

Demand, supply and the market

Learning Outcomes

By the end of this chapter, you should understand:

- 1 the concept of a market
- 2 demand and supply curves
- 3 equilibrium price and equilibrium quantity
- 4 how price adjustment reconciles demand and supply in a market
- 5 what shifts demand and supply curves
- 6 free markets and markets with price controls
- 7 how markets answer what, how and for whom to produce

Society has to find *some* way to decide what, how and for whom to produce. Modern economies rely heavily on markets and prices to allocate resources between competing uses. The interplay of *demand* (the behaviour of buyers) and *supply* (the behaviour of sellers) determines the quantity of the good produced and the price at which it is bought and sold.

3.1 The market

Shops and fruit stalls physically bring together the buyer and seller. The Stock Exchange uses intermediaries (stockbrokers) who transact business on behalf of clients. E-commerce is conducted on the internet. In supermarkets, sellers choose the price and let customers choose whether or not to buy. Antique auctions force buyers to bid against each other, with the seller taking a passive role.

A **market** is a set of arrangements by which buyers and sellers exchange goods and services.

Although superficially different, these markets perform the same economic function. They determine prices that ensure that the quantity people wish to buy equals the quantity people wish to sell. Price and quantity cannot be considered separately. In fixing the price of a Bentley at 20 times the price of a Fiat, the market for motor cars ensures that production and sales of Fiats greatly exceed the production and sale of Bentleys. These prices guide society in choosing what, how and for whom to produce.

To understand this process more fully, we need to model a typical market. The ingredients are demand (the behaviour of buyers) and supply (the behaviour of sellers). We can then study how these interact to see how a market works.



3.2 Demand, supply and equilibrium

Demand is not a particular quantity, such as six bars of chocolate, but rather a full description of the quantity of chocolate buyers would purchase at each and every price that might be charged. The first column of Table 3.1 shows prices of chocolate bars. The second column shows the quantities demanded at these prices. Even if chocolate is free, only a finite amount is wanted. People get sick from eating too much chocolate. As the price of chocolate rises, the quantity demanded falls, other things equal. We assume nobody buys any chocolate if the price exceeds £0.40. Together, columns (1) and (2) describe the demand for chocolate as a function of its price.

Demand is the quantity that buyers wish to purchase at each conceivable price.

Supply is not a particular quantity but a complete description of the quantity that sellers want to sell at each possible price. The third column of Table 3.1 shows how much sellers wish to sell at each price. Chocolate cannot be produced for nothing. Nobody would supply at a zero price. In our example, it takes a price of £0.20 before there is an incentive to supply chocolate. At higher prices it is more lucrative to supply chocolate bars and there is a rise in the quantity supplied. Together, columns (1) and (3) describe the supply of chocolate bars as a function of their price.

Supply is the quantity of a good that sellers wish to sell at each possible price.

Note the distinction between *demand* and the *quantity demanded*. Demand describes the behaviour of buyers at every price. At a particular price there is a particular quantity demanded. The term 'quantity demanded' makes sense only in relation to a particular price. The same applies to *supply* and *quantity supplied*.

In everyday language, we say that when the demand for football tickets exceeds their supply some people do not get into the ground. Economists must be more precise. At the price charged for tickets, the quantity demanded exceeded the quantity supplied. A higher ticket price would have reduced the quantity demanded, leaving empty space in the ground. Yet there is no change in demand, the schedule describing how many people want admission at each possible ticket price. The quantity demanded only changed because the price changed.

The demand and supply schedules are each constructed on the assumption of 'other things equal'. In the demand for football tickets, one of the 'other things' is whether the game is televised. If it is, the quantity of tickets demanded at each and every price is lower than if the game is not televised.

Think again about the market for chocolate in Table 3.1. Other things equal, the lower the price of chocolate, the higher the quantity demanded. Other things equal, the higher the price of chocolate, the higher the quantity supplied. A campaign by dentists warning of the effect of chocolate on tooth decay, or a fall in household incomes, would change the 'other things' relevant to the demand for chocolate. Either of these changes would reduce the demand for chocolate, reducing the quantities demanded at each price. Cheaper cocoa beans, or technical advances in packaging chocolate bars, would change the 'other things' relevant to the supply of chocolate bars. They would tend to increase the supply of chocolate bars, increasing the quantity supplied at each possible price.

The equilibrium price

Assume, initially, that all these other things remain constant. We combine the behaviour of buyers and sellers to model the market for chocolate bars. At low prices, the quantity demanded exceeds the quantity supplied but the reverse is true at high prices. At some intermediate price, which we call the equilibrium price, the quantity demanded just equals the quantity supplied.

The **equilibrium price** is the price at which the quantity supplied equals the quantity demanded.

In Table 3.1 the equilibrium price is £0.30, at which 80 bars is the *equilibrium quantity*, the quantity buyers wish to buy and sellers wish to sell. At prices below £0.30, the quantity demanded exceeds the



(1) Price (£/bar)	(2) Demand (no. of bars)	(3) Supply (no. of bars)
0.00	200	0
0.10	160	0
0.20	120	40
0.30	80	80
0.40	40	120
0.50	0	160

Table 3.1 Demand and supply of chocolate

quantity supplied and some buyers are frustrated. There is a shortage. When economists say there is *excess demand* they are using a shorthand for the more accurate expression: the quantity demanded exceeds the quantity supplied *at this price*.

Conversely, at any price above £0.30, the quantity supplied exceeds the quantity demanded. Sellers have unsold stock. Economists describe this surplus as *excess supply*, shorthand for an excess quantity supplied *at this price*. Only at £0.30, the equilibrium price, are quantity demanded and quantity supplied equal. The market clears. People's wishes are fulfilled at the equilibrium price.

Excess supply exists when the quantity supplied exceeds the quantity demanded at the ruling price. **Excess demand** exists when the quantity demanded exceeds the quantity supplied at the ruling price.

Is a market automatically in equilibrium? What could bring this about? Suppose the price is initially £0.50, above the equilibrium price. Suppliers offer 160 bars but nobody buys at this price. Sellers cut the price to clear their stock. Cutting the price to £0.40 has two effects. It raises the quantity demanded to 40 bars and cuts the quantity producers wish to make and sell to 120 bars. Both effects reduce excess supply. Price cutting continues until the equilibrium price of £0.30 is reached and excess supply disappears. At this price the market clears.

If the price is below the equilibrium price the process works in reverse. At a price of £0.20, 120 bars are demanded but only 40 supplied. Sellers run out of stock and charge higher prices. This incentive to raise prices continues until the equilibrium price is reached, excess demand is eliminated and the market clears.

At a particular time, the price may not be the equilibrium price. If not, there is either excess supply or excess demand, depending on whether the price lies above or below the equilibrium price. But these imbalances provide the incentive to change prices towards the equilibrium price. Markets are self-correcting. Some of the key issues in economics turn on how quickly prices adjust to restore equilibrium in particular markets.

3.3 Demand and supply curves

Table 3.1 shows demand and supply conditions in the chocolate market and allows us to find the equilibrium price and quantity. It is useful to analyse the same problem diagrammatically.

The **demand curve** shows the relation between price and quantity demanded, other things equal.

Figure 3.1 measures chocolate prices on the vertical axis and chocolate quantities on the horizontal axis. The demand curve *DD* plots the data in the first two columns of Table 3.1 and joins up the

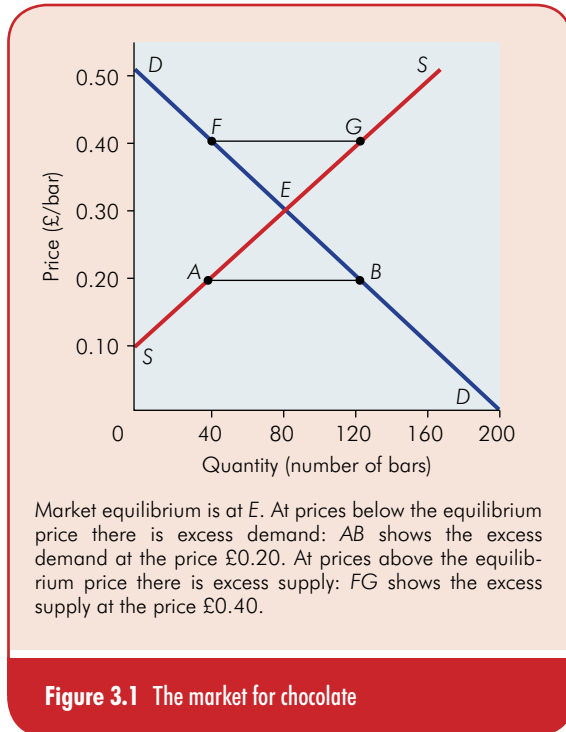


Figure 3.1 The market for chocolate

points. This demand curve happens to be a straight line, though it need not be. Our straight line has a negative slope. Larger quantities are demanded at lower prices.

Figure 3.1 plots columns (1) and (3) of Table 3.1. Joining up the different points yields the supply curve *SS*. Again, this happens to be a straight line but it need not be. It slopes up because suppliers only wish to increase the quantity supplied if they get a higher price.

The **supply curve** shows the relation between price and quantity supplied, other things equal.

We can now re-examine excess supply, excess demand and equilibrium. A particular price is shown by a height on the vertical axis, a particular quantity by a length on the horizontal axis. Equilibrium is at point *E*. As in Table 3.1, this entails a price of £0.30 and a quantity of 80 bars. At any price below the equilibrium price, the horizontal distance between the supply curve and the demand curve is the excess demand at that price. At

£0.20, 40 bars are supplied but 120 bars are demanded. The distance *AB* is the excess demand of 80 bars. Conversely, above the equilibrium price there is excess supply. At £0.40, 40 bars are demanded, 120 bars are supplied and the horizontal distance *FG* is the excess supply of 80 bars at this price.

Suppose the price is £0.40. Only 40 bars are sold, even though sellers would like to sell 120 bars. Why are sellers – not buyers – frustrated when their wishes differ? Participation in a market is voluntary. Buyers are not *forced* to buy nor sellers *forced* to sell. When markets are not in equilibrium, the quantity transacted is the *smaller* of the quantity supplied and the quantity demanded. Any quantity above 40 bars at a price of £0.40 would force buyers into purchases they do not want. Similarly, at a price of £0.20, any quantity greater than 40 bars involves sellers in forced sales.

We can now reconsider *price determination* in the chocolate market. Figure 3.1 implies that there is excess supply at all prices above the equilibrium price of £0.30. Sellers react to unsold stocks by cutting prices. Once the price falls to the equilibrium price, excess supply is eliminated. Equilibrium is at point *E*. Conversely, at prices below £0.30 there is excess demand, which bids up the price of chocolate, eliminating excess demand until the equilibrium point *E* is reached. In equilibrium, buyers and sellers can trade as much as they wish at the equilibrium price. There is no incentive for any further price changes.

3.4 Behind the demand curve

The demand curve depicts the relation between price and quantity demanded *holding other things constant*. What are those ‘other things’? The other things relevant to demand curves can usually be grouped under three headings: the price of related goods, the income of consumers (buyers) and consumer tastes or preferences. We look at each of these in turn.

The price of related goods

In Chapter 2 we discussed the demand for tube travel. A rise in bus fares or petrol prices would increase the quantity of tube travel demanded at each possible tube price. In everyday language, buses and cars are *substitutes* for the tube. Similarly, petrol and cars are *complements* because you cannot use a car without also using fuel. A rise in the price of petrol tends to reduce the demand for cars.

How do substitutes and complements relate to the demand for chocolate bars? Clearly, other sweets (jelly babies, say) are substitutes for chocolate. An increase in the price of other sweets increases the quantity of chocolate demanded at each possible chocolate price, as people substitute away from other sweets towards chocolate. If people buy chocolate to eat at the cinema, films would be a complement for bars of chocolate. A rise in the price of cinema tickets would reduce the demand for chocolate since fewer people would go to the cinema. Nevertheless, it is difficult to think of a lot of goods that are complements for chocolate. This suggests, correctly, that most of the time goods are substitutes for each other. Complementarity is usually a more specific feature (CD players and CDs, coffee and milk, shoes and shoelaces).

A price increase for one good raises the demand for **substitutes** for this good but reduces the demand for **complements** to the good.

Consumer incomes

The second category of 'other things equal' when we draw a particular demand curve is consumer income. When incomes rise, the demand for most goods increases. Typically, consumers buy more of everything. However, there are exceptions.

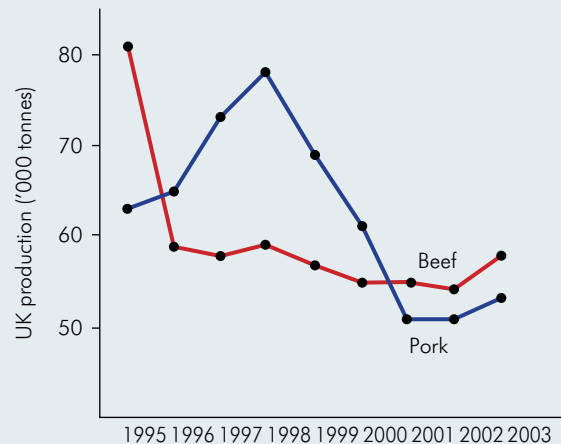
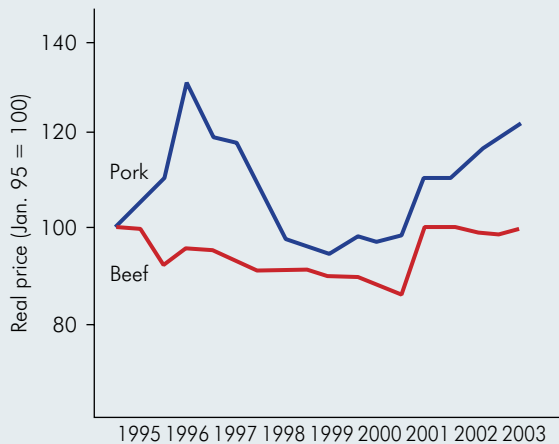
For a **normal good** demand increases when incomes rise. For an **inferior good** demand falls when incomes rise.

As their name suggests, most goods are normal goods. Inferior goods are typically cheap but low-quality goods that people prefer not to buy if they can afford to spend a little more.

Box 3.1 One little piggy went to market . .

The 1996 BSE crisis led to a collapse in the demand for British beef. With a lower demand curve, the equilibrium price of beef fell. Consumers switched to chicken and pork. The price of pig meat rose sharply. Many farmers switched from rearing cows to pigs. By 1998 the market was flooded with pork and pig prices collapsed again! By 2001 many fewer piggies were being reared for the market.

Source: ONS, *Monthly Digest of Statistics*.



Tastes

The third category of things held constant along a particular demand curve is consumer tastes or preferences. In part, these are shaped by convenience, custom and social attitudes. The fashion for the mini-skirt reduced the demand for textile material. The emphasis on health and fitness has increased the demand for jogging equipment, health foods and sports facilities while reducing the demand for cream cakes, butter and cigarettes.

3.5 Shifts in the demand curve

We can now distinguish between movements along a given demand curve and shifts in the demand curve itself. In Figure 3.1 we drew the demand curve for chocolate bars for a given level of the three underlying factors: the price of related goods, incomes and tastes. Movements along the demand curve isolate the effects of chocolate prices on quantity demanded, holding other things equal. Changes in any of these three factors will change the demand for chocolate.

Figure 3.2 shows a rise in the price of a substitute for chocolate, say ice cream, which leads people to demand more chocolate and less ice cream. At each chocolate price there is a larger quantity of chocolate demanded when ice cream prices are high. People substitute chocolate for ice cream. This *shifts* the demand curve for chocolate from DD to $D'D'$. The entire demand curve shifts to the right. At each price on the vertical axis, a larger horizontal distance indicates a higher quantity demanded.

Changes in the price of ice cream have no effect on the incentives to supply chocolate bars: at each price of chocolate, suppliers wish to supply the same quantity of chocolate as before. The increase in demand, or rightward shift in the demand curve, changes the equilibrium price and quantity in the chocolate market. Equilibrium has changed from E to E' . The new equilibrium price is £0.40 and the new equilibrium quantity is 120 bars.

We can sketch the transition from the old equilibrium at E to the new equilibrium at E' . When the ice cream prices first rise, the demand curve for chocolate shifts from DD to $D'D'$. With the chocolate price still at £0.30 there is an excess demand EH : 160 bars are demanded but only 80 bars are supplied. This excess demand bids up prices, which gradually rise to the new equilibrium price of £0.40, choking the quantity demanded back from 160 bars to 120 bars and providing the incentive to raise the quantity supplied from 80 bars to 120 bars.

We draw two lessons from this example. First, the quantity demanded depends on four things: its own price, prices of related goods, incomes and tastes. We could draw a two-dimensional diagram

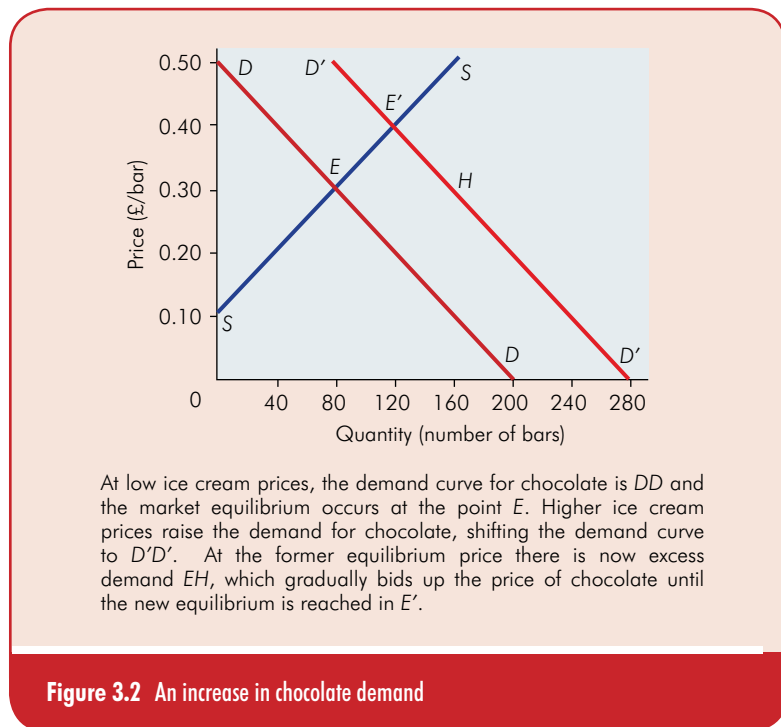


Figure 3.2 An increase in chocolate demand

showing the relation between quantity of chocolate demanded and any one of these four things. The other three things would then be the 'other things equal' for this diagram. In drawing demand curves, we single out the price of the commodity itself (here the price of chocolate bars) to put in the diagram with quantity demanded. The other three factors are the 'other things equal' for drawing a particular demand curve. Changes in any of these other three things shift the position of demand curves.

Why single out the price of the commodity itself to plot against quantity demanded? We want to study the market for chocolate. Prices of related goods, incomes and tastes are determined elsewhere in the economy. By focusing on the price of chocolate, we see the self-correcting mechanism by which the market reacts to excess demand or excess supply, inducing changes in chocolate prices within the chocolate market to restore equilibrium.

Second, our example illustrates analysis by *comparative statics*. The analysis is comparative because it compares the old and new equilibrium, and static because it compares only the equilibrium positions. In each equilibrium, prices and quantities are constant. Comparative static analysis is not interested in the dynamic path by which the economy moves from one equilibrium to the other, only in the point from which it began and the point at which it ends.

Comparative static analysis
changes one of the 'other things equal' and examines the effect on equilibrium price and quantity.

Using Figure 3.2 we can also analyse a change in one of the 'other things equal'. Suppose the demand curve is initially $D'D'$ and the market begins in equilibrium at E' . Then the demand for chocolate falls to DD . This might reflect a fall in the price of a chocolate substitute, a fall in consumer incomes or a change in tastes away from liking chocolate. When the demand curve shifts left to DD , showing less chocolate demanded at each price, the new equilibrium is at E . At the original price of £0.40 there is excess supply, which bids prices down to the new equilibrium price of £0.30. When the demand curve shifts to the left, there is a fall in both equilibrium price and equilibrium quantity.

3.6 Behind the supply curve

At low prices, only the most efficient chocolate producers make profits. As prices rise, producers previously unable to compete can now make a profit in the chocolate business and wish to supply. Moreover, previously existing firms may be able to expand output by working overtime, or buying fancy equipment unjustified when selling chocolate at lower prices. In general, higher prices are needed to induce firms to produce more chocolate. Other things equal, supply curves slope up as we move to the right.

Just as we studied the 'other things equal' along a demand curve, we now examine three categories of 'other things equal' along a supply curve: the technology available to producers, the cost of inputs (labour, machines, fuel, raw materials) and government regulation. Along a particular supply curve, all of these are held constant. A change in any of these categories shifts the supply curve, changing the amount producers wish to supply at each price.

Technology

A supply curve is drawn for a given technology. Better technology shifts the supply curve to the right. Producers supply more than previously at each price. Better cocoa refining reduces the cost of making chocolate. Faster shipping and better refrigeration lead to less wastage in spoiled cocoa beans. Technological advance enables firms to supply more at each price.

As a determinant of supply, technology must be interpreted broadly. It embraces all know how about production methods, not merely the state of available machinery. In agriculture, the development of disease-resistant seeds is a technological advance. Improved weather forecasting might enable better



PART ONE Introduction

timing of planting and harvesting. A technological advance is any idea that allows more output from the same inputs as before. In the terminology of Chapter 1, a technological advance shifts the production possibility frontier outwards.

Input costs

A particular supply curve is drawn for a given level of input prices. Lower input prices (lower wages, lower fuel costs) induce firms to supply more output at each price, shifting the supply curve to the right. Higher input prices make production less attractive and shift the supply curve to the left. If a late frost destroys much of the cocoa crop, scarcity will bid up the price of cocoa beans. Chocolate producers supply less chocolate at each price than previously.

Activity Box 3 Movement along a curve versus shifts of the curve

From the initial point A , the figure shows two quite different 'increases in demand'. One is an increase in the quantity demanded, from Q_0 to Q_1 , moving along the curve from A to B . This is the effect of a price cut but *not* an increase in demand since the demand curve DD is unaffected.

By an increase in demand we mean a shift in the demand curve, say from DD to $D'D'$, which also increases quantity demanded from Q_0 to Q_1 at the going price P_0 . This shift in demand reflects an increase in the price of a substitute good (decrease in the price of a complement good), an increase in income or a change of taste.

Similarly, sellers adjust to higher prices by moving up a given supply curve. But an increase in supply means an upward shift in the whole supply curve, caused by lower input prices, new technology or less regulation.

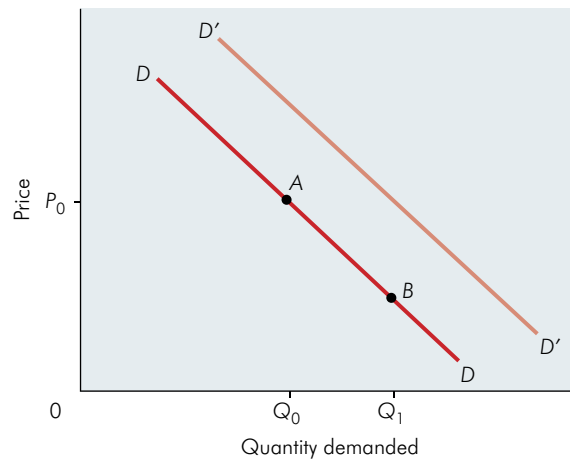
Other things equal, changes in price move us *along* demand and supply curves. When other determinants change, they shift these schedules.

Questions

Classify each of the following as an upward or downward shift in supply or demand curve:

- (a) New interactions between Europe and China make wages of unskilled European workers fall.
- (b) New interactions between Europe and China make the price of European coal increase.
- (c) The government ban on city parking by large cars reduces the price of Bentleys.

To check your answers to these questions, go to page 000.



Government regulation

In discussing technology, we spoke only of technological advances. Once people have discovered a better production method they are unlikely subsequently to forget it.

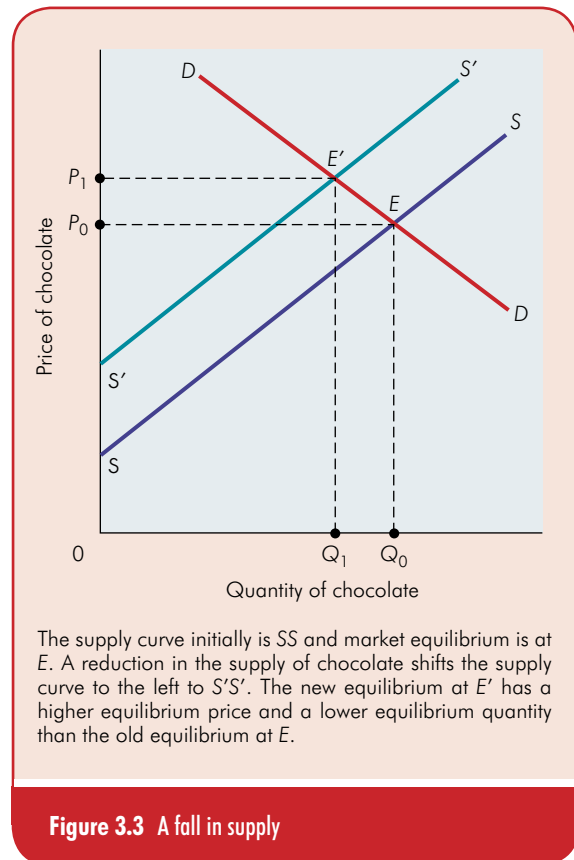
Government regulations can sometimes be viewed as imposing a technological change that is *adverse* for producers. If so, the effect of regulations will be to shift the supply curve to the left, reducing quantity supplied at each price.

More stringent safety regulations prevent chocolate producers using the most productive process because it is quite dangerous to workers. Anti-pollution devices may raise the cost of making cars, and regulations to protect the environment may make it unprofitable for firms to extract surface mineral deposits which could have been cheaply quarried but whose extraction now requires expensive landscaping. Whenever regulations prevent producers from selecting the production methods they would otherwise have chosen, the effect of regulations is to shift the supply curve to the left.

3.7 Shifts in the supply curve

Along a given supply curve we hold constant technology, the prices of inputs and the extent of government regulation. We now undertake a comparative static analysis of what happens when a change in one of these 'other things equal' leads to a fall in supply. Suppose tougher safety legislation makes it more expensive to make chocolate bars in mechanized factories. Figure 3.3 shows a shift to the left in the supply curve, from SS to $S'S'$. Equilibrium shifts from E to E' .

The equilibrium price *rises* but equilibrium quantity *falls* when the supply curve shifts to the left. Conversely, a rise in supply shifts the supply curve from $S'S'$ to SS . Equilibrium shifts from E' to E . A rise in supply induces a *higher* equilibrium quantity and *lower* equilibrium price.



3.8 Free markets and price controls

Government actions may shift demand and supply curves, as when changes in safety legislation shift the supply curve, but the government makes no attempt to regulate prices directly. If prices are sufficiently flexible, the pressure of excess supply or excess demand will quickly bid prices in a free market to their equilibrium level. Markets will not be free when effective price controls exist. Price controls may be *floor* prices (minimum prices) or *ceiling* prices (maximum prices).

Price ceilings make it illegal for sellers to charge more than a specific maximum price. Ceilings may be introduced when a shortage of a commodity threatens to raise its price a lot (such as food prices during war blockade). High prices are the way a free market rations goods in scarce supply. This

Free markets allow prices to be determined purely by the forces of supply and demand.

Price controls are government rules or laws setting price floors or ceilings that forbid the adjustment of prices to clear markets.



PART ONE Introduction

Box 3.2 TUC concludes migrant workers boosted UK economy

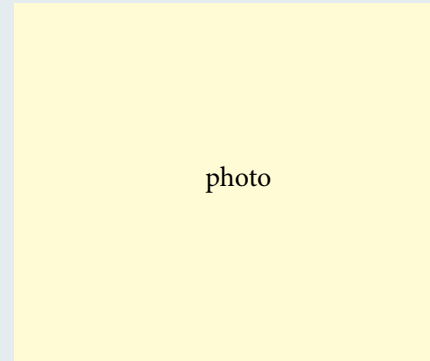
Foreign workers made a positive net economic contribution to the UK economy, reported Britain's Trades Union Congress, with their share of tax paid exceeding the cost of supplying public services to migrants. However, it remains necessary to ensure that gangmasters and other unscrupulous employers provide proper employment conditions and adhere to the minimum wage. The UK saw an influx of migrant workers from Eastern Europe after 2004 when a host of new countries joined the European Union.

Increased labour supply in the UK should be expected to reduce wages relative to what they would have been in sectors such as construction, farming and domestic service.

The 2007 TUC report concluded that the strength of the UK economy had provided sufficient additional demand to absorb the extra labour supply without falls in the wages of the low paid.

Recent statistics suggest migrant numbers from eastern Europe fell in 2007, partly because conditions had improved in Eastern Europe. Better employment opportunities in Poland and Hungary meant fewer casual workers for UK fruit picking.

Source: Adapted from BBC online, 19 June, 2007



solves the allocation problem, ensuring that only a small quantity of the scarce commodity is demanded, but may be thought unfair, a normative value judgement. High food prices mean hardship for the poor. Faced with a national food shortage, a government may impose a price ceiling on food so that poor people can afford food.

Figure 3.4 shows the market for food. War has disrupted imports of food. The supply curve is far to the left and the free market equilibrium price P_0 is very high. Instead of allowing free market equilibrium at E , the government imposes a price ceiling P_1 . The quantity sold is then Q_1 and excess demand is the distance AB . The price ceiling creates a shortage of supply relative to demand by holding food prices below their equilibrium level.¹

The ceiling price P_1 allows the poor to afford food but it reduces total food supplied from Q_0 to Q_1 . With excess demand AB at the ceiling price, rationing must be used to decide which potential buyers are actually supplied. This rationing system could be arbitrary. Food suppliers may sell supplies to their friends, not necessarily the poor, or may take bribes from the rich who jump the queue.

¹ A price ceiling above the equilibrium price is irrelevant. The free market equilibrium at E is still to be attained.

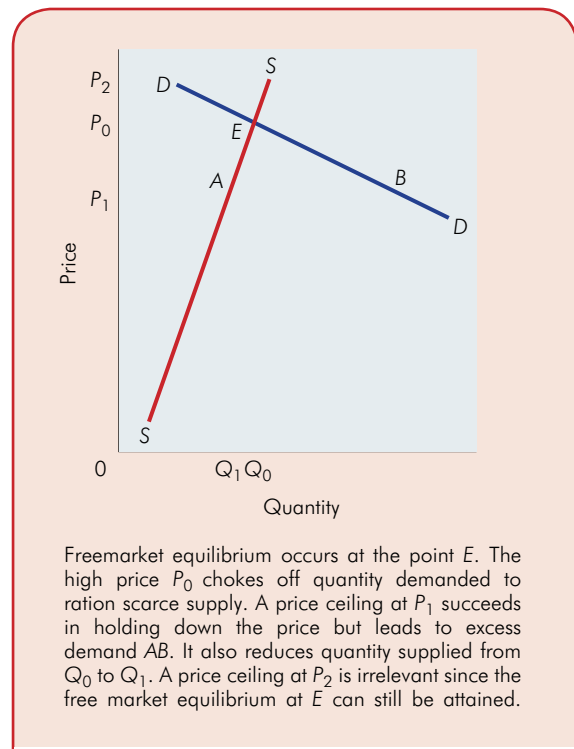


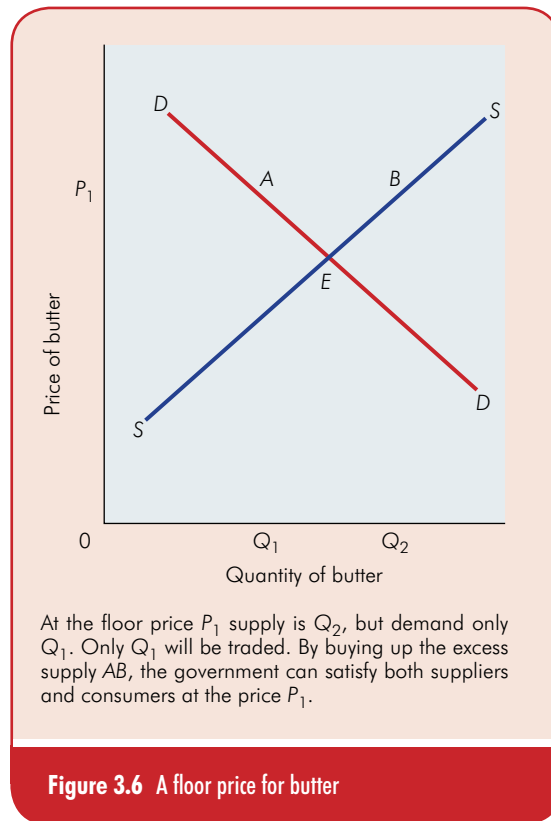
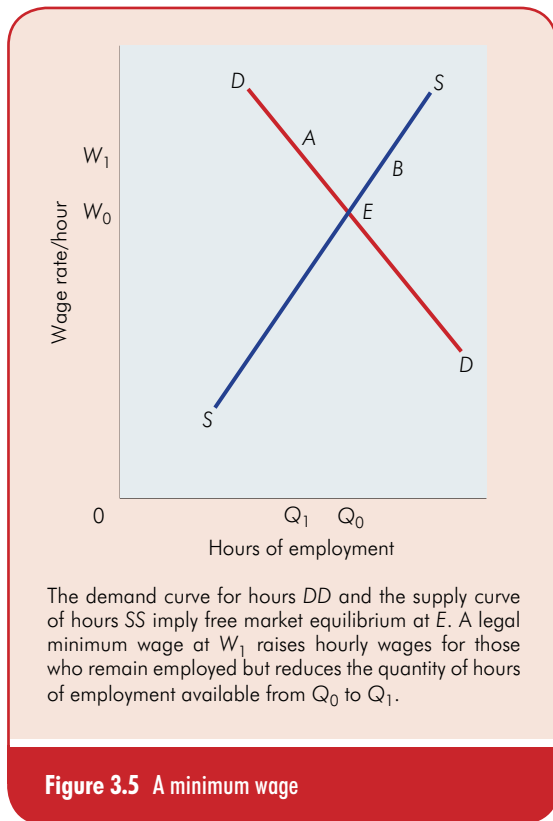
Figure 3.4 The effect of a price ceiling



Holding down the price of food may not help the poor after all. Ceiling prices are often accompanied by government-organized rationing by quota to ensure that available supply is shared out fairly, independently of ability to pay.

Whereas the aim of a price ceiling is to reduce the price for consumers, the aim of a floor price is to raise the price for suppliers. One example of a floor price is a national minimum wage. Figure 3.5 shows the demand curve and supply curve for labour. The free market equilibrium is at E , where the wage is W_0 . A minimum wage below W_0 is irrelevant since the free market equilibrium can still be attained. Suppose, in an effort to help workers, the government imposes a minimum wage at W_1 . Firms demand a quantity of labour Q_1 and there is excess supply AB . The lucky workers who manage to get work are better off than before but some workers are worse off since total hours worked fall from Q_0 to Q_1 .

Many countries set floor prices for agricultural products. Figure 3.6 shows a floor price P_1 for butter. In previous examples we assumed that the quantity traded would be the smaller of quantity supplied and quantity demanded at the controlled price, since private individuals cannot be forced to participate in a market. There is another possibility: the government may intervene not only to set the control price but also to buy or sell quantities of the good to supplement private purchases and sales.





PART ONE Introduction

Box 3.3 Dunces' cap

California, home of Silicon Valley and Hollywood, is one of the richest places on Earth. Yet in 2001 California suffered blackouts as electricity supplies ran out. Since poverty cannot be blamed, it must have been the result of poor policies. California privatized state electricity companies but then capped the price they could charge for electricity. However, the level of the price cap was far too low. Local electricity suppliers haemorrhaged money. Not only does an artificially low price lead sooner or later to a lower quantity supplied, it also raises the quantity demanded. A recipe for disaster.

At the floor price P_1 private individuals demand Q_1 but supply Q_2 . In the absence of government sales or purchases the quantity traded will be Q_1 , the smaller of Q_1 and Q_2 .

However, the government may agree to purchase the excess supply AB so that neither private suppliers nor private demanders need be frustrated. Because European butter prices are set above the free market equilibrium price as part of the Common Agricultural Policy, European governments have been forced to purchase massive stocks of butter that would otherwise have been unsold at the controlled price. Hence the infamous 'butter mountain'.

3.9 What, how and for whom

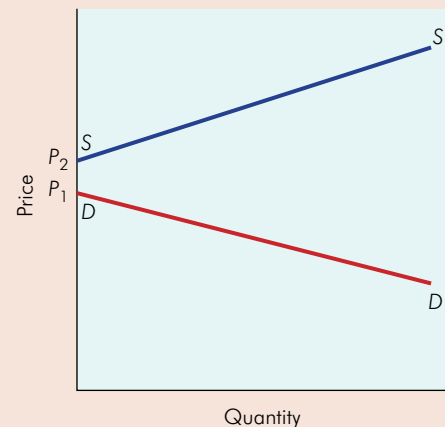
The free market is one way for society to solve the basic economic questions what, how and for whom to produce. In this chapter we have begun to see how the market allocates scarce resources among competing uses.

The market decides how much of a good should be produced by finding the price at which the quantity demanded equals the quantity supplied. Other things being equal, more of a good is produced in market equilibrium the higher the quantity demanded at each price (the further the demand curve lies to the right) and the higher the quantity supplied at each price (the further the supply curve lies to the right).

The market tells us for whom the goods are produced: the good is purchased by all those consumers willing to pay at least the equilibrium price for it. The market also tells us who is producing: all those willing to supply at the equilibrium price. Later in this book we shall see that the market also tells us how goods are produced.

Finally, the market determines what goods are being produced. Nature supplies goods free of charge. People engage in costly production activities only if they are paid. The supply curve tells us how much has to be paid to bring supply. Figure 3.7 shows a good that will not be produced. The highest price P_1 that consumers are prepared to pay is still insufficient to persuade producers to produce.

Society may not like the answers the market provides. Free markets *do not* provide enough food to remove hunger or enough medical care to treat all the sick. They provide food and medical care for those willing and *able to pay* the



Even P_1 , the highest price consumers will pay, is lower than P_2 , the minimum price producers require to produce any of this good.

Figure 3.7 A good not produced

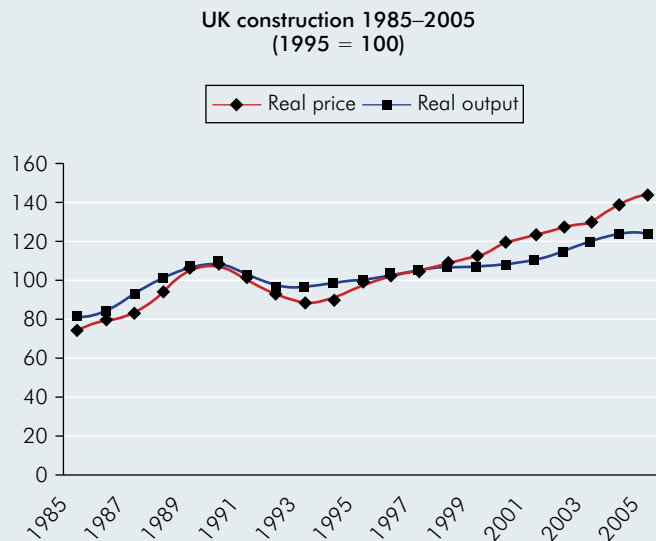


Box 3.4 Anatomy of price and quantity changes

How should we interpret the figure showing data for the UK construction industry? What was happening? Was it a shift in demand, in supply or in both that caused this pattern during 1985–2005?

Suppose all the observations represent *equilibrium* prices and quantities in each year. Thus each point reflects the intersection of the demand and supply curve that year. What changes in the ‘other things equal’ determinants of supply and demand led to shifts in supply and demand curves and hence changed the location of the data points? Try drawing a diagram with a *given* demand curve and a *shifting* supply curve (do it now!). The equilibrium points you will trace out all lie on the *given* demand curve. If only supply shifts we expect a *negative* relation between price and quantity as we pick off different points on the same demand curve, which slopes downwards. Now, suppose the supply curve is *fixed* but the demand curve *shifts*. The equilibrium points then all lie on the *given* supply curve and exhibit a positive relation between price and quantity. The data in our example show a largely positive relationship between the price of construction and the quantity of construction, and hence principally correspond to a fixed supply curve for construction. It was demand for construction that must have been shifting around. Construction demand increased steadily during 1985–89, fell back in 1990–93, then grew again thereafter.

Having made a diagnosis, we now gather corroborating evidence. Economy-wide activity is an important determinant of the demand for construction. UK real income grew strongly during 1985–89, fell sharply during 1990–93 and grew fairly steadily thereafter. These changes in income nicely fit our theory that demand shifts mainly caused the data pattern in the figure.



Sources: DEFRA, Association for Consultancy & Engineering

equilibrium price. Society may adopt the normative judgement that the poor should get more food and medical care than they get in a free market. Society may also adopt the normative judgement that, although people are willing and able to pay for pornography, it is socially better to ban some of these activities. Few societies allow unrestricted free markets for all commodities. Governments intervene widely to alter market outcomes, through direct regulation, taxation and transfer payments such as unemployment benefit.

Summary

- **Demand** is the quantity that buyers wish to buy at each price. Other things equal, the lower the price, the higher the quantity demanded. Demand curves slope down.
- **Supply** is the quantity of a good sellers wish to sell at each price. Other things equal, the higher the price, the higher the quantity. Supply curves slope upwards.
- **The market clears, or is in equilibrium**, when the price equates the quantity supplied and the quantity demanded. At this point supply and demand curves intersect. At prices below the equilibrium price there is **excess demand** (shortage), which itself tends to raise the price. At prices above the equilibrium price there is **excess supply** (surplus), which itself tends to reduce the price. In a **free market**, deviations from the equilibrium price tend to be self-correcting.
- Along a given demand curve, the other things assumed equal are the prices of related goods, consumer incomes and tastes or habits.
- An increase in the price of a **substitute** good (or decrease in the price of a **complement** good) will raise the quantity demanded at each price. An increase in consumer income will increase demand for the good if the good is a **normal good** but decrease demand for the good if it is an **inferior good**.
- Along a given supply curve the other things assumed constant are technology, the price of inputs and the degree of government regulation. An improvement in technology, or a reduction in input prices, will increase the quantity supplied at each price.
- Any factor inducing an increase in demand shifts the demand curve to the right, increasing equilibrium price and equilibrium quantity. A decrease in demand (downward shift of the demand curve) reduces both equilibrium price and equilibrium quantity. Any factor increasing supply shifts the supply curve to the right, increasing equilibrium quantity but reducing equilibrium price. Reductions in supply (leftward shift of the supply curve) reduce equilibrium quantity but increase equilibrium price.
- To be effective, a **price ceiling** must be imposed below the free market equilibrium price. It will then reduce the quantity supplied and lead to excess demand unless the government itself provides the extra quantity required. An effective **price floor** must be imposed above the free market equilibrium price. It will then reduce the quantity demanded unless the government adds its own demand to that of the private sector.

Review questions

To check your answers to these questions, see page 000.

- 1 Supply and demand data for toasters are shown below. Plot the supply curve and demand curve and find the equilibrium price and quantity.

Quantity	Price					
	10	12	14	16	18	20
Demanded	10	9	8	7	6	5
Supplied	3	4	5	6	7	8

- 2 What is the excess supply or demand when the price is (a) 12, (b) 20? Describe the price movements induced by positions (a) and (b).
- 3 What happens to the demand curve for toasters if the price of bread rises? Show in a supply–demand diagram how the equilibrium price and quantity of toasters change.
- 4 How is the demand curve for toasters affected by the invention of the toaster oven if people prefer this new way of toasting? What happens to the equilibrium quantity and price of toasters?
- 5 You are a sheep farmer. Give three examples of a change that would reduce your supply of wool. Did you use a fall in the price of wool as one of your examples? Is it a valid example?
- 6 Goods with snob value are demanded because they are expensive. Does the demand curve for such goods slope upwards?
- 7 **Common fallacies** Why are these statements wrong? (a) Manchester United is a more famous football club than Wrexham. Man Utd will always find it easier to fill its stadium. (b) The European ‘butter mountain’ shows how productivity can be improved when farmers are inspired by the European ideal. (c) Holding down rents ensures plenty of cheap housing for the poor.

- 8 (**Harder question**) Consider the market for safe cities. Someone knocks on your door and asks if you wish to purchase a reduction in crime by subscribing to an enhanced city-wide police force. Your city has 1 million residents. (a) What happens if you do not subscribe but all your fellow city dwellers do? (b) What happens if you subscribe but nobody else subscribes? (c) What does this tell you about the possibility of a market for public goods such as safe cities? (d) How might society ensure that desirably safe cities are provided?
- 9 (**Harder question**) Profitable speculation should stabilize financial markets – successful speculators are those who buy when the price is below the equilibrium price and sell when it has risen, or sell when the price is above the equilibrium price and buy when it has fallen. Why then are financial market prices so volatile?



PART ONE Introduction

10 (Essay question) The UK government is discussing a change in the planning laws to allow the building of 3 million new homes by 2020. Discuss what this is likely to mean for (a) the price of houses for first-time buyers and (b) the demand for country houses in areas adjacent to new housing developments. (c) Does your answer to (b) depend upon whether new houses are accompanied by new infrastructure (better roads, shops, train services, flood protection)?



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