

(a) Cars: an increase in quantity demanded



(b) Petrol: an increase in demand



Figure 3.9 Complements

The precise effect of the change in price of a linked product depends first on whether it is a substitute or a complement, and also on the closeness of the relationship. Beefsteak is a substitute for lamb chops because both are meat, but it may not be as close a substitute as lamb steaks. Similarly, cars and insurance are complements but the relationship may not be as close as that between cars and petrol because a car can be driven without insurance but not without petrol.

Returning to Figure 3.7(b), we are now in the position to give a fuller explanation of changes in demand.

When income increases, consumers increasingly favour a product, the price of a substitute product increases, or the price of a complement falls, there will be an increase in demand for the good. This means that at each and every possible price, consumers will demand more. Graphically, this is shown as an outward movement of the demand curve to D_1 . At price P consumers demand quantity Y instead of quantity X and the same is the case for each possible price. Note that demand curves are now drawn as straight lines for convenience.



Motor vehicles and petrol are complements in consumption

If income falls, consumer preferences move against a product, the price of a substitute falls, or the price of a complement increases, a decrease in demand results.

It is important to see why, in some cases, there may be a movement along a demand curve (change in quantity demanded) and at other times a shift of the curve (change in demand). The rule is simple and is set out below.

If the only change is in the price of the product itself, move along the demand curve. If any other factors change, shift the curve in or out.

Endogenous variable: Any variable that is 'inside' a functional relationship.

Price is said to be the **endogenous variable** because it is 'within' the demand/price relationship. A change in price is thereby accommodated by a movement along the existing demand curve. All other variables are exogenous; that is, they are 'outside' the relationship between price and quantity demanded. A change in any of these exogenous variables will cause the demand to increase or decrease, even though the price of the good remains constant; therefore, the demand curve must shift.

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Demand for outdoor recreation is affected by the weather, an exogenous variable

Supply

Marginal costs and the firm's supply curve

A firm's **supply curve** represents a relationship between prices and quantities that a firm is willing to put on the market. The costs of production – which include all outlays on producing, financing and selling good and services – are the major factors determining those quantities. If we want to look at how much additional or extra output a firm will supply in the short run as its costs change, we must look at **marginal cost**: the extra cost incurred if one more article is produced.

A business usually has the ability to produce a number of different products. Consider a firm which assembles both trucks and cars. Some resources can be used on either production line but there are others which are more suited to, say, the assembly of trucks. Assume that there is an increased demand for trucks and that the factory is working at full capacity. The firm responds by assembling more trucks but to do so, the factory must necessarily shift resources from car assembly. As more trucks are produced, the opportunity cost of assembling each additional truck rises in terms of cars forgone. In Chapter 1 we described this as a situation of increasing costs.

We can say that the combination of resources or inputs to the truck production line becomes less and less efficient and, as a result, the cost of

producing each additional truck rises; that is, marginal costs rise as more trucks are supplied.

As costs shown on the marginal cost curve are rising, a firm will supply additional trucks only if price covers the additional cost; that is, if price is equivalent to the increasing marginal cost. So, in Figure 3.10, at marginal costs C_2 and C_3 , the firm will be willing to put more trucks on the market *only* at prices P_2 and P_3 .

Supply curve: A curve or line functionally relating the quantity of an item producers wish to sell to its price.

Marginal cost: The addition to total production costs when one more unit is produced.

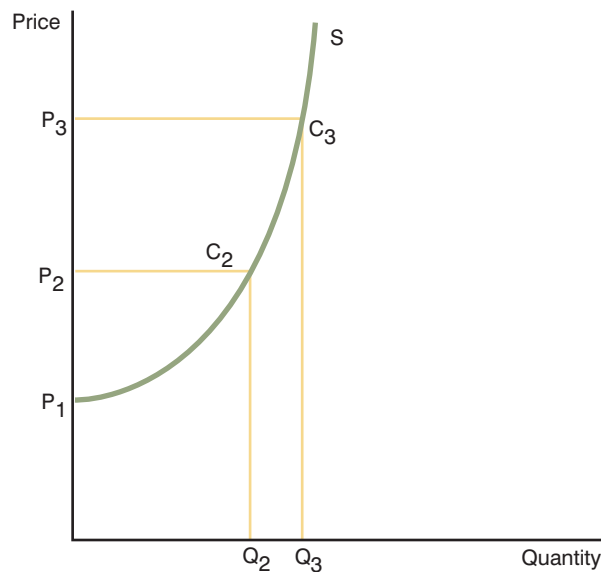


Figure 3.10 The firm's supply curve

The supply curve shows the cost of producing successive units. These costs are the additional labour, raw materials, transport, power, and so on that are needed. A firm is generally unwilling to put goods on the market at less than cost and we assume that it will be unwilling to supply any trucks at, or below, price P_1 . In general terms, the marginal cost curve represents the quantity of goods which a firm will willingly put on the market at each of a series of prices. It is the firm's supply curve. We will discuss the concept of marginal costs and supply more fully in Chapter 5.

We can draw up a **supply schedule** for trucks as shown in Figure 3.11(a). At, or below, \$30,000 per vehicle the firm will be unwilling to supply any trucks, but as the price rises, it will willingly supply increasing numbers. The schedule is graphed as a supply curve in Figure 3.11(b).

Supply schedule: A table showing the quantity of a good or service offered for sale over a range of possible prices.

The price/quantity relationship is based on costs, but costs are affected by the technology used. The quantity supplied is also influenced by the price of related outputs. For instance, the price of onions now, and expectations of future prices, can affect a farmer's decision to plant and supply potatoes the following year. In drawing up the supply schedule, these factors are held constant; that is, we apply *ceteris paribus*.

(a) Supply schedule

Price (\$000)	Quantity supplied (00s annually)
30	0
40	3
50	4
60	5
70	6
80	7

(b) Supply curve

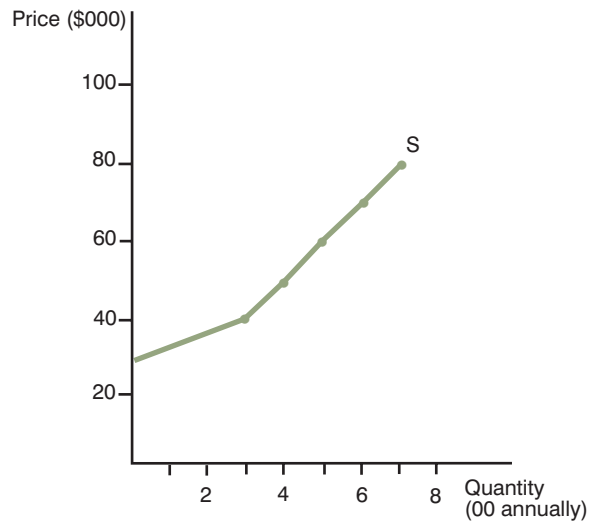


Figure 3.11 Supply schedule and curve for trucks

The market supply curve

Market supply curve: Curve or line showing the total amount of a good or service which firms collectively wish to sell at each possible price, which represents the sum of each firm's supply.

The market supply is the quantity which all firms in an industry are prepared to supply to the market at each of a series of prices. The industry supply curve is derived from the supply curves of the individual firms by a simple horizontal summation. The principle is exactly the same as that used in Figure 3.5 to derive a market demand curve. All that is necessary is to add the quantities which would be supplied at each price and then to graph the new figures.

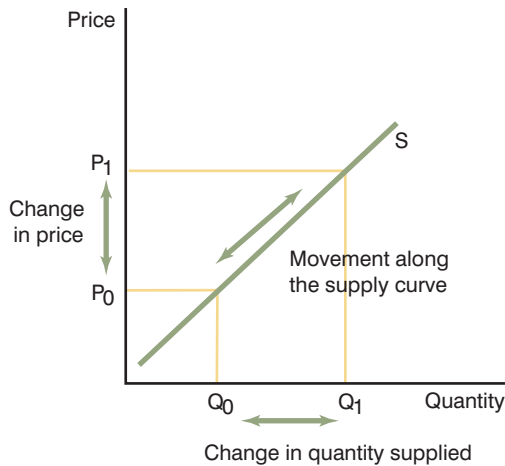
Factors affecting supply

We have just seen how the quantities supplied are related to costs of production. Rising marginal costs mean that a firm is prepared to put more goods on the market only if rising costs can be covered, through higher prices. It follows, then, that a change in price will alter the quantity supplied.

The supply schedule and curve drawn in Figure 3.11 assume that the only variables are price and quantity supplied. Thus, a change in price will cause a movement along the supply curve. At \$40,000 each, 300 trucks will be supplied each year. But at \$80,000 per truck the quantity supplied increases to 700 annually.

This example illustrates another economic principle: *a change in price alone leads to a change in the quantity supplied*. A movement up the supply curve represents an increase in the quantity supplied; a movement down the curve is termed a *decrease in quantity supplied*. This is shown in Figure 3.12(a), where *ceteris paribus* is assumed in respect of any other factors which might influence supply.

(a) Change in price



(b) Change in costs of production, technology, or the price of related goods

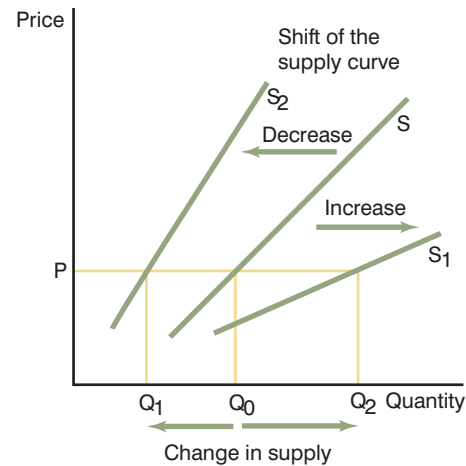


Figure 3.12 Factors affecting the supply curve

Now we drop *ceteris paribus* and investigate other factors which may affect supply; that is, we are now considering a *change in supply* which will lead to an inward or outward shift of the curve.

- **A rise or fall in costs of production.** This is the most important factor in shifting the supply curve. For most firms, salary and wage payments are the largest single cost. If employees achieve wage increases, costs of production rise. The same thing occurs if the price of diesel or petrol rises because this adds to transport costs; or if electricity charges increase. As a result of an increase in any of these costs, the firm will put a smaller quantity on the market at any given price. This is shown graphically by an inward movement of the supply curve from S to S_2 in Figure 3.12(b). At price P , quantity Q_1 is supplied instead of quantity Q_0 . There has been a decrease in supply.
- **A reduction in costs** has the opposite effect, moving the supply curve out to S_1 . At price P , quantity Q_2 will be supplied instead of quantity Q_0 . This is termed an *increase in supply*.
- **A change in technology.** Technological change is one of the major reasons for production costs falling. With a growing firm, large-scale production usually makes it possible to install more sophisticated equipment and perhaps to adopt assembly-line techniques. Although there are additional capital costs in switching to new processes and training operators on new equipment, technological change eventually pays for itself. If there were no long-term cost

reduction, firms would not utilise new processes. The adoption of improved technology moves the supply curve outward to S_1 .

- **The prices of related goods.** Take the example of a sheep farmer who runs 10,000 sheep on his property and usually sends his lambs to the freezing works (a meat-packing plant) as soon as they get to the right weight. If the price for lambs at the works is low, but the price of wool is high and likely to stay at that level for a few years, it makes sense to hold back half the lambs to get a bigger clip of wool at shearing time. The economics of this is that the high price of wool, a related good, reduces the supply of meat. This is represented on the graph in Figure 3.12(b) as an inward movement of the supply curve; in this case, the supply curve of meat.

In some cases, the change in market conditions leads to a movement along the supply curve, while in others there is a shift of the curve to a new position. The rule is the same in principle as it was for the demand curve.

- If the only change is in the price of the good itself, the result is a movement along the good's supply curve.
- If any other factors change, the result is a shift of the supply curve: inwards for a decrease, outwards for an increase.

Market equilibrium

Market equilibrium: A state in which the quantity of a good or service demanded by consumers at the prevailing price is exactly matched by the quantity sellers wish to sell.

The term *equilibrium* is used frequently in economics and, in each case, denotes some form of balance between the forces involved. In the market, the balance is between the forces of demand and supply. Consumers demand goods and services; producers supply those goods and services. These market forces establish a price at which the amount consumers wish to buy is equal to the amount producers willingly supply. This is the unique equilibrium price and the quantity traded at that price is the equilibrium quantity.

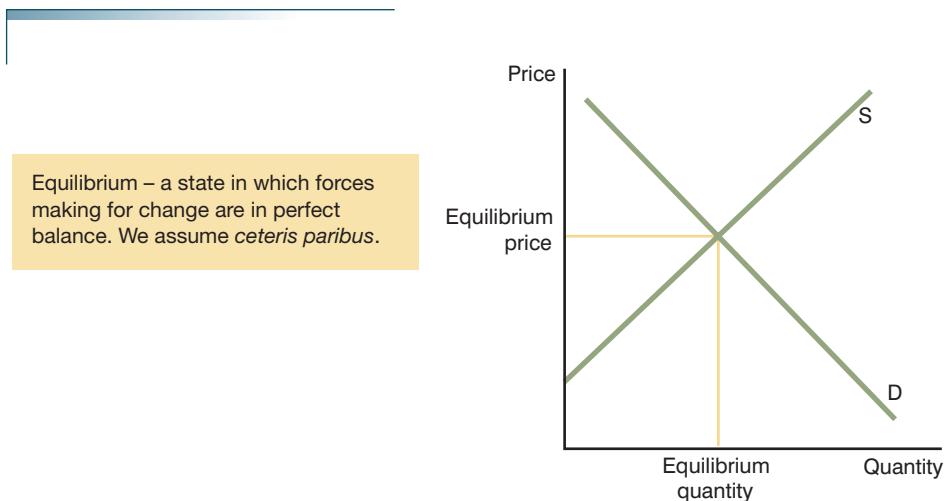


Figure 3.13 Market equilibrium