

Test your understanding 2.3

- 1 **(a)** Define 'supply'. **(b)** What is the law of supply? **(c)** Explain whether the law of supply shows a positive or negative relationship. **(d)** Show the law of supply in a diagram. **(e)** What is the relationship between individual supply and market supply? **(f)** Distinguish between a 'change in supply' and a 'change in quantity supplied' and explain the cause or causes of each. **(g)** How would you show the difference between a movement along the supply curve and a shift of the supply curve in a diagram? **(h)** What are the non-price determinants of supply?
- 2 Give some examples of goods with a vertical supply curve.
- 3 Using diagrams, show the impact of each of the following on the supply curve of product A.
 - (a)** The number of firms in the industry producing product A decreases.
 - (b)** The price of oil, a key input in the production of product A, increases.
 - (c)** Firms expect that the price of product A will fall in the future.
 - (d)** The government grants a subsidy on each unit of A produced.
 - (e)** The price of product B falls, and B is in competitive supply with A.
 - (f)** The price of product B increases, and B is in joint supply with A.
 - (g)** A new technology is adopted by firms in the industry producing A.

2.4 Market equilibrium: demand and supply

The market demand and market supply for chocolate bars that we have considered separately above show the quantities consumers and firms are *willing and able* to buy and sell at each price, not how much they actually buy and sell. We will now put market demand and market supply together to find out how these interact to determine what happens in the market for chocolate bars.

Market equilibrium

- ◆ Explain, using diagrams, how demand and supply interact to produce market equilibrium.

Excess demand (shortages) and excess supply (surpluses)

Figure 2.9 presents the same market demand and supply curves that appeared in Figures 2.2(c) and 2.6(c). The same information appears as a demand schedule and a supply schedule in Table 2.3.

In both Table 2.3 and Figure 2.9 we see that when the price of chocolate bars is \$3, quantity demanded is exactly equal to quantity supplied, at 8000 chocolate bars. Note that there is only one price where this can occur. At a higher price, say \$4, quantity supplied (10000 bars) is greater than quantity demanded (6000 bars). There is *excess supply*, or a *surplus* of 4000 bars (10000–6000). At the even higher price of \$5, there is a larger excess supply (surplus) of 8000 bars.

Suppose the price in this market is initially \$5. At this price, chocolate producers would be willing and able to produce 12000 bars, but consumers would only be willing and able to buy 4000 bars. What will happen? With unsold output of 8000 bars, producers will lower their price to encourage consumers to buy more chocolate. As the price falls, quantity supplied becomes smaller and quantity demanded becomes bigger. As long as there is a surplus, there will be a downward pressure on the price. The price will keep falling until it

Price of chocolate bars (\$)	Quantity of chocolate bars demanded (per week)	Quantity of chocolate bars supplied (per week)
5	4 000	12 000
4	6 000	10 000
3	8 000	8 000
2	10 000	6 000
1	12 000	4 000

Table 2.3 Market demand and supply schedules for chocolate bars

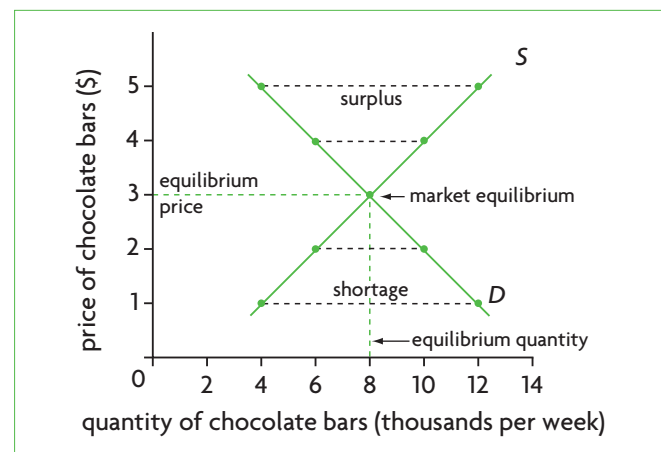


Figure 2.9 Market equilibrium

reaches the point where quantity demanded is equal to quantity supplied, and the surplus is eliminated.

At a lower price than \$3, say \$2, quantity demanded (10000 bars) is larger than quantity supplied (6000 bars). There is now *excess demand* or a *shortage* of 4000 bars (10000–6000). If price were even lower, at \$1, the shortage would be larger, at 8000 bars. At a price of \$1, producers would be willing and able to supply only 4000 bars, whereas consumers would be willing and able to buy 12000 bars. Producers will notice that the chocolate bars are quickly sold out, and so begin to raise the price. As they do so, quantity demanded begins to fall and quantity supplied begins to rise. The shortage in the chocolate market exerts an upward pressure on price. The price will keep increasing until the shortage is eliminated; this will happen when quantity supplied is exactly equal to quantity demanded.

If quantity demanded of a good is smaller than quantity supplied, the difference between the two is called a **surplus**, where there is **excess supply**; if quantity demanded of a good is larger than quantity supplied, the difference is called a **shortage**, where there is **excess demand**. The existence of a surplus or a shortage in a free market will cause the price to change so that the quantity demanded will be made equal to quantity supplied. In the event of a shortage, price will rise; in the event of a surplus, price will fall.

Market equilibrium

Equilibrium is defined as a state of balance between different forces, such that there is no tendency to change. This is an important concept in economics that we will encounter repeatedly. When quantity demanded is equal to quantity supplied, there is **market equilibrium**; the forces of supply and demand are in balance, and there is no tendency for the price to change. Market equilibrium is determined

at the point where the demand curve intersects the supply curve. The price in market equilibrium is the **equilibrium price**, and the quantity is the **equilibrium quantity**. At the equilibrium price, the quantity consumers are willing and able to buy is exactly equal to the quantity firms are willing and able to sell. This price is also known as the *market-clearing price*, or simply *market price*. In the market for chocolate bars in Figure 2.9, the equilibrium price is \$3 per chocolate bar, and the equilibrium quantity is 8000 bars. At any price other than the equilibrium price, there is *market disequilibrium*. In a free market, a market disequilibrium cannot last, as demand and supply force the price to change until it reaches its equilibrium level.

When a market is in equilibrium, quantity demanded equals quantity supplied, and there is no tendency for the price to change. In a market disequilibrium, there is excess demand (shortage) or excess supply (surplus), and the forces of demand and supply cause the price to change until the market reaches equilibrium.

Changes in market equilibrium

◆ Analyse, using diagrams and with reference to excess demand or excess supply, how changes in the determinants of demand and/or supply result in a new market equilibrium.

Once a price reaches its equilibrium level, consumers and firms are satisfied and will not engage in any action to make it change. However, if there is a change in any of the non-price determinants of demand or supply, a shift in the curves results, and the market will adjust to a new equilibrium.

Changes in demand (demand curve shifts)

In Figure 2.10(a) D_1 intersects S at point a, resulting in equilibrium price and quantity P_1 and Q_1 . Consider

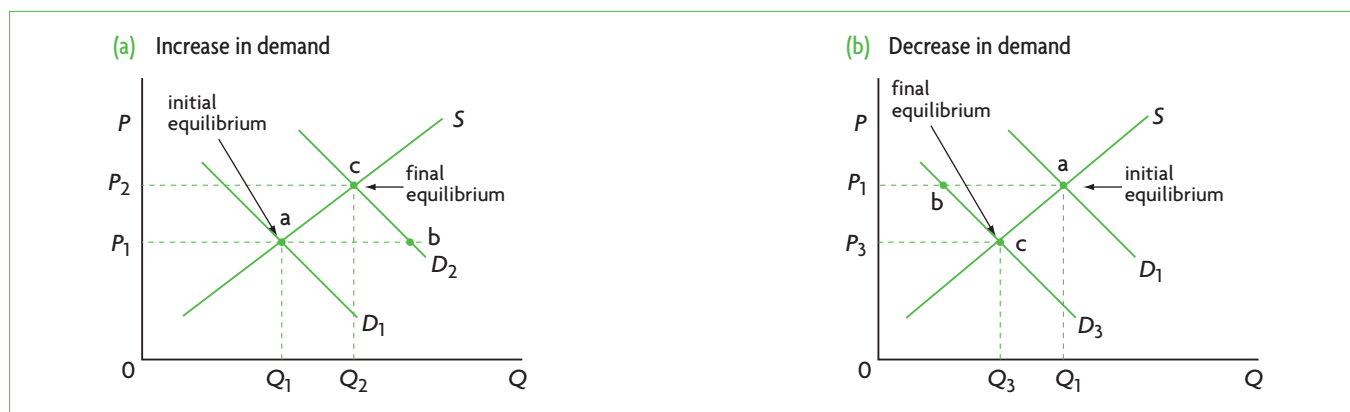


Figure 2.10 Changes in demand and the new equilibrium price and quantity

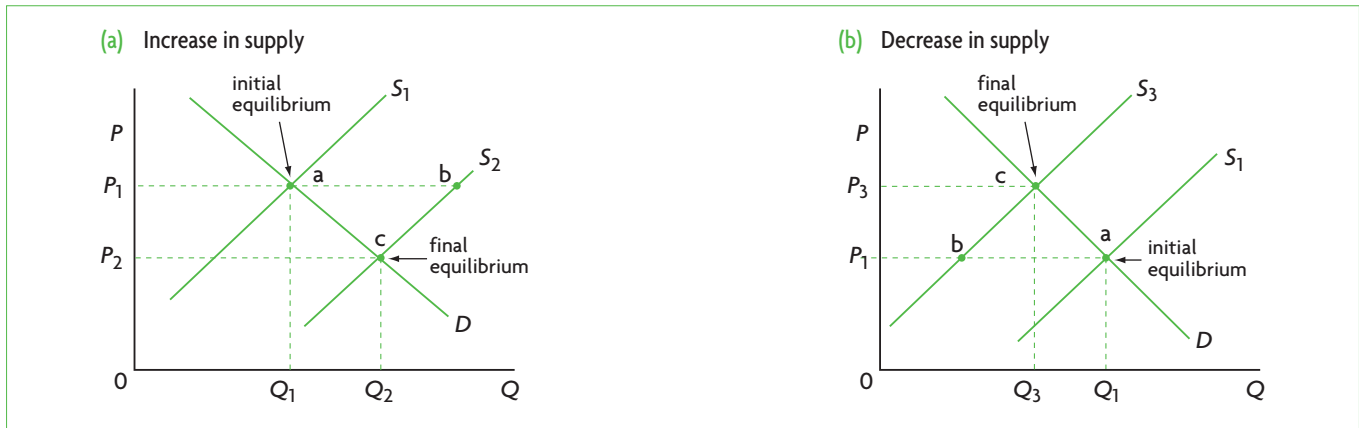


Figure 2.11 Changes in supply and the new equilibrium price and quantity

a change in a determinant of demand that causes the demand curve to shift to the right from D_1 to D_2 (for example, an increase in consumer income in the case of a normal good). Given D_2 , at the initial price, P_1 , there is a movement to point b, which results in excess demand equal to the horizontal distance between points a and b. Point b represents a disequilibrium, where quantity demanded is larger than quantity supplied, thus exerting an upward pressure on price. The price therefore begins to increase, causing a movement up D_2 to point c, where excess demand is eliminated and a new equilibrium is reached. At c, there is a higher equilibrium price, P_2 , and greater equilibrium quantity, Q_2 , given by the intersection of D_2 with S .

A decrease in demand, shown in Figure 2.10(b), leads to a leftward shift in the demand curve from D_1 to D_3 (for example, due to a decrease in the number of consumers). Given D_3 , at price P_1 , there is a move from the initial equilibrium (point a) to point b, where quantity demanded is less than quantity supplied, and therefore a disequilibrium where there is excess supply equal to the horizontal difference between a and b. This exerts a downward pressure on price, which falls, causing a movement down D_3 to point c, where excess supply is eliminated, and a new equilibrium is reached. At c, there is a lower equilibrium price, P_3 , and a lower equilibrium quantity, Q_3 , given by the intersection of D_3 with S .

Changes in supply (supply curve shifts)

We now consider supply curve shifts that can arise from changes in the determinants of supply. In Figure 2.11(a), the initial equilibrium is at point a where D intersects S_1 , and where equilibrium price and quantity are P_1 and Q_1 . An increase in supply (say, due to an improvement in technology) shifts the supply curve to S_2 . With S_2 and initial price P_1 , there is a move from point a to b, where there is disequilibrium due to excess supply (by the amount equal to the horizontal distance between a and b). Therefore, price begins to

fall, and there results a movement down S_2 to point c where a new equilibrium is reached. At c, excess supply has been eliminated, and there is a lower equilibrium price, P_2 , but a higher equilibrium quantity, Q_2 .

A decrease in supply is shown in Figure 2.11(b) (say, due to a fall in the number of firms). With the new supply curve S_3 , at the initial price P_1 , there has been a move from initial equilibrium a to disequilibrium point b, where there is excess demand (equal to the distance between a and b). This causes an upward pressure on price, which begins to increase, causing a move up S_3 until a final equilibrium is reached at point c, where the excess demand has been eliminated, and there is a higher equilibrium price P_3 and lower quantity Q_3 .

Test your understanding 2.4

- In Figure 2.9, state whether there is excess supply (a surplus) or excess demand (a shortage), and how large this is if price per chocolate bar is: **(a)** \$5, **(b)** \$4, **(c)** \$3, **(d)** \$2, and **(e)** \$1.
- Use a demand and supply diagram to: **(a)** show equilibrium price and quantity, **(b)** show possible disequilibrium prices and quantities, **(c)** relate disequilibrium prices to excess demand (shortages) and excess supply (surpluses), **(d)** explain the meaning of 'market equilibrium', and **(e)** explain the roles of demand and supply in achieving market equilibrium.
- Use supply and demand diagrams to illustrate the following events.
 - Freezing weather destroys the orange crop and the price of oranges rises.
 - The mass media report on the fat content of cheese and the price of cheese falls.