

## Chapter 4

# SUPPLY AND DEMAND

*Macroeconomics in Context (Goodwin, et al.)*

### Chapter Overview

In this chapter, you'll find the basics of supply and demand analysis. As you work through this chapter, you will start learning how to manipulate supply and demand curves as a way to analyze the relationships among prices, volume of production, and other factors. You will learn about the various factors that can shift a supply or demand curve up or down, the concepts of equilibrium and market adjustment and the concept of elasticity. You will also be asked to consider how supply and demand analysis may or may not be useful in explaining macroeconomic phenomena.

### Objectives

After reading and reviewing this chapter, you should be able to:

1. Understand the characteristics of the market theorized in the Classical model.
2. Interpret supply and demand curves.
3. Understand the difference between a change in supply (demand) and a change in the quantity supplied (demanded).
4. Describe some changes that would cause a shift in a supply curve, or a demand curve.
5. Explain how price adjusts due to changes in supply and demand.
6. Identify what is meant by the "price elasticity" of demand (supply).
7. Appreciate the usefulness and limitations of the theory of supply and demand in the real world, and its relevance to macroeconomics.

### Key Terms

perfectly competitive markets  
self-correcting market  
supply curve  
change in quantity supplied  
change in supply  
demand curve  
change in quantity demanded  
change in demand  
substitute good  
complementary good  
surplus  
shortage

market equilibrium  
theory of market adjustment  
market disequilibrium  
price elasticity  
price elasticity of demand  
price elasticity of supply  
quantity adjustments  
menu costs  
speculation  
speculative bubble  
subprime mortgage

## Active Review

### *Fill in the Blank*

1. Assume that in the market for tulips, there are hundreds of buyers and sellers of tulips, all of the tulips are identical, and it is extremely easy for anyone to become a tulip farmer and sell tulips. This market would most likely be characterized as a \_\_\_\_\_ market.
2. You decide to take a Uber ride when there is a heavy rain and most buses are running late. Many other commuters are also using Uber services for the same reason, which instantly increases the price of Uber rides. This market would be characterized as a \_\_\_\_\_ market.
3. A curve indicating the quantities that buyers are willing to purchase at various prices is known as a(n) \_\_\_\_\_ curve.
4. You notice that when the price of gasoline goes up in your town, people buy less gasoline. Assuming that nothing else has changed, this would be described by economists as a change in \_\_\_\_\_.
5. Tabitha needs furniture for her room. She is deciding between a medium-sized couch and a large armchair. Either the couch or the armchair could fulfill her need for sitting space in the room. The couch and the armchair can be referred to as \_\_\_\_\_ goods.
6. When people eat french fries, they like to put ketchup on them. Due to an increase in the price of french fries, total sales of french fries decrease. At the same time, ketchup sales also decrease. This phenomenon can be explained by noting that french fries and ketchup are \_\_\_\_\_ goods.
7. Surplus and shortage are both instances of \_\_\_\_\_.
8. A curve indicating the quantities that sellers are willing to offer at various prices is known as a(n) \_\_\_\_\_ curve.
9. In general, in a basic model showing supply and demand, if the supply curve shifts to the right, equilibrium price will \_\_\_\_\_ and equilibrium quantity will \_\_\_\_\_.
10. Henry notices that when the price of bread goes up by 10%, the quantity demanded falls only slightly. To measure by how much quantity demanded falls, Henry should use the \_\_\_\_\_ of demand.
11. When people rush to buy an asset because they expect the price to continue to rise and thereby expect to profit from the asset's appreciation in value, this can cause the emergence of a \_\_\_\_\_.

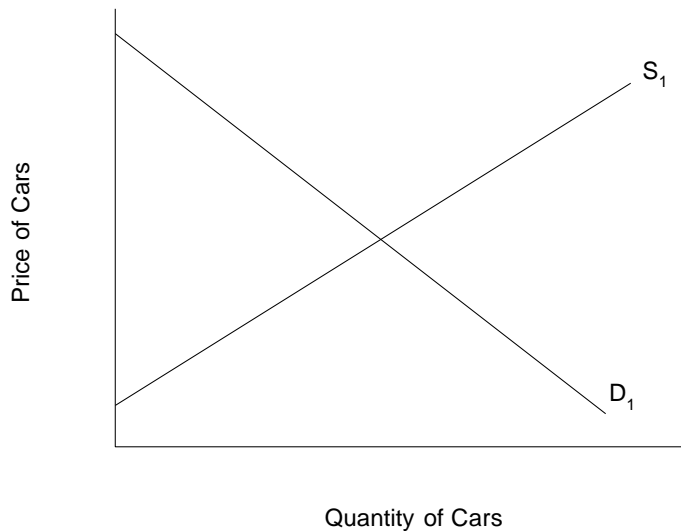
*True or False*

12. The quantity of rainfall is a nonprice determinant of the supply of lemons.
13. The demand curve for a good shows the same information as the demand schedule.
14. The level of income (or ability to pay) enjoyed by potential buyers is one factor determining the location of the demand curve.
15. In general, an increase in demand tends to increase equilibrium price and decrease equilibrium quantity.
16. In a situation of shortage, the quantity supplied exceeds the quantity demanded.

*Short Answer*

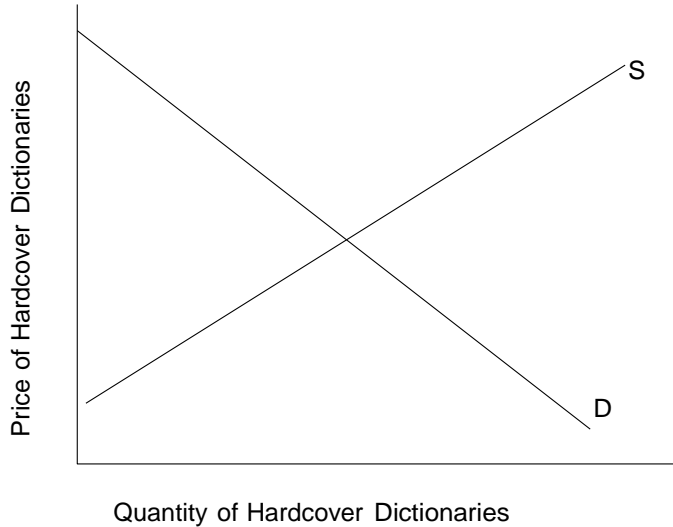
17. Why do demand curves generally slope downward?
  
  
  
  
  
  
  
  
  
  
18. Explain the difference between a *change in quantity demanded* and a *change in demand*.
  
  
  
  
  
  
  
  
  
  
19. A U.S. car manufacturer has produced a lot of SUVs, but now is having difficulty selling them at the price it had intended to sell them for. The cars are sitting at the warehouse unsold. Is this market in equilibrium? Explain.
  
  
  
  
  
  
  
  
  
  
20. A new movie is released after having been heavily promoted to teenagers. On the first night, the tickets sell out and there are still teenagers waiting outside theaters, desperate to see the movie and unable to get a ticket. Is this market in equilibrium? Explain.
  
  
  
  
  
  
  
  
  
  
21. What is the mathematical definition of price elasticity of demand (supply)?
  
  
  
  
  
  
  
  
  
  
22. Provide an example of a market in which prices may adjust very slowly; and an example of a market in which prices may adjust very quickly.

## Problems



1. For the following questions, refer to the graph shown above.
  - a. Label the equilibrium point as  $E_1$ , the equilibrium quantity as  $Q_1$ , and the equilibrium price as  $P_1$ .
  - b. Show how the supply curve will change if car manufacturers achieve a technological breakthrough that allows them to produce cars more cheaply.
  - c. If the price stayed at  $P_1$ , would a surplus or a shortage result from the technological breakthrough described in part (b)? Answer in words, and show on the graph.
  - d. Assuming market forces work quickly, show the new equilibrium price to which the market will adjust. Label this point as  $E_2$ . Label the new equilibrium quantity as  $Q_2$ , and the new equilibrium price as  $P_2$ .
  - e. In words, summarize the information that you have shown in your adjustments to the graph in parts (a) through (d).

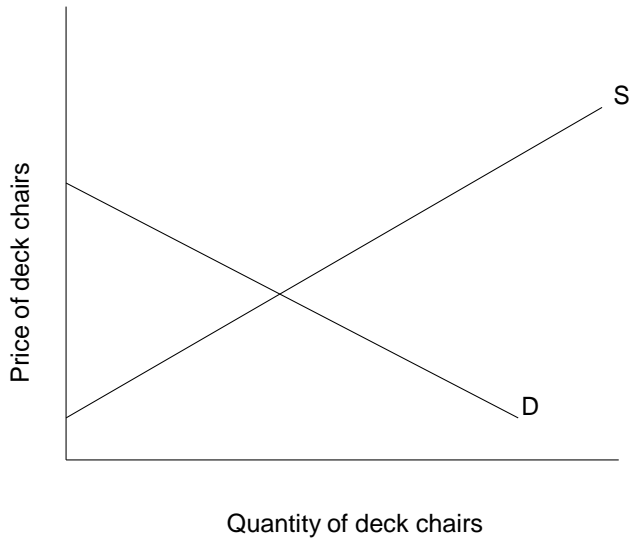
2. The following graph shows supply and demand for hardcover unabridged English dictionaries. Suppose that a new dictionary resource is created on the Internet, decreasing people's interest in buying large dictionaries in book form. For the questions below, state the answer in words and, where relevant, diagram your answer.



- a. What happens to the demand curve for hardcover dictionaries, as a result of this Internet innovation? (Answer in words and diagram.)
- b. What happens to the supply curve as a result of the Internet innovation? (Answer in words and diagram.)
- c. What happens to the price of hardcover dictionaries as a result of the innovation? Show the new price level on the graph you drew for part (b).

3. Refer again to the graph above, showing the market for hardcover dictionaries. What are the two types of change in this market that would lead the equilibrium price to *rise*?

4. In a popular new movie, a central character spends much of his time sitting on a white deck chair. Suddenly, white deck chairs come into fashion and everybody wants one. The graph below shows the market for deck chairs *before* the movie came out.



- a. On the diagram above, show what happens to the market for deck chairs as a result of the movie.
- b. Show the size of the shortage that exists in the short term, before the market adjusts to equilibrium.
- c. Label the new equilibrium point as  $E_2$ .

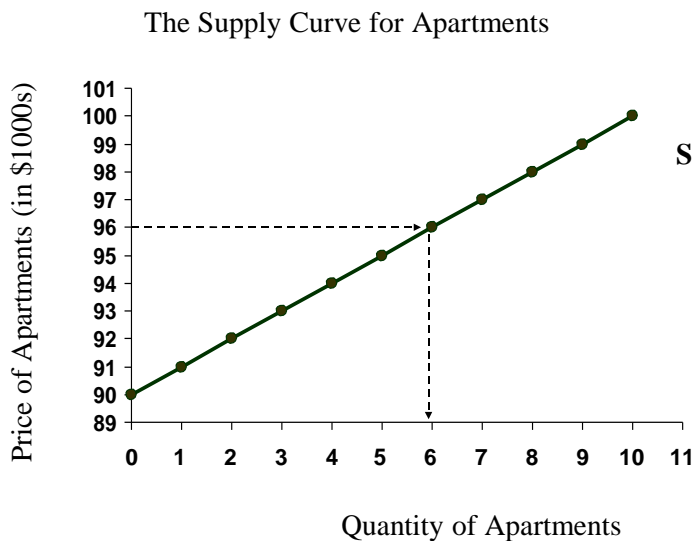
5. Using the same example of the market in white deck chairs, describe and, on separate graphs, show the changes in equilibrium price and quantity that would occur in response to the following events.

- a. A key input for making deck chairs becomes more expensive (*ceteris paribus*).
- b. In a highly publicized event, someone falls off a poorly constructed deck chair and sustains a serious head injury (*ceteris paribus*).

## Self Test

1. Which of the following is a characteristic of the sort of market imagined by classical macroeconomists?
  - a. A market with speculation
  - b. A market with only one seller
  - c. A market with long-term contracts
  - d. A perfectly competitive market
  - e. A long supply-chain market
  
2. Which of the following is true for a “self-correcting” market?
  - a. The government sets the price and the market respects that decision.
  - b. Imbalances between buyers and sellers are automatically reduced through changes in prices
  - c. Sellers use their market power to set prices high and persistent surpluses are the result.
  - d. Buyers use their market power to set prices low and persistent shortages are the result.
  - e. Sellers use their market power to set prices high and persistent shortages are the result.

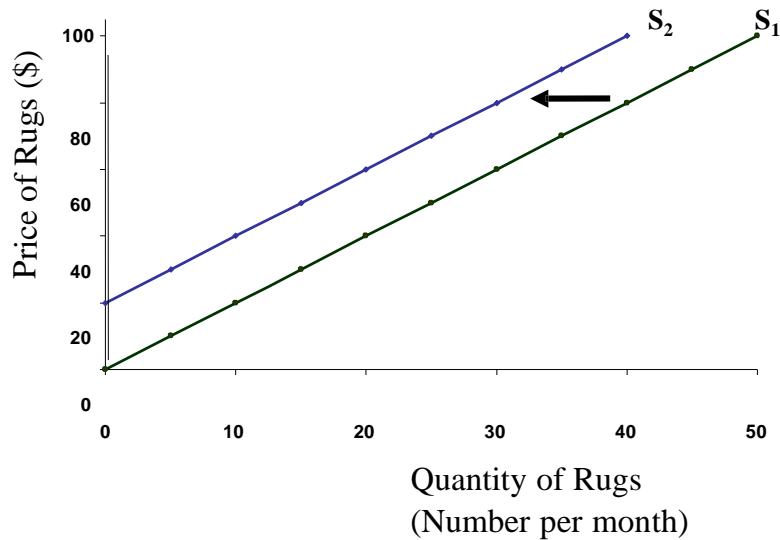
Questions 3 to 5 refer to the following graph:



3. Based on the figure above, how many apartment owners would be willing to sell their apartments for \$91,000?
- None
  - One
  - Two
  - Six
  - All ten apartment owners
4. In the scenario depicted in the figure above, up to ten apartments may be available for sale. Suppose that ten more apartment owners enter the market, for a total of twenty available apartments. These new entrants into the market would be all willing to sell their apartments for any price above \$90,000. Which of the following statements accurately describes the resulting change in the supply curve?
- The supply curve shifts upward.
  - The supply curve shifts to the right.
  - The supply curve shifts to the left.
  - The supply curve becomes longer.
  - The supply curve can no longer be represented by a straight line.
5. In the situation described in question #4, how many apartment owners would be willing to sell their apartments for \$91,000?
- None
  - One
  - Two
  - Ten
  - Eleven
6. Which of the following statements is true, regarding the supply of a particular good, and that good's own price?
- A price increase shifts the supply curve to the right.
  - A price decrease shifts the supply curve to the right.
  - A price increase shifts the supply curve downward.
  - A price change alone does not shift the supply curve.
  - A price change is the only way to shift the supply curve.



Question #7 refers to the following graph.



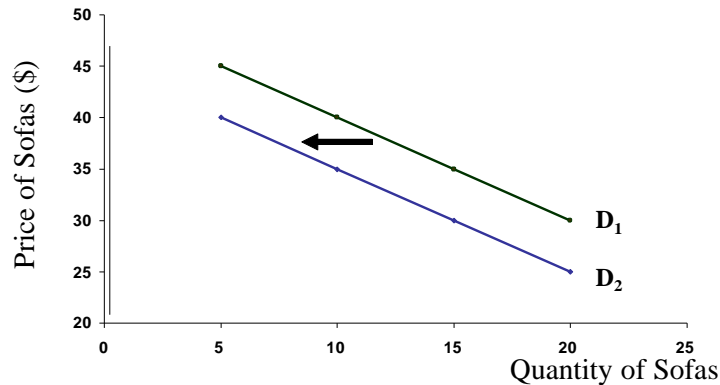
7. The graph shown above depicts two possible supply curves for production of handmade rugs.  $S_1$  is the initial supply curve, and  $S_2$  is the new supply curve after a change has occurred in the market. Which of the following events could have caused this shift?

- Several rug makers have left the market, making handmade rugs more scarce.
- Several new rug makers have entered the market, making handmade rugs more plentiful.
- The price of thread used in rugs has dropped, making it cheaper to produce rugs.
- Rugs have come into fashion, so buyers want more of them.
- Rugs have gone out of fashion, so buyers want fewer of them.

8. Which of the following is an example of movement *along* a supply curve?

- The quantity of apples offered for sale increases as the price of apples rises.
- An apple orchard burns down in an accidental fire, decreasing the number of suppliers on the market.
- Thanks to good weather conditions, apple growers enjoy a bumper crop this year.
- The price of pears doubles, increasing demand for apples.
- The price of fertilizer increases, making it more expensive to produce apples.

Question #9 refers to the following graph:



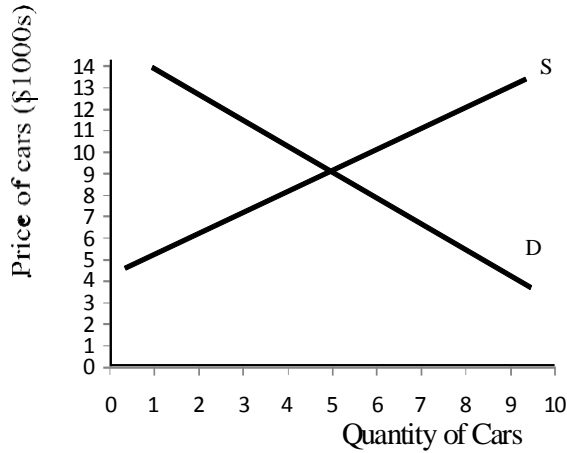
9. Assume that sofas and arm chairs are substitute goods. The graph shown above illustrates the demand curve for sofas. Which of the following events could have triggered the shift in demand from  $D_1$  to  $D_2$ , as shown above?

- a. The price of sofas increased.
- b. The price of armchairs increased.
- c. The price of labor for making sofas increased.
- d. The price of sofas decreased.
- e. The price of armchairs decreased.

10. A bike shop in a small town has received a shipment of 10 new bicycles. The shop offers the bikes for sale at a price of \$300 each. At this price, however, there are only two people in town who are willing to buy a bicycle. This situation can be described as

- a. disequilibrium
- b. shortage
- c. surplus
- d. equilibrium
- e. both a and c are correct

Questions 11 to 13 refer to the following graph.



11. When the price of cars is \$5000, which of the following terms is *not* an accurate description of the situation?

- Quantity demanded exceeds quantity supplied.
- A shortage exists.
- The market is in disequilibrium.
- Fewer than five cars are available for sale.
- The market is in equilibrium.

12. Beginning from the price of \$5000, which of the following events would be predicted by the theory of market adjustment?

- Some buyers who are willing to pay more will bid the price of cars up.
- The market will remain in disequilibrium.
- Prices will fall.
- All buyers will remain in the market.
- The supply and demand curves will shift to achieve equilibrium.

13. Now suppose that the local government invests in a new, very efficient fleet of buses. Now, it is easy and affordable to get from one place to another without having your own car. What change in the graph shown above is most likely to result from the new bus service?

- The supply curve shifts to the right.
- The supply curve shifts to the left.
- The demand curve shifts to the right.
- The demand curve shifts to the left.
- None of the above.

14. Suppose the demand curve for gasoline shifts to the right, as global demand from India and China increases. Suppose also that new discoveries of oil enable an increase in the supply of gasoline to be sold on the market. Assuming that nothing else changes, what is the likely effect on the equilibrium price of gasoline?

- a. The equilibrium price rises.
- b. The equilibrium price falls.
- c. The equilibrium price remains the same.
- d. The effect on the equilibrium price is uncertain, as it depends of the extent of the shifts in supply and demand.
- e. None of the above.

15. Suppose we observe an increase in the world price of corn. Which of the following could have caused the price increase?

- a. An increase in the demand for corn by households in China and India.
- b. An increase in the demand for corn for use in ethanol production in the U.S.
- c. A fall in the supply of corn due to a drought in Australia.
- d. A rise in the price of fertilizer, a key input in the production of corn.
- e. All of the above.

16. Suppose the price elasticity of demand for oil is found to be very inelastic. Which of the following factors could account for its inelasticity?

- a. Oil is a greatly needed item, as it is a key ingredient for gasoline and many other industrial products and processes.
- b. There are few substitutes available for oil.
- c. Oil accounts for a very small part of consumers' budgets, so an increase in the price of oil is barely noticed by consumers.
- d. Oil accounts for a very large part of consumers' budgets, so an increase in the price of oil is quickly noticed and consumers greatly reduce the amount of oil they purchase.
- e. Both a and b.

17. Which of the following markets do not operate like the Classical's perfectly competitive and self-correcting mechanisms?

- a. Markets with long-term contracts
- b. Retail markets, such as for clothing, with prices posted on tags and long supply chains
- c. Restaurants with high menu costs
- d. The market for computer operating systems
- e. All of the above

18. Assume there's been a fall in demand for automobiles in the U.S. Which of the following best describes a "quantity adjustment" made by the U.S. automobile producers?
- a. Producers lower their price.
  - b. Although supply now is greater than demand at the initial equilibrium price, producers continue to produce at the same rate, despite the resulting surplus of automobiles on the market.
  - c. Producers primarily reduce their production levels, rather than lowering their price.
  - d. Producers raise their price, hoping to maintain their profit margins.
  - e. Producers raise their production levels, to entice customers back with more automobiles to choose from.
19. Which of the following markets have experienced speculative bubbles (somewhere, at some point in history)?
- a. The stock market
  - b. The real estate market
  - c. The market for mortgage-based securities
  - d. The market for foreign exchange
  - e. All of the above
20. Which of the following reflects a Keynesian view of how the market mechanism may operate?
- a. Sometimes price adjustments are very slow
  - b. Sometimes price adjustments are too fast
  - c. Sometimes the market can get stuck at an equilibrium that is undesirable.
  - d. The market mechanism often does not work smoothly, thus necessitating some corrective measures by government.
  - e. All of the above.

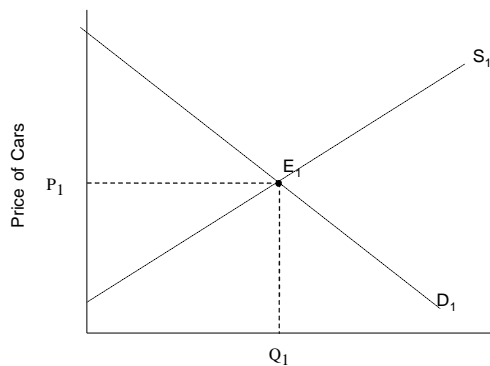
### **Answers to Active Review Questions**

- 1. perfectly competitive
- 2. self-correcting
- 3. demand
- 4. quantity demanded
- 5. substitute
- 6. complementary
- 7. disequilibrium
- 8. supply
- 9. decrease, increase
- 10. price elasticity
- 11. speculative bubble
- 12. True. For example, a drought would decrease the supply of lemons.

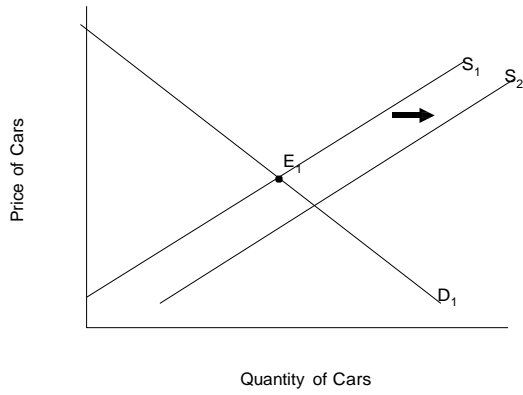
13. True.
14. True.
15. False. In general, an increase in demand tends to increase both equilibrium price and equilibrium quantity.
16. False. In a shortage situation, the quantity demanded exceeds the quantity supplied.
17. The demand curve slopes downward because in general, the higher the price of the good, the fewer people will want to buy it.
18. "Change in quantity demanded" refers to movement *along* the demand curve. For example, if the price of apples rises, all other things being equal, people will buy fewer apples; thus, the quantity demanded will decrease. A "change in demand" refers to a situation in which the entire demand curve shifts. For example, if a large number of new people move into your neighborhood, there will be a larger pool of people interested in buying apples at the local grocery store.
19. No, this market is not in equilibrium; there is a surplus of SUVs.
20. No, this market is not in equilibrium; there is a shortage of movie tickets.
21. The price elasticity of demand is the percentage change in quantity demanded divided by the percentage change in price. The price elasticity of supply is the percentage change in quantity supplied divided by the percentage change in price.
22. In retail markets with long supply chains, prices may adjust very slowly. In stock markets, prices may adjust very rapidly.

### Answers to Problems

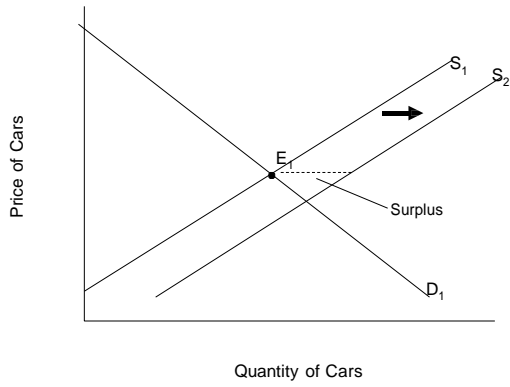
1.a.



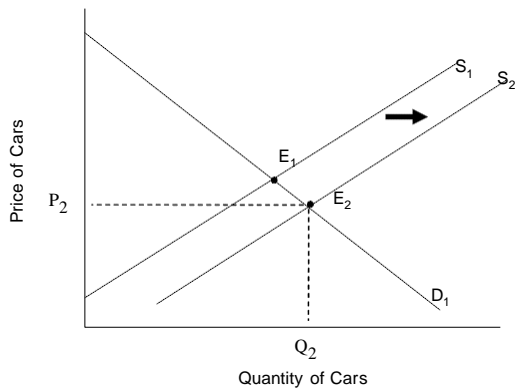
1. b.



1. c. The shift in the supply curve creates a temporary surplus.

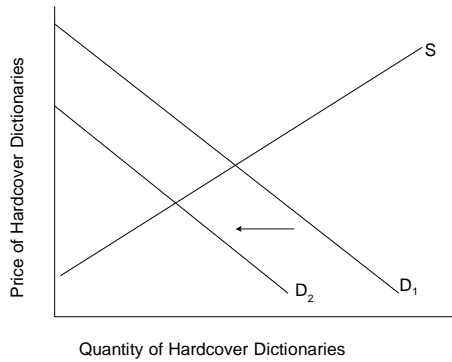


1. d.



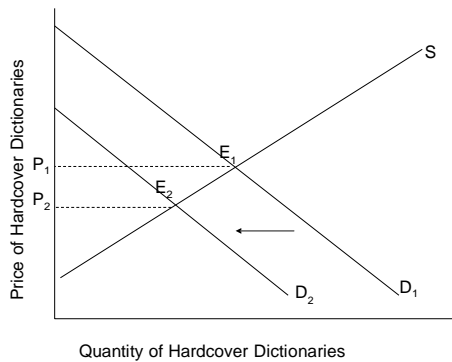
1. e. The supply curve has shifted to the right. The equilibrium price has fallen, and equilibrium quantity has risen.

2. a. The demand curve shifts to the left.



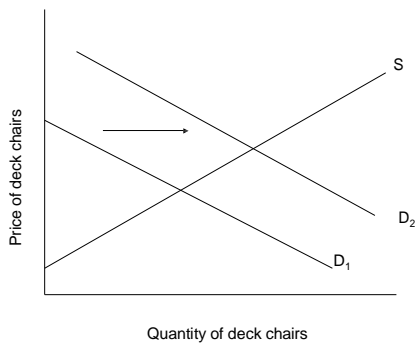
2. b. The supply curve does not shift.

2. c. The price of hardcover dictionaries at the new equilibrium,  $E_2$ , is lower.



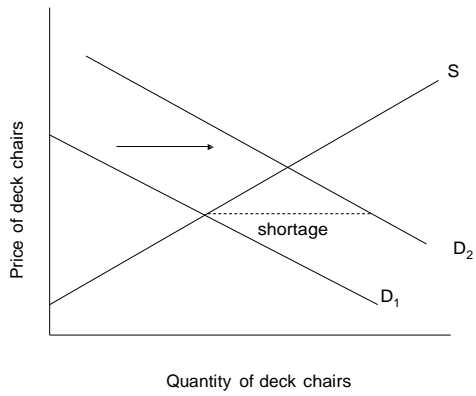
3. The equilibrium price could rise as a result of the supply curve shifting to the left (i.e. a decrease in supply), or as a result of the demand curve shifting to the right (i.e. an increase in demand).

4. a.. The demand curve shifts to the right, as shown below.

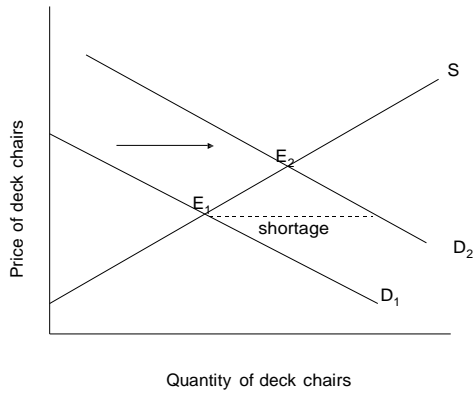




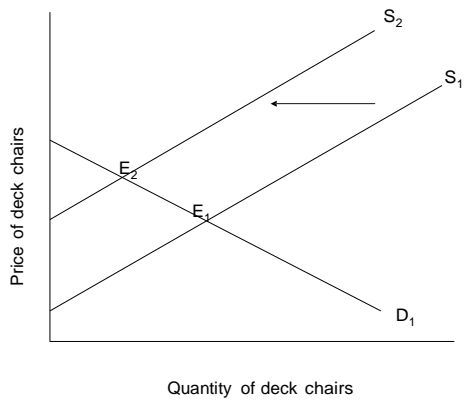
4. b.



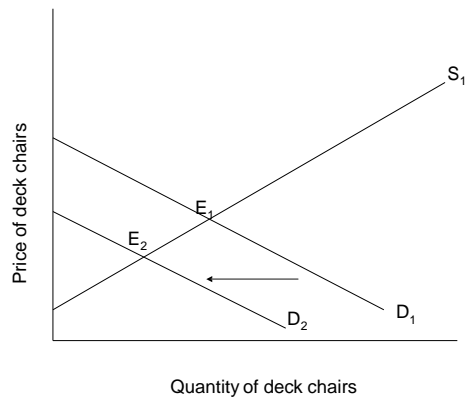
4. c.



5. a. The supply curve shifts to the left, leading to a higher equilibrium price and lower equilibrium quantity.



5. b. The demand curve shifts to the left, leading to a lower equilibrium price and lower equilibrium quantity.



### Answers to Self Test Questions

- |                         |       |
|-------------------------|-------|
| 1. d                    | 11. e |
| 2. b                    | 12. a |
| 3. b                    | 13. d |
| 4. b                    | 14. d |
| 5. e                    | 15. e |
| 6. d                    | 16. e |
| 7. a                    | 17. e |
| 8. a                    | 18. c |
| 9. e (substitute goods) | 19. e |
| 10. e                   | 20. e |