

Key Concepts

market, p. 66

competitive market, p. 66

quantity demanded, p. 67

law of demand, p. 67

demand schedule, p. 67

demand curve, p. 68

normal good, p. 70

inferior good, p. 70

substitutes, p. 70

complements, p. 70

quantity supplied, p. 73

law of supply, p. 73

supply schedule, p. 74

supply curve, p. 74

equilibrium, p. 77

equilibrium price, p. 77

equilibrium quantity, p. 77

surplus, p. 77

shortage, p. 78

law of supply and demand, p. 79

Questions for Review

1. What is a competitive market? Briefly describe a type of market that is *not* perfectly competitive.
2. What are the demand schedule and the demand curve, and how are they related? Why does the demand curve slope downward?
3. Does a change in consumers' tastes lead to a movement along the demand curve or a shift in the demand curve? Does a change in price lead to a movement along the demand curve or a shift in the demand curve? Explain your answers.
4. Popeye's income declines, and as a result, he buys more spinach. Is spinach an inferior or a normal good? What happens to Popeye's demand curve for spinach?
5. What are the supply schedule and the supply curve, and how are they related? Why does the supply curve slope upward?
6. Does a change in producers' technology lead to a movement along the supply curve or a shift in the supply curve? Does a change in price lead to a movement along the supply curve or a shift in the supply curve?
7. Define the equilibrium of a market. Describe the forces that move a market toward its equilibrium.
8. Beer and pizza are complements because they are often enjoyed together. When the price of beer rises, what happens to the supply, demand, quantity supplied, quantity demanded, and price in the market for pizza?
9. Describe the role of prices in market economies.

Quick Check Multiple Choice

1. A change in which of the following will NOT shift the demand curve for hamburgers?
 - a. the price of hot dogs
 - b. the price of hamburgers
 - c. the price of hamburger buns
 - d. the income of hamburger consumers
2. An increase in _____ will cause a movement along a given demand curve, which is called a change in _____.
 - a. supply, demand
 - b. supply, quantity demanded
 - c. demand, supply
 - d. demand, quantity supplied
3. Movie tickets and DVDs are substitutes. If the price of DVDs increases, what happens in the market for movie tickets?
 - a. The supply curve shifts to the left.
 - b. The supply curve shifts to the right.
 - c. The demand curve shifts to the left.
 - d. The demand curve shifts to the right.
4. The discovery of a large new reserve of crude oil will shift the _____ curve for gasoline, leading to a _____ equilibrium price.
 - a. supply, higher
 - b. supply, lower
 - c. demand, higher
 - d. demand, lower
5. If the economy goes into a recession and incomes fall, what happens in the markets for inferior goods?
 - a. Prices and quantities both rise.
 - b. Prices and quantities both fall.
 - c. Prices rise, quantities fall.
 - d. Prices fall, quantities rise.
6. Which of the following might lead to an increase in the equilibrium price of jelly and a decrease in the equilibrium quantity of jelly sold?
 - a. an increase in the price of peanut butter, a complement to jelly
 - b. an increase in the price of Marshmallow Fluff, a substitute for jelly
 - c. an increase in the price of grapes, an input into jelly
 - d. an increase in consumers' incomes, as long as jelly is a normal good

Problems and Applications

1. Explain each of the following statements using supply-and-demand diagrams.
 - a. "When a cold snap hits Florida, the price of orange juice rises in supermarkets throughout the country."
 - b. "When the weather turns warm in New England every summer, the price of hotel rooms in Caribbean resorts plummets."
 - c. "When a war breaks out in the Middle East, the price of gasoline rises and the price of a used Cadillac falls."
2. "An increase in the demand for notebooks raises the quantity of notebooks demanded but not the quantity supplied." Is this statement true or false? Explain.
3. Consider the market for minivans. For each of the events listed here, identify which of the determinants of demand or supply are affected. Also indicate whether demand or supply increases or decreases. Then draw a diagram to show the effect on the price and quantity of minivans.
 - a. People decide to have more children.
 - b. A strike by steelworkers raises steel prices.
 - c. Engineers develop new automated machinery for the production of minivans.
 - d. The price of sports utility vehicles rises.
 - e. A stock market crash lowers people's wealth.
4. Consider the markets for DVDs, TV screens, and tickets at movie theaters.
 - a. For each pair, identify whether they are complements or substitutes:
 - DVDs and TV screens
 - DVDs and movie tickets
 - TV screens and movie tickets
 - b. Suppose a technological advance reduces the cost of manufacturing TV screens. Draw a diagram to show what happens in the market for TV screens.
 - c. Draw two more diagrams to show how the change in the market for TV screens affects the markets for DVDs and movie tickets.
5. Over the past 30 years, technological advances have reduced the cost of computer chips. How do you think this has affected the market for computers? For computer software? For typewriters?
6. Using supply-and-demand diagrams, show the effect of the following events on the market for sweatshirts.
 - a. A hurricane in South Carolina damages the cotton crop.
 - b. The price of leather jackets falls.
7. Ketchup is a complement (as well as a condiment) for hot dogs. If the price of hot dogs rises, what happens to the market for ketchup? For tomatoes? For tomato juice? For orange juice?
8. The market for pizza has the following demand and supply schedules:

Price	Quantity Demanded	Quantity Supplied
\$4	135 pizzas	26 pizzas
5	104	53
6	81	81
7	68	98
8	53	110
9	39	121

 - a. Graph the demand and supply curves. What is the equilibrium price and quantity in this market?
 - b. If the actual price in this market were *above* the equilibrium price, what would drive the market toward the equilibrium?
 - c. If the actual price in this market were *below* the equilibrium price, what would drive the market toward the equilibrium?
9. Consider the following events: Scientists reveal that eating oranges decreases the risk of diabetes, and at the same time, farmers use a new fertilizer that makes orange trees produce more oranges. Illustrate and explain what effect these changes have on the equilibrium price and quantity of oranges.
10. Because bagels and cream cheese are often eaten together, they are complements.
 - a. We observe that both the equilibrium price of cream cheese and the equilibrium quantity of bagels have risen. What could be responsible for this pattern—a fall in the price of flour or a fall in the price of milk? Illustrate and explain your answer.
 - b. Suppose instead that the equilibrium price of cream cheese has risen but the equilibrium quantity of bagels has fallen. What could be responsible for this pattern—a rise in the price of flour or a rise in the price of milk? Illustrate and explain your answer.

Key Concepts

elasticity, p. 90

price elasticity of demand, p. 90

total revenue, p. 94

income elasticity of demand, p. 97

cross-price elasticity of demand, p. 98

price elasticity of supply, p. 98

Questions for Review

1. Define the price elasticity of demand and the income elasticity of demand.
2. List and explain the four determinants of the price elasticity of demand discussed in the chapter.
3. If the elasticity is greater than 1, is demand elastic or inelastic? If the elasticity equals zero, is demand perfectly elastic or perfectly inelastic?
4. On a supply-and-demand diagram, show equilibrium price, equilibrium quantity, and the total revenue received by producers.
5. If demand is elastic, how will an increase in price change total revenue? Explain.
6. What do we call a good with an income elasticity less than zero?
7. How is the price elasticity of supply calculated? Explain what it measures.
8. If a fixed quantity of a good is available, and no more can be made, what is the price elasticity of supply?
9. A storm destroys half the fava bean crop. Is this event more likely to hurt fava bean farmers if the demand for fava beans is very elastic or very inelastic? Explain.

Quick Check Multiple Choice

1. A life-saving medicine without any close substitutes will tend to have
 - a. a small elasticity of demand.
 - b. a large elasticity of demand.
 - c. a small elasticity of supply.
 - d. a large elasticity of supply.
2. The price of a good rises from \$8 to \$12, and the quantity demanded falls from 110 to 90 units. Calculated with the midpoint method, the elasticity is
 - a. 1/5.
 - b. 1/2.
 - c. 2.
 - d. 5.
3. A linear, downward-sloping demand curve is
 - a. inelastic.
 - b. unit elastic.
 - c. elastic.
 - d. inelastic at some points, and elastic at others.
4. The ability of firms to enter and exit a market over time means that, in the long run,
 - a. the demand curve is more elastic.
 - b. the demand curve is less elastic.
 - c. the supply curve is more elastic.
 - d. the supply curve is less elastic.
5. An increase in the supply of a good will decrease the total revenue producers receive if
 - a. the demand curve is inelastic.
 - b. the demand curve is elastic.
 - c. the supply curve is inelastic.
 - d. the supply curve is elastic.
6. The price of coffee rose sharply last month, while the quantity sold remained the same. Each of five people suggests an explanation:

TOM: Demand increased, but supply was perfectly inelastic.

DICK: Demand increased, but it was perfectly inelastic.

HARRY: Demand increased, but supply decreased at the same time.

LARRY: Supply decreased, but demand was unit elastic.

MARY: Supply decreased, but demand was perfectly inelastic.

Who could possibly be right?

 - a. Tom, Dick, and Harry
 - b. Tom, Dick, and Mary
 - c. Tom, Harry, and Mary
 - d. Dick, Harry, and Larry
 - e. Dick, Harry, and Mary

Problems and Applications

1. For each of the following pairs of goods, which good would you expect to have more elastic demand and why?
 - a. required textbooks or mystery novels
 - b. Beethoven recordings or classical music recordings in general
 - c. subway rides during the next six months or subway rides during the next five years
 - d. root beer or water
2. Suppose that business travelers and vacationers have the following demand for airline tickets from New York to Boston:

Price	Quantity Demanded (business travelers)	Quantity Demanded (vacationers)
\$150	2,100 tickets	1,000 tickets
200	2,000	800
250	1,900	600
300	1,800	400

- a. As the price of tickets rises from \$200 to \$250, what is the price elasticity of demand for (i) business travelers and (ii) vacationers? (Use the midpoint method in your calculations.)
 - b. Why might vacationers have a different elasticity from business travelers?
3. Suppose the price elasticity of demand for heating oil is 0.2 in the short run and 0.7 in the long run.
 - a. If the price of heating oil rises from \$1.80 to \$2.20 per gallon, what happens to the quantity of heating oil demanded in the short run? In the long run? (Use the midpoint method in your calculations.)
 - b. Why might this elasticity depend on the time horizon?
 4. A price change causes the quantity demanded of a good to decrease by 30 percent, while the total revenue of that good increases by 15 percent. Is the demand curve elastic or inelastic? Explain.
 5. Cups of coffee and donuts are complements. Both have inelastic demand. A hurricane destroys half the coffee bean crop. Use appropriately labeled diagrams to answer the following questions.
 - a. What happens to the price of coffee beans?
 - b. What happens to the price of a cup of coffee? What happens to total expenditure on cups of coffee?
 - c. What happens to the price of donuts? What happens to total expenditure on donuts?

6. Suppose that your demand schedule for DVDs is as follows:

Price	Quantity Demanded (income = \$10,000)	Quantity Demanded (income = \$12,000)
\$8	40 DVDs	50 DVDs
10	32	45
12	24	30
14	16	20
16	8	12

- a. Use the midpoint method to calculate your price elasticity of demand as the price of DVDs increases from \$8 to \$10 if (i) your income is \$10,000 and (ii) your income is \$12,000.
 - b. Calculate your income elasticity of demand as your income increases from \$10,000 to \$12,000 if (i) the price is \$12 and (ii) the price is \$16.
7. Maria has decided always to spend one-third of her income on clothing.
 - a. What is her income elasticity of clothing demand?
 - b. What is her price elasticity of clothing demand?
 - c. If Maria's tastes change and she decides to spend only one-fourth of her income on clothing, how does her demand curve change? What is her income elasticity and price elasticity now?
 8. The *New York Times* reported (Feb. 17, 1996) that subway ridership declined after a fare increase: "There were nearly 4 million fewer riders in December 1995, the first full month after the price of a token increased 25 cents to \$1.50, than in the previous December, a 4.3 percent decline."
 - a. Use these data to estimate the price elasticity of demand for subway rides.
 - b. According to your estimate, what happens to the Transit Authority's revenue when the fare rises?
 - c. Why might your estimate of the elasticity be unreliable?
 9. Two drivers—Walt and Jessie—each drive up to a gas station. Before looking at the price, each places an order. Walt says, "I'd like 10 gallons of gas." Jessie says, "I'd like \$10 worth of gas." What is each driver's price elasticity of demand?
 10. Consider public policy aimed at smoking.
 - a. Studies indicate that the price elasticity of demand for cigarettes is about 0.4. If a pack of cigarettes currently costs \$2 and the government wants to reduce smoking by 20 percent, by how much should it increase the price?

of the payroll tax. In other words, the distribution of the tax burden is far from the 50-50 split that lawmakers intended.

case study

Who Pays the Luxury Tax?

In 1990, Congress adopted a new luxury tax on items such as yachts, private airplanes, furs, jewelry, and expensive cars. The goal of the tax was to raise revenue from those who could most easily afford to pay. Because only the rich could afford to buy such extravagances, taxing luxuries seemed a logical way of taxing the rich.

Yet, when the forces of supply and demand took over, the outcome was quite different from the one Congress intended. Consider, for example, the market for yachts. The demand for yachts is quite elastic. A millionaire can easily not buy a yacht; he can use the money to buy a bigger house, take a European vacation, or leave a larger bequest to his heirs. By contrast, the supply of yachts is relatively inelastic, at least in the short run. Yacht factories are not easily converted to alternative uses, and workers who build yachts are not eager to change careers in response to changing market conditions.

Our analysis makes a clear prediction in this case. With elastic demand and inelastic supply, the burden of a tax falls largely on the suppliers. That is, a tax on yachts places a burden largely on the firms and workers who build yachts because they end up getting a significantly lower price for their product. The workers, however, are not wealthy. Thus, the burden of a luxury tax falls more on the middle class than on the rich.

The mistaken assumptions about the incidence of the luxury tax quickly became apparent after the tax went into effect. Suppliers of luxuries made their congressional representatives well aware of the economic hardship they experienced, and Congress repealed most of the luxury tax in 1993. ▀

Quick Quiz In a supply-and-demand diagram, show how a tax on car buyers of \$1,000 per car affects the quantity of cars sold and the price of cars. In another diagram, show how a tax on car sellers of \$1,000 per car affects the quantity of cars sold and the price of cars. In both of your diagrams, show the change in the price paid by car buyers and the change in the price received by car sellers.

6-3 Conclusion

The economy is governed by two kinds of laws: the laws of supply and demand and the laws enacted by governments. In this chapter, we have begun to see how these laws interact. Price controls and taxes are common in various markets in the economy, and their effects are frequently debated in the press and among policy-makers. Even a little bit of economic knowledge can go a long way toward understanding and evaluating these policies.

In subsequent chapters, we analyze many government policies in greater detail. We examine the effects of taxation more fully and consider a broader range of policies than we considered here. Yet the basic lessons of this chapter will not change: When analyzing government policies, supply and demand are the first and most useful tools of analysis.



"If this boat were any more expensive, we'd be playing golf."

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Summary

- A price ceiling is a legal maximum on the price of a good or service. An example is rent control. If the price ceiling is below the equilibrium price, then the price ceiling is binding, and the quantity demanded exceeds the quantity supplied. Because of the resulting shortage, sellers must in some way ration the good or service among buyers.
- A price floor is a legal minimum on the price of a good or service. An example is the minimum wage. If the price floor is above the equilibrium price, then the price floor is binding, and the quantity supplied exceeds the quantity demanded. Because of the resulting surplus, buyers' demands for the good or service must in some way be rationed among sellers.
- When the government levies a tax on a good, the equilibrium quantity of the good falls. That is, a tax on a market shrinks the size of the market.

Key Concepts

price ceiling, p. 112

price floor, p. 112

tax incidence, p. 122

Questions for Review

1. Give an example of a price ceiling and an example of a price floor.
2. Which causes a shortage of a good—a price ceiling or a price floor? Justify your answer with a graph.
3. What mechanisms allocate resources when the price of a good is not allowed to bring supply and demand into equilibrium?
4. Explain why economists usually oppose controls on prices.
5. Suppose the government removes a tax on buyers of a good and levies a tax of the same size on sellers of

the good. How does this change in tax policy affect the price that buyers pay sellers for this good, the amount buyers are out of pocket (including any tax payments they make), the amount sellers receive (net of any tax payments they make), and the quantity of the good sold?

6. How does a tax on a good affect the price paid by buyers, the price received by sellers, and the quantity sold?
7. What determines how the burden of a tax is divided between buyers and sellers? Why?

Quick Check Multiple Choice

1. When the government imposes a binding price floor, it causes
 - a. the supply curve to shift to the left.
 - b. the demand curve to shift to the right.
 - c. a shortage of the good to develop.
 - d. a surplus of the good to develop.
2. In a market with a binding price ceiling, an increase in the ceiling will _____ the quantity supplied, _____ the quantity demanded, and reduce the _____.
 - a. increase, decrease, surplus
 - b. decrease, increase, surplus
 - c. increase, decrease, shortage
 - d. decrease, increase, shortage
3. A \$1 per unit tax levied on consumers of a good is equivalent to
 - a. a \$1 per unit tax levied on producers of the good.
 - b. a \$1 per unit subsidy paid to producers of the good.
 - c. a price floor that raises the good's price by \$1 per unit.
 - d. a price ceiling that raises the good's price by \$1 per unit.