or a supply curve causes a change in equilibrium price, the change in price does not cause a further change in demand or supply.

Teaching Tips

Encourage your students to study Table 3.3, which summarizes all combinations of shifts in demand and supply over time and the effects of these shifts on price and quantity.

Extra Solved Problem 3.4

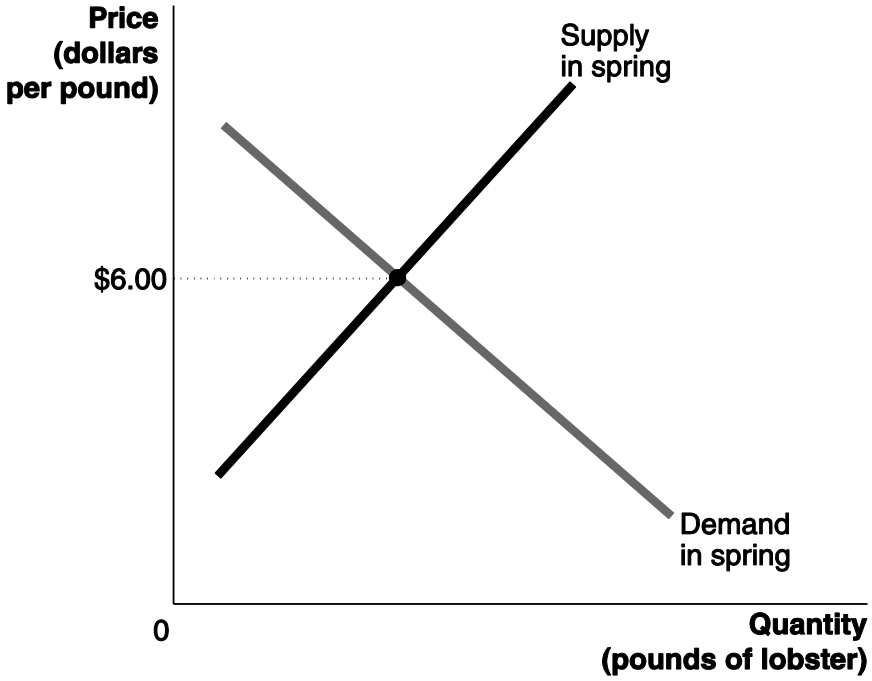
High Demand and Low Prices in the Lobster Market?

During a typical spring, when demand for lobster is relatively low, Maine lobstermen can sell their lobster catches at a high price; for example, $6.00 per pound. During the summer, when demand for lobster is much higher, Maine lobstermen typically sell their lobster catches for a lower price; for example, $3.00 per pound. One recent July, a lobster-boat captain noted, "Per pound, it's less expensive than hot dogs right now." It may seem strange that the market price is higher when demand is low than when demand is high. Resolve this paradox, with the help of demand and supply graphs.

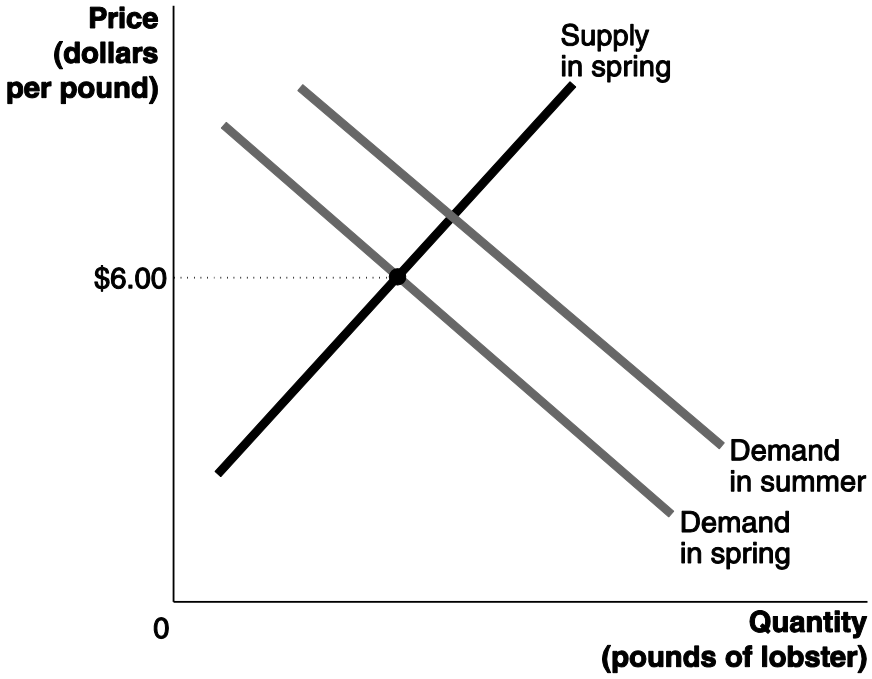
Solving the Problem

Step 1: Review the chapter material.
This problem is about how shifts in demand and supply curves affect the equilibrium price, so you may want to review the section "The Effect of Shifts in Demand and Supply over Time," which begins on page 90.

Step 2: Draw a demand and supply graph.
Draw a demand and supply graph, showing the market equilibrium in the spring. Label the equilibrium price $6.00. Label both the demand and supply curves "in spring."



Step 3: Add to your graph a demand curve for summer.



Step 4: Explain the graph.

After studying the graph, it is possible to see how the equilibrium price can fall from $6.00 to $3.00, despite the increase in demand: The supply curve must have shifted to the right by enough to cause the equilibrium price to fall to $3.00. Draw the new supply curve, label it "in summer," and label the new equilibrium price $3.00. The demand for lobster does increase in summer compared with spring. But the increase in the supply of lobster between spring and summer is even greater. Therefore, the equilibrium price will be lower in the summer than in the spring.

Sources: Beth D'Addono, "With Prices Falling, Lobster Is No Longer a Splurge," *Philadelphia Daily News*, June 16, 2011; and Jon Birger, "Looking for a Bargain Dinner: Try Lobster," cnnmoney.com, July 18, 2009.

Extra Economics in Your Life & Career

Following devastating hurricanes that hit Texas, Florida, and Puerto Rico in 2017 Donald Boudreaux, a professor of economics at George Mason University, argued that high prices for water, gasoline, and airline fares would aid in the recovery from such disasters and criticized politicians who called for capping prices of essentials items to protect consumers from "price gouging" by sellers:

> …high prices are an essential way to ensure that resources get where they are desperately needed. Imposing artificially low prices creates shortages of vital supplies and makes it harder for people to recover from disasters.

Question: Why would measures to prevent prices from rising in the aftermath of a hurricane make it more difficult for people to recover from the hurricane?

Answer: Prices increases for vital goods and services that follow natural disasters are the result of increased scarcity, rather than the actions of greedy producers. Donald Boudreaux explained "Price hikes prompt consumers to use fuel more judiciously…diminishing pressure on supplies… [and] create a financial incentive for suppliers to move their product from outside the area to…high-demand zones. As supplies return to normal, so do prices." Although people suffer significant hardships from hurricanes and other natural disasters, well-intentioned measures to protect consumers from paying higher prices may have the unintended result of making recovery from the disasters more difficult.

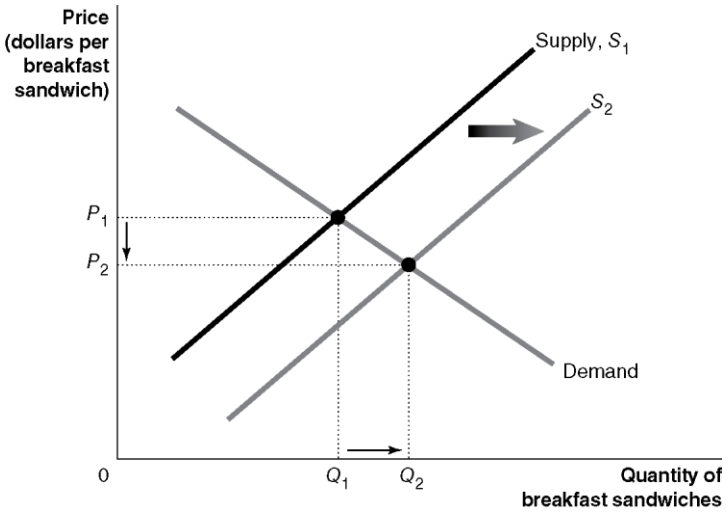
Source: Donald J. Boudreaux, "'Price Gouging' After a Disaster Is Good for the Public," *Wall Street Journal*, October 4, 2017.

Solutions to End-of-Chapter Exercises

Answers to *Thinking Critically* Questions to accompany the *Inside Look* newspaper feature

1. McDonald's market is highly competitive. The article mentioned that McDonald's sales had declined for five consecutive years. Serving breakfast all day and enabling consumers to order meals online are attempts to compete more effectively with rival firms such as Burger King and Wendy's.

2. A positive technological change, such as the success of self-service kiosks enabling fast food restaurants to reduce the number of employees, will reduce the restaurants' labor costs and therefore increase the quantity of breakfast sandwiches they supply at every price. The supply curve will shift to the right, from S_1 to S_2, equilibrium price will decrease from P_1 to P_2, and equilibrium quantity will increase from Q_1 to Q_2.



3.1 The Demand Side of the Market

Learning Objective: List and describe the variables that influence demand.

Review Questions

1.1 A demand schedule is a table showing the relationship between the price of a product and the quantity of the product demanded. A demand curve is a curve that shows the relationship between the price of a product and the quantity of the product demanded.

1.2 *Ceteris paribus* means "all else equal"—that is, holding everything else constant when examining the relationship between two variables.

1.3 A "change in demand" refers to a shift of the demand curve, while a "change in quantity demanded" refers to a movement along the demand curve as a result of a change in a product's price.

1.4 The law of demand states that, holding all else constant, when the price of a product falls, the quantity demanded of the product will increase (and when the price of a product rises, the quantity demanded of the product will decrease). An increase in the price of a product raises the price of the product relative to other products, causing consumers to substitute away from the higher priced product. The increase in the price of the product also causes a decrease in the real incomes of consumers, and assuming that the product is a normal good, leads consumers to buy less of the product.

1.5 The main variables that will cause a demand curve to shift are as follows: (1) changes in the prices of a related good—substitutes or complements; (2) changes in income; (3) changes in tastes; (4) changes in population or demographics; and (5) changes in expected future prices. An example of substitute goods is Coke and Pepsi, and an example of complementary goods is hot dogs and hot dog buns. An example of a normal good may be a name brand product, like Coca-Cola. An example of an inferior good may be a store branded product, like Sam's Cola (assuming that some consumers will switch from Sam's Cola to Coca Cola as their incomes increase). An example of changes in tastes would be organic produce becoming more popular. An example of changes in population or demographics would be as the number of people over the age of 65 increases, demand for health care services will increase. An example of changes in expected future prices would be if the prices of hybrid vehicles are expected to decline in the future, then the current demand for hybrids will decrease.

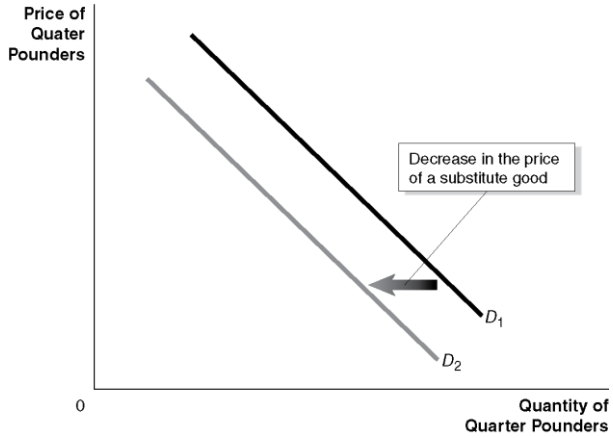
Problems and Applications

1.6 **a.** Substitutes
b. Complements
c. Unrelated
d. Substitutes

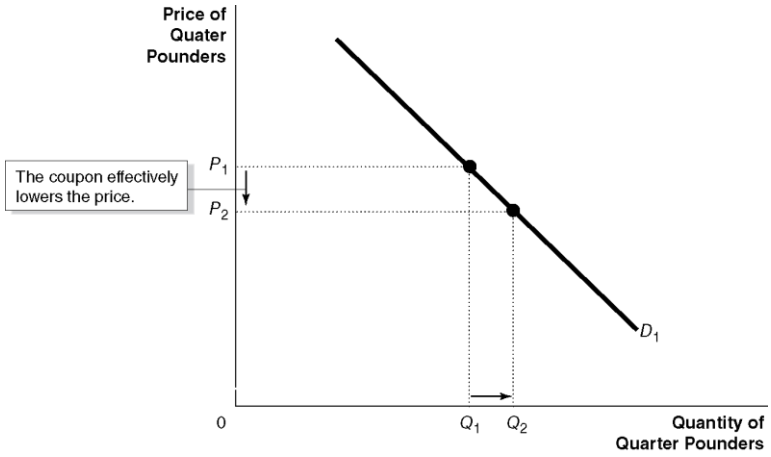
1.7 The article implies that gasoline-powered cars and gasoline are complements because sales of gasoline-powered SUVs were expected to increase as a result of a decrease in the price of gasoline. The article suggests that gasoline-powered cars and hybrids are substitutes because "Americans are now more likely to trade in a hybrid…for an SUV…" after the fall in gasoline prices reduced the cost of operating an SUV.

1.8 Assuming that premium bottled water and carbonated sodas are substitutes, then a tax on sodas will increase the price of sodas and increase the demand for premium bottled water.

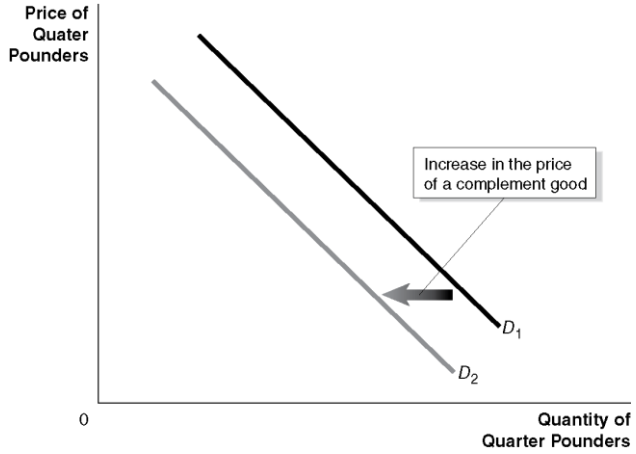
1.9 **a.** Because the price of a substitute good has declined, the demand curve for Quarter Pounders will shift to the left from D_1 to D_2 in the following graph.



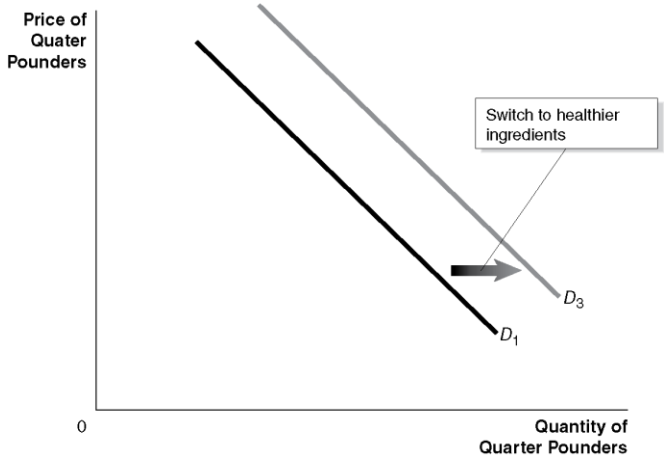
b. The coupon results in a cut in the price of Quarter Pounders, so there will be a movement down the demand curve for Quarter Pounders in the following graph.



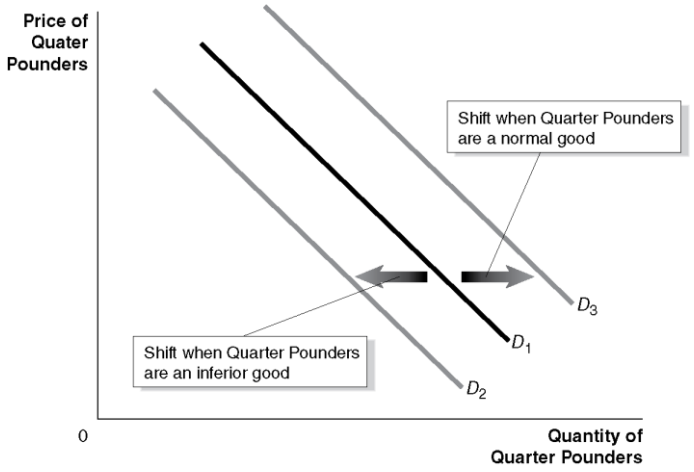
c. Because for many people Quarter Pounders and fries are complements, an increase in the price of French fries will shift the demand curve for Quarter Pounders to the left from D_1 to D_2 in the following graph.



d. If McDonald's made this switch it would expect there to be an increase in the demand for Quarter Pounders (demand would shift from D_1 to D_3 in the following graph), but until the switch is made the effect on the demand for Quarter Pounders is uncertain.



e. The demand curve for Quarter Pounders will shift. If Quarter Pounders are an inferior good, the demand curve will shift to the left from D_1 to D_2 in the following graph. If Quarter Pounders are a normal good, the demand curve will shift to the right from D_1 to D_3.



1.10 The demand for UGG boots decreased from 2018 to 2019, which could be caused by a decrease in the price of leather boots, which are a substitute good (UGG boots are sheepskin boots), by a decrease in national income, assuming UGG boots are normal goods, by a decrease in the taste (preference) for UGG boots as a result of a campaign by animal rights activists against using sheepskin to make boots, or by other factors that decrease demand.

1.11 A movement along the demand curve from point *A* to point *B* would be caused by a decrease in the price of traditional wings at Buffalo Wild Wings. A shift to the right of the demand curve from point *A* to point *C* could be caused by an increase in the price of pizza or steak (substitutes for wings), an increase in national income (assuming wings at Buffalo Wild Wings are normal goods), an increase in the taste (preference) for wings at Buffalo Wild Wings as a result of a successful advertising campaign, or by other factors that increase demand.

1.12 These developments would allow virtual reality headset users to play games that can also be played on video game consoles. Therefore, the headsets would become closer substitutes for video game consoles.

1.13 China's one-child policy increased the relative demand for goods and services consumed by the population over age 14 and increased the relative demand for goods and services consumed by boys relative to girls. So the demand for children's toys and children's books decreased. The demand for male clothing increased relative to the demand for female clothing.

1.14 Answers may vary, but it is unlikely that Starbucks Reserve will attract many baby boomers, who are used to buying less expensive coffee. Many millennials are more likely to buy bottled water than coffee. Because the average incomes of the youngest millennials are lower than older millennials and Generation Xers, coffee at $12 is a luxury that few will be able to afford. Therefore, it is reasonable to surmise that Starbucks Reserve will be more likely to attract members of Generation X. To justify its high coffee prices Starbucks Reserve coffee shops will have to offer amenities that are unavailable at standard Starbucks coffee shops and, possibly, a greater variety of menu items.

1.15 The data do not indicate that the demand curve for Priuses is upward sloping. It is likely that factors such as income, fuel prices, and the prices of other hybrid vehicles would have changed during these three years. Therefore, the data are likely to represent points from three different demand curves.

1.16 You should disagree with the quote from the first article because a change in the price of oil affects *the quantity of oil demanded*, but does not affect *the demand for oil*. You should agree with the quote in the second article. If the demand for electric cars, a substitute for gasoline-powered cars, increases, then the demand for gasoline powered-cars will decline. This decline will reduce the demand for gasoline, a complement for gasoline-powered cars.

1.17 **a.** Factors that have caused a decline in sales of carbonated beverages include the following: increases in demand for substitutes, such as bottled water; health concerns among consumers regarding sugar and other ingredients found in carbonated beverages; increases in taxes on sugary drinks. It is likely that these factors will continue to affect demand for carbonated beverages in the future.

b. Sales of bottled water might decline during a recession because consumers can use tap water as a substitute for bottled water. Because the price of premium bottled water is higher than the price of regular bottled water, sales of premium bottled water are likely to decline more than regular bottled water during a recession.

3.2 The Supply Side of the Market

Learning Objective: List and describe the variables that influence supply.

Review Questions

2.1 A supply schedule is a table that shows the relationship between the price of a product and the quantity of the product supplied. A supply curve is a curve that shows the relationship between the price of a product and the quantity of the product supplied.

2.2. A "change in supply" refers to a shift of the supply curve, while a "change in quantity supplied" refers to a movement along the supply curve as a result of a change in the product's price.

2.3 The law of supply states that, holding everything else constant, an increase in price causes an increase in the quantity supplied (and a decrease in price causes a decrease in the quantity supplied). The main variables that will cause a supply curve to shift are: (1) changes in the prices of inputs used to make the product, (2) technological change, (3) changes in the prices of substitutes or complements in production, (4) changes in expected future prices, and (5) changes in the number of firms. Some examples: If the price of hybrid car engines increases, the supply of hybrid cars will decrease. If there is positive technological change in producing smartphones, the supply of smartphones will increase. If the price of 4K TVs increases, the supply of LED TVs, a substitute in production, will decrease. If the price of beef increases, the supply of leather, a complement in production, will increase. As more firms enter the smartwatch market, the supply of smartwatches will increase. If firms believe that the price of copper will increase in the future, the supply of copper will decrease today (and increase it in the future).

Problems and Applications

2.4 **a.** Change in quantity supplied: A movement up the supply curve.

b. Change in supply: The supply curve shifts to the right.

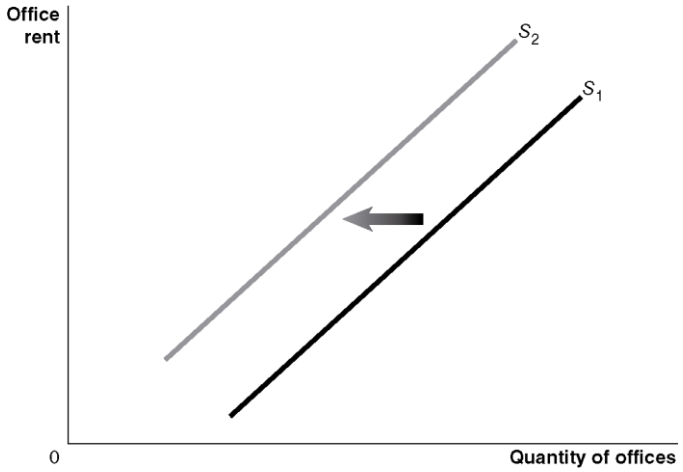
c. Change in supply: The supply curve shifts to the left.

2.5 No. A decline in oil prices would reduce *the quantity of oil supplied*, not *the supply* of oil.

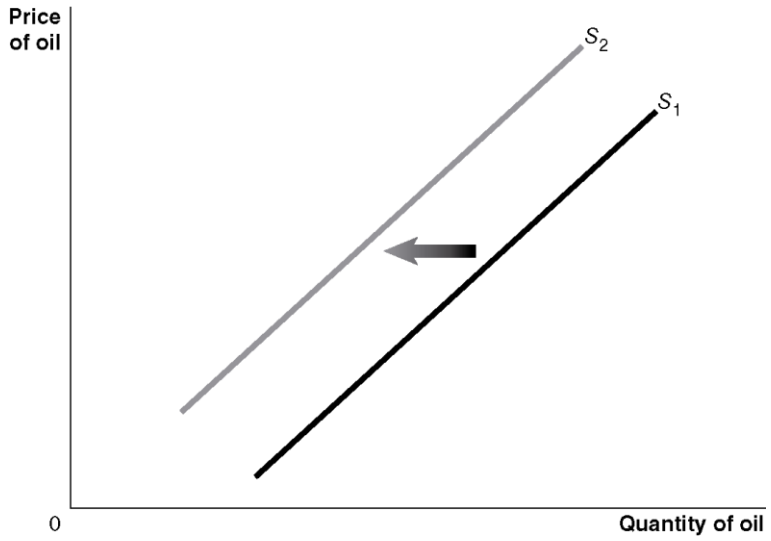
2.6 A movement along the supply curve from point *A* to point *B* would be caused by an increase in the price of traditional wings at Buffalo Wild Wings. A shift to the right of the supply curve from point *A* to point *C* could be caused by a decrease in the price of feed for chickens, a positive technological change in producing chicken wings, an increase in the number restaurants that sell chicken wings, or other factors that cause an increase in supply.

2.7 The supply of UGG boots decreased from 2018 to 2019. The decrease in supply could be caused by an increase in the price of sheepskin (UGG boots are sheepskin boots), an increase in the price of the machines used to assembly the boots, an increase in the price of other types of boots that UGG could produce, or other factors that cause a decrease in supply.

2.8 One of the variables that shifts a market supply curve is a change in the price of a substitute in production. Residential apartments are a substitute for office space. In response to an increase in residential rents, the supply of office space will decrease, from S_1 to S_2, as shown in the following graph.



2.9 One of the variables that will shift a market supply curve is a change in the expected future price of the good or service. Holding some oil in storage rather than selling it would mean less oil would be supplied at every price. As a result, the supply of oil will shift to the left from S_1 to S_2 in the following graph.



3.3 Market Equilibrium: Putting Demand and Supply Together

Learning Objective: Use a graph to illustrate market equilibrium.

Review Questions

3.1 Market equilibrium is the situation in which the quantity demanded equals the quantity supplied.

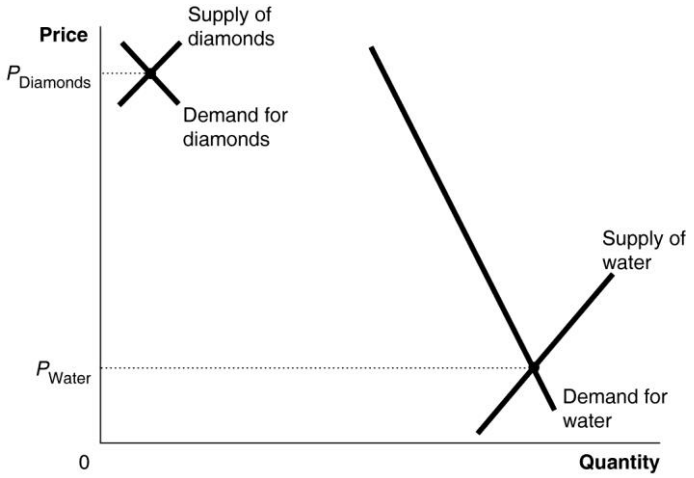
3.2 A shortage is a situation in which, at the current price, the quantity demanded is greater than the quantity supplied, and a surplus is the situation in which, at the current price, the quantity demanded is less than the quantity supplied.

3.3 If the current price is above equilibrium, the quantity supplied will be greater than the quantity demanded, and there will be a surplus. A surplus causes the market price to fall toward equilibrium. If the current price is below equilibrium, the quantity demanded will be greater than the quantity supplied, and there will be a shortage. A shortage causes the market price to rise toward equilibrium.

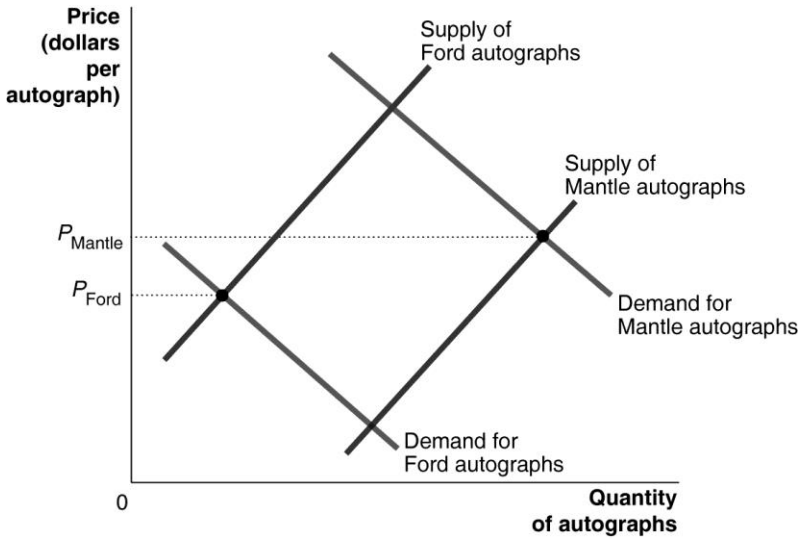
Problems and Applications

3.4 You should disagree. The demand curve will not shift as a result of a shortage. If there is a shortage, firms will raise the prices they charge. The quantity supplied will increase, the quantity demanded will decrease, and equilibrium will be reached at a higher market price.

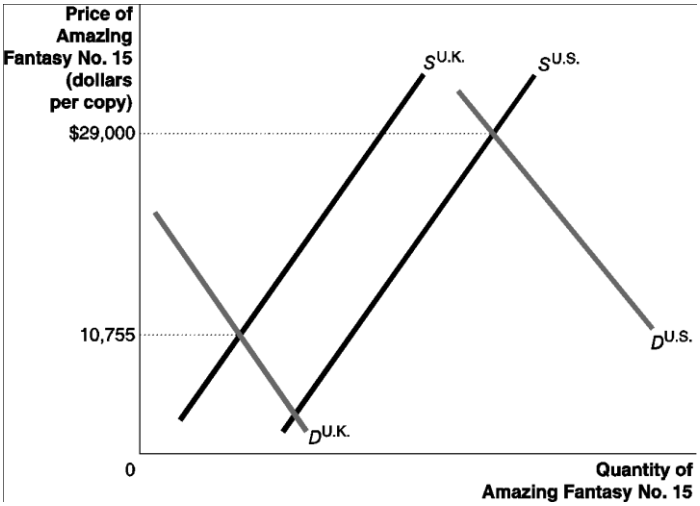
3.5 Begin by drawing two demand curves. Label one "Demand for diamonds" and the other "Demand for water." Make sure that the water demand curve is much farther to the right than the diamond demand curve. Based on the demand curves you have just drawn, think about how it might be possible for the market price of water to be much lower than the market price for diamonds. The only way this can be true is if the supply of water is much greater than the supply of diamonds. Draw on your graph a supply curve for water and a supply curve for diamonds that will result in an equilibrium price of diamonds that is much higher than the equilibrium price of water.



3.6 Begin by drawing two supply curves. Label one "Supply of Mantle autographs" and the other "Supply of Ford autographs." Make sure that the Mantle supply curve is much farther to the right than the Ford supply curve. Based on the supply curves you have just drawn, think about how it might be possible for the market price of Ford autographs to be lower than the market price for Mantle autographs. The only way this can be true is if the demand for Mantle autographs is much greater than the demand for Ford autographs. Draw on your graph a demand curve for Mantle autographs and a demand curve for Ford autographs that will result in an equilibrium price of Mantle autographs that is higher than the equilibrium price of Ford autographs.



3.7 The demand for the U.S. version of *Amazing Fantasy* No. 15 comic relative to the demand for the U.K. version of the comic must be even greater than the supply of the U.S. version of the comic relative to the supply of the U.K. version of the comic. The graph below shows a greater supply of the U.S. version of the comic than the supply of the U.K. version and shows a much greater demand for the U.S. version of the comic than the demand for the U.K. version.



3.8 No. It only means that consumers who are willing to pay the equilibrium price are able to purchase the good, and sellers who are willing to accept the equilibrium price are able to sell the good. Consumers would have been happier paying less. And there are likely to be consumers who want the good but are not willing (or able) to pay the market price. Similarly, sellers would be happier to receive a higher price than the equilibrium price, and there may be sellers who are only willing to sell at a higher price and, therefore, do not participate in the market.

3.9 **a.** In referring to a "global supply glut" the article describes the result of a significant increase in the supply of crude oil relative to the demand. This change resulted in a greater quantity supplied than quantity demanded for crude oil; in other words, there was a surplus in the market for crude oil.

b. In response to the surplus of oil, the market price would fall to a new, lower equilibrium price at which the quantity demanded would equal the quantity supplied.

c. As the market price fell in response to the surplus, crude oil producers would reduce the quantity of oil they supply and buyers would increase the quantity they demand. When the market reaches its equilibrium point the glut would be eliminated.

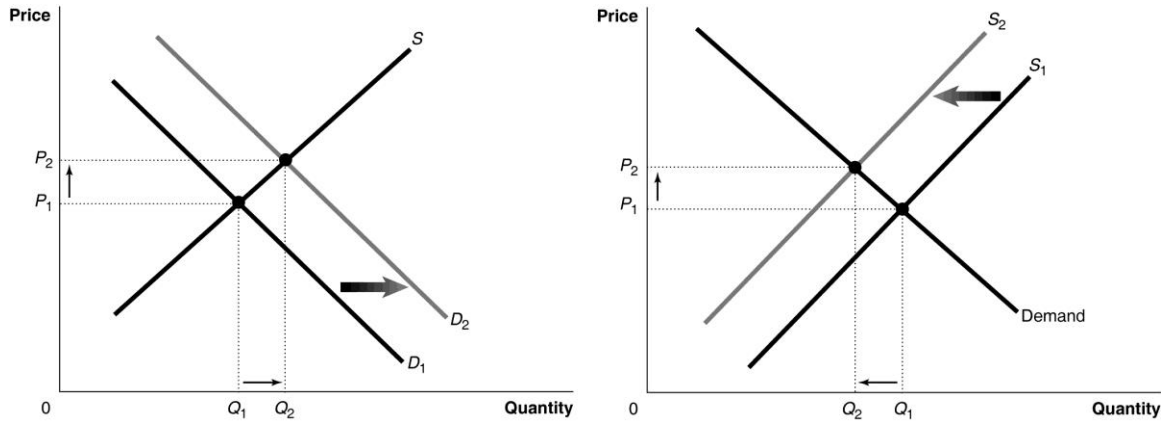
3.4 The Effect of Demand and Supply Shifts on Equilibrium

Learning Objective: Use demand and supply graphs to predict changes in prices and quantities.

Review Questions

4.1 **a.** When the demand curve shifts to the right, the equilibrium price and equilibrium quantity both rise. The following graph on the left illustrates this case.

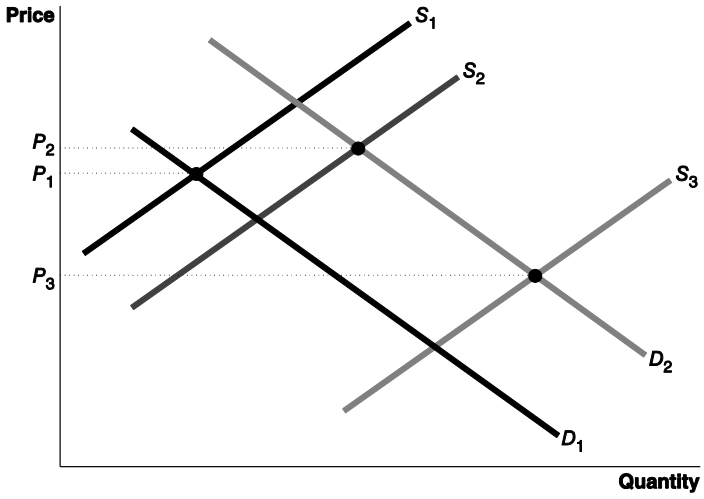
b. When the supply curve shifts to the left, the equilibrium price rises, but the equilibrium quantity falls. The following graph on the right illustrates this case.



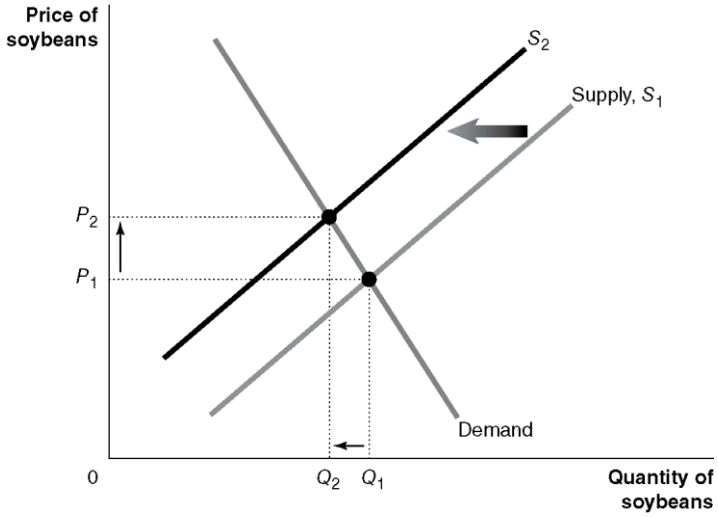
4.2 If the demand curve shifts to the right more than the supply curve does, the equilibrium price will rise. Figure 3.11 (a) on page 91 of the text illustrates this case. If the supply curve shifts to the right more than the demand curve, the equilibrium price will fall. Figure 3.11 (b), also on page 91 of the text, illustrates this case.

Problems and Applications

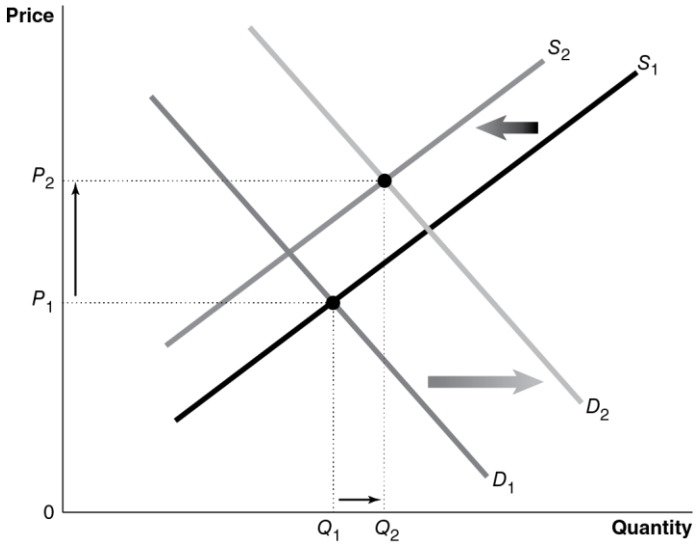
4.3 You should agree. The increase in demand for premium bottled water would cause the demand curve to shift to the right along an unchanged supply curve. By itself, this shift in the demand curve would result in an increase in the price of premium bottled water. But an increase in the number of firms producing premium bottled water would result in an increase in supply—the supply curve will shift to the right—and a lower price—if demand remained unchanged. The relative size of the shift of the demand curve and the supply curve will determine whether the equilibrium price rises or falls. The following graph illustrates this uncertainty. For a given increase in demand – from D_1 to D_2 – an increase in supply from S_1 to S_2 results in an increase in the equilibrium price from P_1 to P_2, but an increase in supply from S_1 to S_3 results in a decrease in the equilibrium price from P_1 to P_3.



4.4 The problem assumes that soybeans and corn are substitutes in production. In response to an increase in the demand for corn caused by the increase in the demand for ethanol, the equilibrium price of corn will increase. As a result, some farmers will shift acreage from growing soybeans to growing corn. As the graph shows, the supply curve for soybeans will shift to the left from S_1 to S_2, which will cause the equilibrium price of soybeans to increase from P_1 to P_2, all else equal.

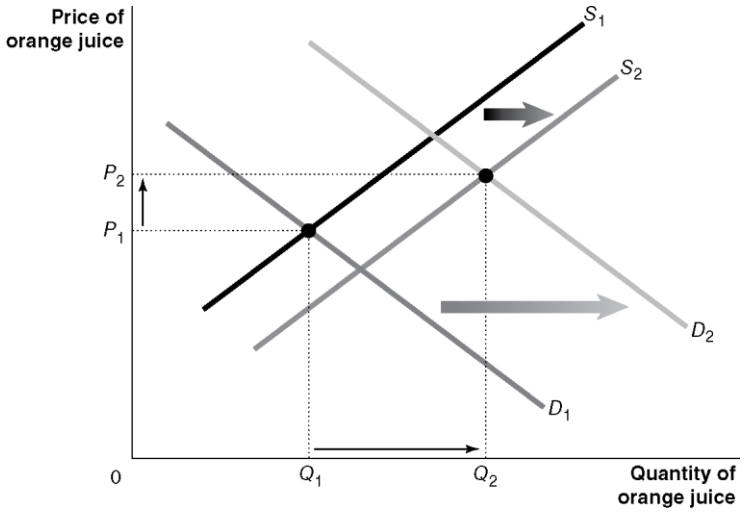


4.5 **a.** The following graph illustrates an increase in the demand for coffee from D_1 to D_2 due to the millennials' "unquenchable thirst" for coffee. The supply curve shifts to the left from S_1 to S_2 as the result of dry weather in Brazil and Asia. The shifts in demand and supply would each increase the equilibrium price of coffee, but an increase in demand by itself would increase the equilibrium quantity while a decrease in supply by itself would cause the equilibrium quantity to decrease. The graph shows that the equilibrium quantity of coffee will increase from Q_1 to Q_2 if the increase in demand is greater than the decrease in supply.



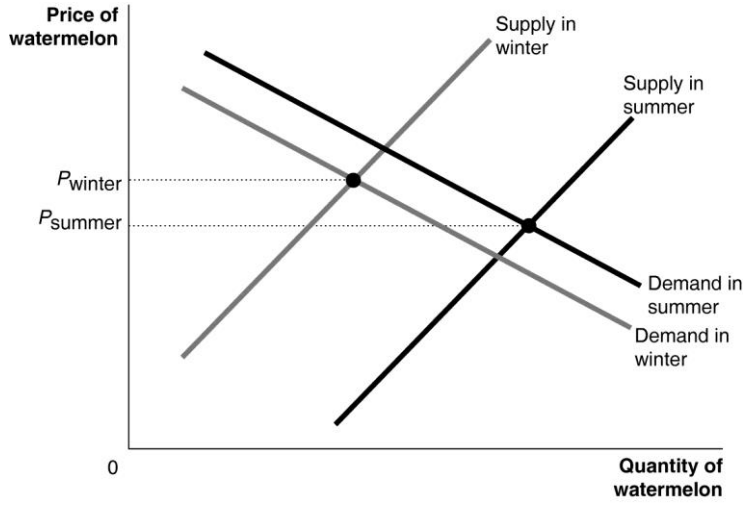
b. The quantity of coffee sold over time is a result of changes in both demand and supply. The quantity of coffee sold can increase due to an increase in supply even if demand hasn't increased.

4.6 **a.** The following graph shows the initial equilibrium price, P_1, and equilibrium quantity, Q_1, in the market for orange juice. The imposition of taxes on carbonated sodas will increase their prices. Assuming that orange juice is a substitute for carbonated sodas, the demand for orange juice will increase. This is shown in the following graph by a shift in the demand curve from D_1 to D_2. The cure for citrus greening would increase the supply of oranges and, in turn, the supply of orange juice, so the supply curve for orange juice shifts to the right from S_1 to S_2. By itself, the shift in the demand curve would result in an increase in the equilibrium price, but, by itself, the shift in the supply curve would cause the equilibrium price to decrease. We cannot determine whether the net effect of both changes would result in an increase or a decrease in the equilibrium price. In the graph the new equilibrium price, P_2, is greater than the initial equilibrium price, P_1, because the change in demand is greater than the change in supply. If the change in supply is drawn to be greater than the change in demand, P_2 would be less than P_1.

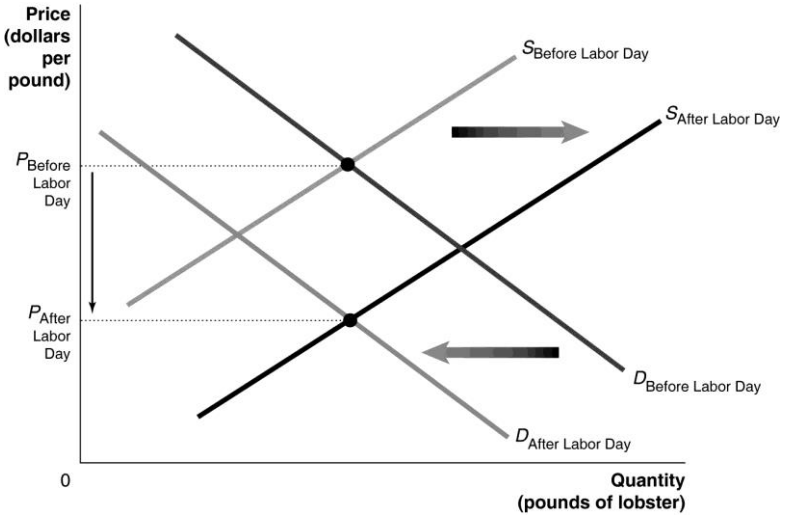


b. Because an increase in demand and an increase in supply each result in an increase in quantity, we can say that the net effect of both changes will be an increase the equilibrium quantity of orange juice.

4.7 Draw a demand and supply graph for watermelon with two demand curves and two supply curves. Label the demand curves "Demand in winter" and "Demand in summer." Label the supply curves "Supply in winter" and "Supply in summer." Be sure that the winter supply curve is to the left of the summer supply curve and the summer demand curve lies to the right of the winter demand curve. Look at the following graph to see how the equilibrium price in the summer could be lower than the equilibrium price you have established for the winter. The only way for this to happen is for the summer supply curve to shift to the right by enough to cause the equilibrium price to be lower in the summer than it is in the winter despite the increase in demand. The demand for watermelon does increase in the summer compared with the winter, but the increase in the supply of watermelons in the summer is even greater, so the equilibrium price falls.

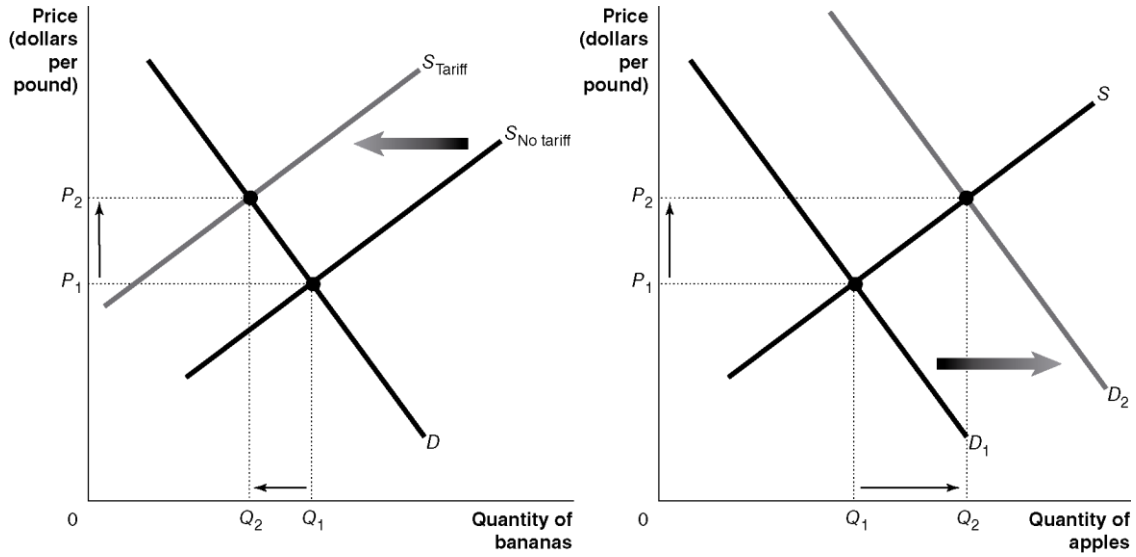


4.8 Draw a demand and supply graph showing the market equilibrium before Labor Day. Label both the demand and supply curves "Before Labor Day," and label the resulting equilibrium price $P_{\text{Before Labor Day}}$. Add to your graph the demand curve for "After Labor Day," making sure it is to the left of the "Before Labor Day" demand curve, as the vacationers have gone home. Add to your graph the supply curve for "After Labor Day," making sure it is to the right of the "Before Labor Day" curve because fishing conditions are good. Because the demand curve has shifted to the left and the supply curve has shifted to the right (or perhaps stayed the same, if the good fishing conditions are a continuation from the summer conditions), the equilibrium price will definitely decrease in the fall.

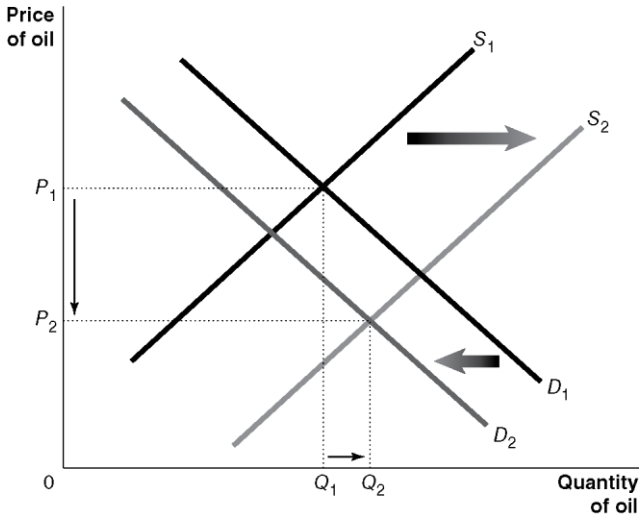


4.9 **a.** The apple producer was assuming that apples and bananas are substitutes. The lower priced bananas would lead people to substitute away from buying apples and toward buying bananas.

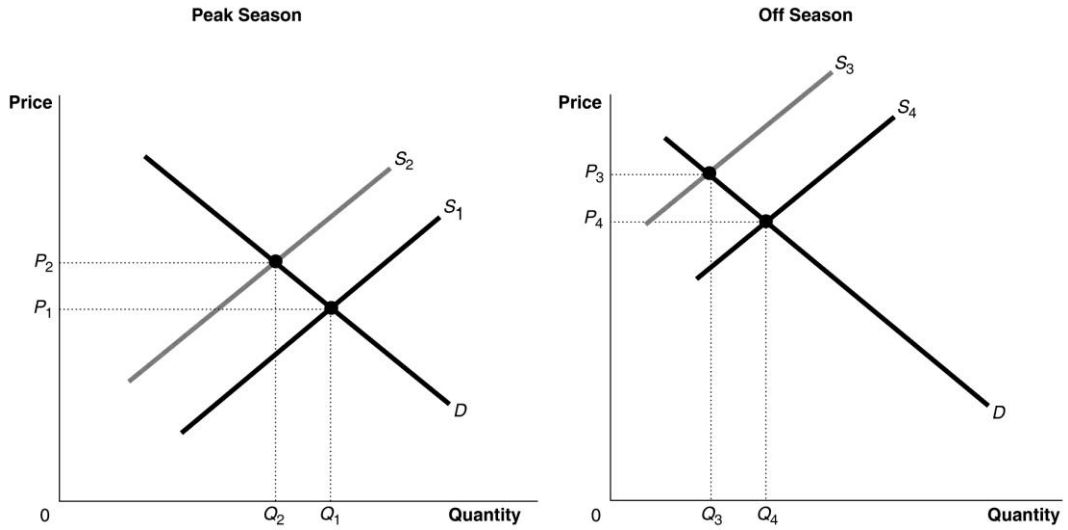
b. In the following two graphs, the one on the left shows that the tariff on imported bananas shifts the supply curve for bananas to the left from $S_{\text{No tariff}}$ to S_{Tariff}, increasing the equilibrium price of bananas from P_1 to P_2, and decreasing the equilibrium quantity from Q_1 to Q_2. The graph on the right, drawn under the assumption that apples and bananas are substitute goods, shows that the higher price of bananas shifts the demand curve for apples to the right from D_1 to D_2, which increases the equilibrium price of apples from P_1 to P_2 and increases the equilibrium quantity from Q_1 to Q_2.



4.10 The student's reasoning is correct. The following graph represents the market for oil with: (a) a decrease in demand from D_1 to D_2, and (b) and an increase in supply from S_1 to S_2. Each change will decrease the equilibrium price of oil; however, by itself the decrease in demand will decrease the equilibrium quantity while, by itself, the increase in supply will increase the equilibrium quantity. Therefore, we can be certain that the equilibrium price will decrease, but we can't know with certainty whether the equilibrium quantity will increase or decrease. In the graph, we show the equilibrium quantity increasing from Q_1 to Q_2 because we have drawn the shift in the supply curve as being greater than the shift in the demand curve. If we had drawn the shift in the demand curve as being greater than the shift in the supply curve, then the equilibrium quantity would have decreased.



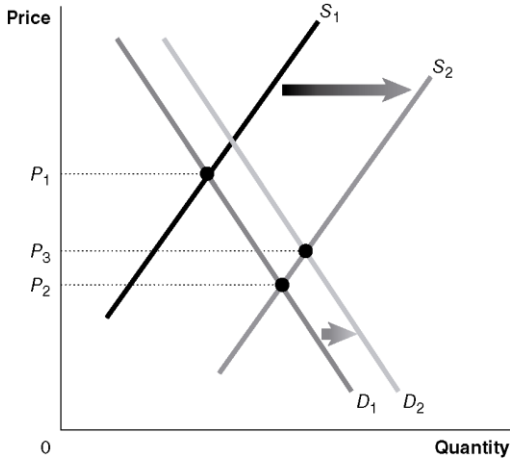
4.11 Refrigeration allowed for the storage of perishable products. In the following two graphs, the one on the left shows that storage removes some of the supply during the peak season, shifting the supply curve to the left from S_1 to S_2 and driving the equilibrium price up from P_1 to P_2. During the off-season, the refrigerated supply could be offered for sale, shifting the relatively small supply to the right from S_3 to S_4 and causing the equilibrium price to fall from P_3 to P_4, as shown in the graph on the right.



4.12 With the equilibrium price increasing and the equilibrium quantity decreasing, we know that the supply curve definitely shifted to the left from 2017 to 2018. It is possible that the demand curve also shifted. But if the demand curve had shifted to the right by more than the supply curve shifted to the left, then the equilibrium quantity would have increased rather than decreased. Similarly, if the demand curve had shifted to the left by more than the supply curve shifted to the left, then the equilibrium price would have decreased rather than increased. We can conclude that the supply curve must have shifted by more than the demand curve.

4.13 The student's reasoning is incorrect. He should have said: "Increased production shifts the supply curve to the right and leads to a lower equilibrium price, but a higher equilibrium quantity, and therefore a larger quantity demanded. The increase in quantity demanded is a result of a supply curve shifting to the right and a movement along the demand curve, but the demand curve does not shift.

4.14 The student's analysis is incorrect—the shift from D_1 to D_2 will not happen. (The following graph represents the student's analysis.) There will be a movement along the demand curve, D_1, due to the price change, but the demand curve will not shift. Recall that a shift in the supply curve causes a change in equilibrium price, but the change in price does not cause a further shift in demand. The whole effect of the decline in price on consumers' willingness to buy premium bottled water is captured by the movement down the original demand curve, D_1. For the demand curve to shift, some factor, other than price, that affects consumers' willingness to buy premium bottled water would have to change.



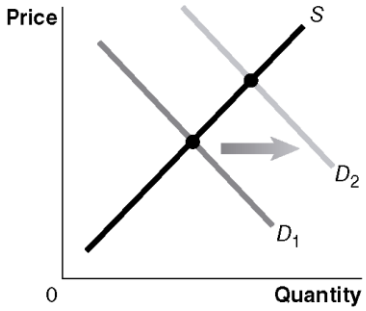
4.15 **a.** Scenario a. is shown in Graph 1. The demand for premium bottled water rises because a decrease in the supply of sports drinks will increase the price of sports drinks, which are substitutes for premium bottled water. The shift in the demand curve for premium bottled water results in a movement along the supply curve for premium bottled water.

b. Scenario b. is shown in Graph 4. The demand for premium bottled water falls when incomes fall assuming premium bottled water is a normal good. The shift in the demand curve for premium bottled water results in a movement along the supply curve for premium bottled water.

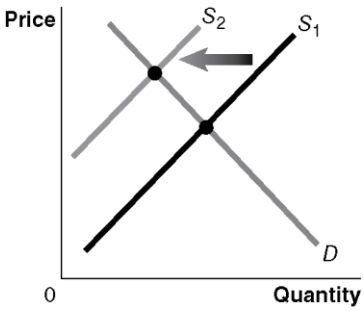
c. Scenario c. is shown in Graph 3. An improvement in technology reduces the cost of producing premium bottled water and shifts the supply curve for premium bottled water to the right.

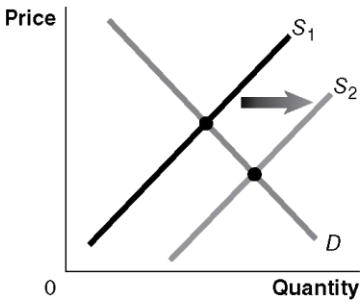
d. Scenario d. is shown in Graph 2. A rise in an input's price shifts the supply curve for premium bottled water to the left.

Graph 1

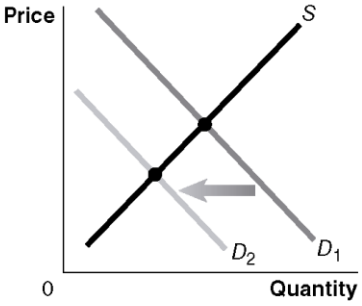


Graph 2



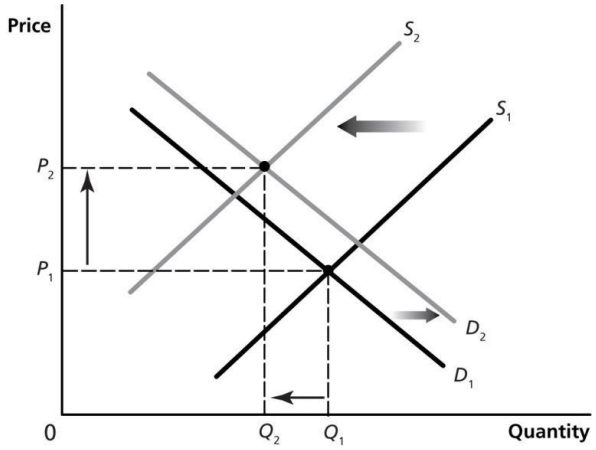


Graph 3



Graph 4

4.16 The rising costs will cause the supply curve to shift to the left, from S_1 to S_2, while the improvement in quality will cause the demand curve to shift to the right from D_1 to D_2. Because we don't know if the demand curve shifts to the right more than the supply curve shifts to the left, we don't know if the equilibrium quantity purchased will increase or decrease. If the shift in the supply curve is greater, as shown in the figure below, the equilibrium quantity will fall. We do know that the equilibrium price of childcare will rise as a result of the regulation.



4.17 The graph with the demand curve shifting to the right from D_1 to D_2 best represents the market for hotel rooms at a ski resort during the peak season of the winter months. If hotel rates stayed at their summer level of P_1, there would be a shortage of hotel rooms during the winter months.

4.18 The graph with the vertical demand curve is more likely to represent the market for the cancer-fighting drug. If the price of this good rises, patients are unlikely to reduce the quantity they demand, but if the price of the electric automobiles rises, households will reduce the quantity they demand as they switch to buying other cars.

Suggestions for the *Thinking Critically Exercises*

CT3.1 Students often have more difficulty with supply as they're generally on the demand side of most markets. By working together, they will see this and better understand the topic as they talk to each other and describe what they find to be most difficult.

CT3.2 It should be a market. Students are likely to have difficulty picking the appropriate theoretical representation of data. Students may also have a problem with this question as they are presented with data and asked what they represent, the type of question they are not used to addressing.

CT3.3 The order would be (i) an external (or exogenous) event, (ii) a curve shifting, and (iii) a new equilibrium. Students sometimes have difficulty integrating these separate pieces in the correct order.

Solutions to End-of-Chapter Exercises

Answers to *Thinking Critically* Questions