2.3 Supply

Understanding the law of supply and the supply curve

Supply is concerned with the behaviour of sellers, which include firms in the product markets and households in resource markets. As we are focusing on product markets, we will consider the behaviour of firms as sellers (though the same general principles also apply to sellers of factors of production in resource markets).

Individual supply

- Explain that a supply curve represents the relationship between the price and the quantity supplied of a product, *ceteris paribus*.
- Draw a supply curve.

Firms produce goods and services, and they supply them to product markets for sale. As sellers, therefore, they are suppliers of goods and services.

The **supply** of an individual firm indicates the various quantities of a good (or service) a firm is *willing and able* to produce and supply to the market for sale at different possible prices, during a particular time period, *ceteris paribus*.

A firm's supply of a good can be presented as a supply schedule, or a table showing the various quantities of a good the firm is willing and able to produce and supply at various prices. Table 2.2 shows a firm's supply schedule for chocolate bars. The same information appears as a graph in Figure 2.5, where price is plotted on the vertical axis and quantity on the horizontal axis. The line appearing in the diagram is the **supply curve** of the firm. If the price is $4, the firm supplies 500 chocolate bars in the course of a week; if price were $3, then the firm would supply 400 chocolate bars, and so on.

Price of chocolate bars ($)	Quantity of chocolate bars supplied (per week)
5	600
4	500
3	400
2	300
1	200

Table 2.2 Supply schedule for a firm

As in the case of demand, where price is only one thing that determines how much is demanded, so in the case of supply, price is only one thing that influences how much the firm supplies to the market; hence the *ceteris paribus* assumption. For the moment, we will ignore other possible influences on supply and focus only on the relationship between price and quantity.

The supply schedule and the supply curve do not tell us anything about how many chocolate bars the firm will actually supply to the market nor what price the firm will receive. The supply information tells us only how many chocolate bars the firm would be prepared to produce and sell if the price were $5, or $4, and so on.

The law of supply

- Explain the positive causal relationship between price and quantity supplied.

The supply curve in Figure 2.5 illustrates an important relationship: as price increases, quantity supplied also increases. When two variables change in the same direction (as one increases, the other also increases), they are said to have a 'positive' (or 'direct') relationship. This relationship is a 'causal' one, because changes in price *cause* changes in quantity supplied (see 'Quantitative techniques' chapter on the CD-ROM, pages 10 and 12). The positive causal relationship between the two variables, price and quantity supplied, is summarised in the law of supply.

According to the **law of supply**, there is a **positive causal relationship** between the quantity of a good supplied over a particular time period and its price, *ceteris paribus*: as the price of the good increases, the quantity of the good supplied also increases; as the price falls, the quantity supplied also falls, *ceteris paribus*.

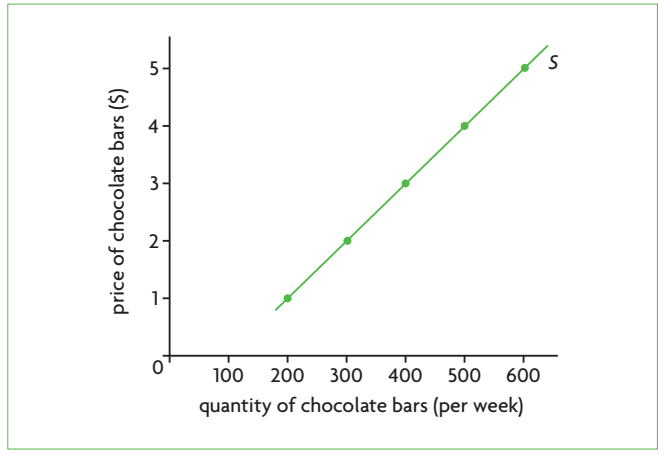

Figure 2.5 Supply curve for a firm

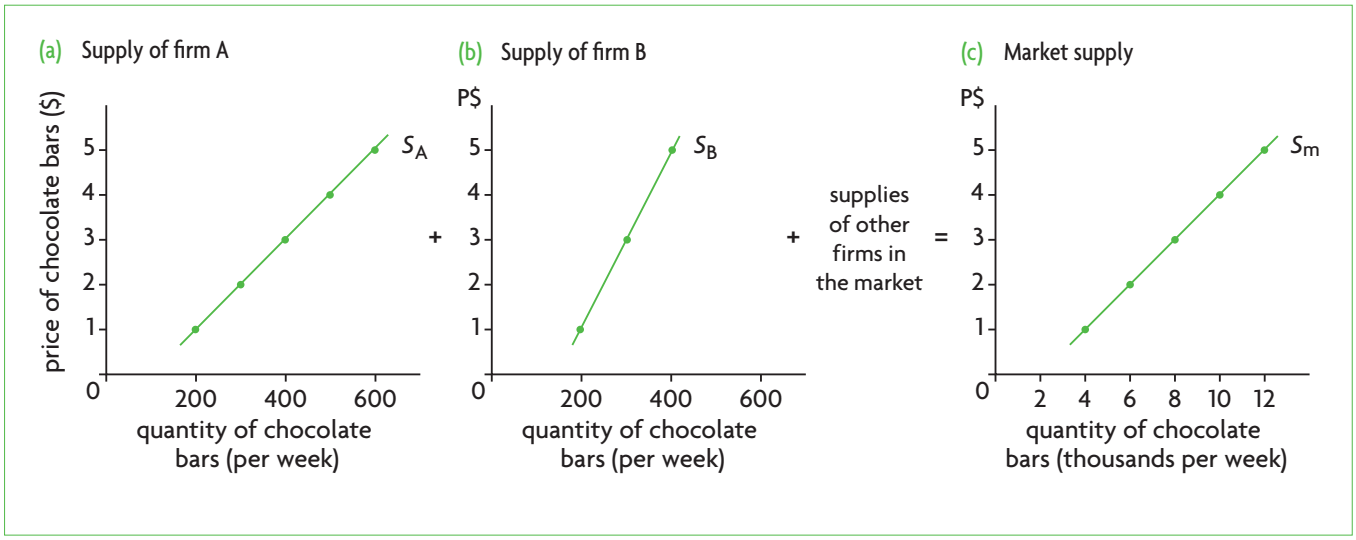

Figure 2.6 Market supply as the sum of individual supplies

Why the supply curve slopes upward

What is the economic reasoning behind the law of supply? Higher prices generally mean that the firm's profits increase, and so the firm faces an incentive to produce more output. Lower prices mean lower profitability, and the incentive facing the firm is to produce less. Therefore, there results a positive relationship between price and quantity supplied: the higher the price, the greater the quantity supplied.

From individual supply to market supply

♦ Describe the relationship between an individual producer's supply and market supply.

Market supply indicates the total quantities of a good that firms are willing and able to supply in the market at different possible prices, and is given by the sum of all individual supplies of that good. Figure 2.6 provides an example where at each price, the quantity supplied by firm A is added to the quantity supplied by firm B, and so on, until all the quantities supplied by all firms producing chocolate bars are added up. For example, at the price of $3, firm A supplies 400 bars per week and firm B supplies 300 bars. If we add these quantities together with all the quantities supplied by other firms, we obtain 8000 bars per week, which is a point on the market supply curve, S_m, corresponding to the price of $3. When the firms' supplies are added up this way for each possible price, we derive the market supply curve, S_m.

Market supply is the sum of all individual firms' supplies for a good. The market supply curve illustrates the law of supply, shown by a positive relationship between price and quantity supplied.

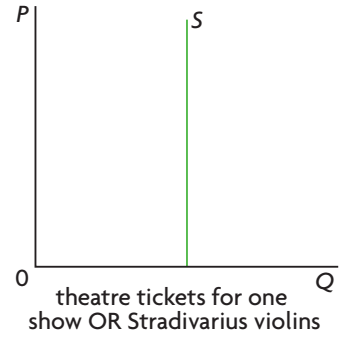

Figure 2.7 The vertical supply curve

The vertical supply curve

Under certain special circumstances, the supply curve is vertical at some particular fixed quantity, as in Figure 2.7. A vertical supply curve tells us that even as price increases, the quantity supplied cannot increase; it remains constant. The quantity supplied is independent of price. There are two reasons why this may occur:

- There is a fixed quantity of the good supplied because there is no time to produce more of it. For example, there is a fixed quantity of theatre tickets in a theatre, because there is a fixed number of seats. No matter how high the price, it is not possible to increase the number of seats in a short period of time.
- There is a fixed quantity of the good because there is no possibility of ever producing more of it. This is the case with original antiques (for example, Stradivarius violins) and original paintings and

sculptures of famous artists. It may be possible to make reproductions, but it is not possible to make more originals.

Non-price determinants of supply and shifts of the supply curve

The non-price determinants

♦ Explain how factors including changes in costs of factors of production (land, labour, capital and entrepreneurship), technology, prices of related goods (joint/competitive supply), expectations, indirect taxes and subsidies and the number of firms in the market can change supply.

We now turn to the **non-price determinants of supply**, or the factors other than price that can influence supply. Changes in the determinants of supply cause shifts in the supply curve. A rightward shift means that for a given price, supply increases and more is supplied; a leftward shift means that for a given price, supply decreases and less is supplied. As Figure 2.8(b) shows, when supply is S_1, quantity Q_1 will be supplied at price P_1. If there is an increase in supply to S_2, at the same price P_1, then Q_2 quantity is supplied. If supply falls to S_3, then Q_3 quantity is supplied at the same price P_1.

A rightward shift of the supply curve indicates that more is supplied for a given price; a leftward shift of the supply curve indicates that less is supplied for a given price. A rightward shift of the curve is called an *increase in supply*; a leftward shift is called a *decrease in supply*.

The non-price determinants of market supply include the following:

- **Costs of factors of production (factor or resource prices).** The firm buys various factors of production (land, labour, capital entrepreneurship) that it uses to produce its product. Prices of factors of production (such as wages, which are the price of labour) are important in determining the firm's costs of production. If a factor price rises, production costs increase, production becomes less profitable and the firm produces less; the supply curve shifts to the left. If a factor price falls, costs of production fall, production becomes more profitable and the firm produces more; the supply curve shifts to the right.
- **Technology.** A new improved technology lowers costs of production, thus making production more profitable. Supply increases and the supply curve shifts to the right. In the (less likely) event that a firm uses a less productive technology, costs of production increase and the supply curve shifts leftward.
- **Prices of related goods: competitive supply.** **Competitive supply** of two or more products refers to production of one or the other by a firm; the goods compete for the use of the same resources, and producing more of one means producing less of the other. For example, a farmer, who can grow wheat or corn, chooses to grow wheat. If the price of corn increases, the farmer may switch to corn production as this is now more profitable, resulting in a fall in wheat supply and a leftward shift of the supply curve. A fall in the price of corn results in

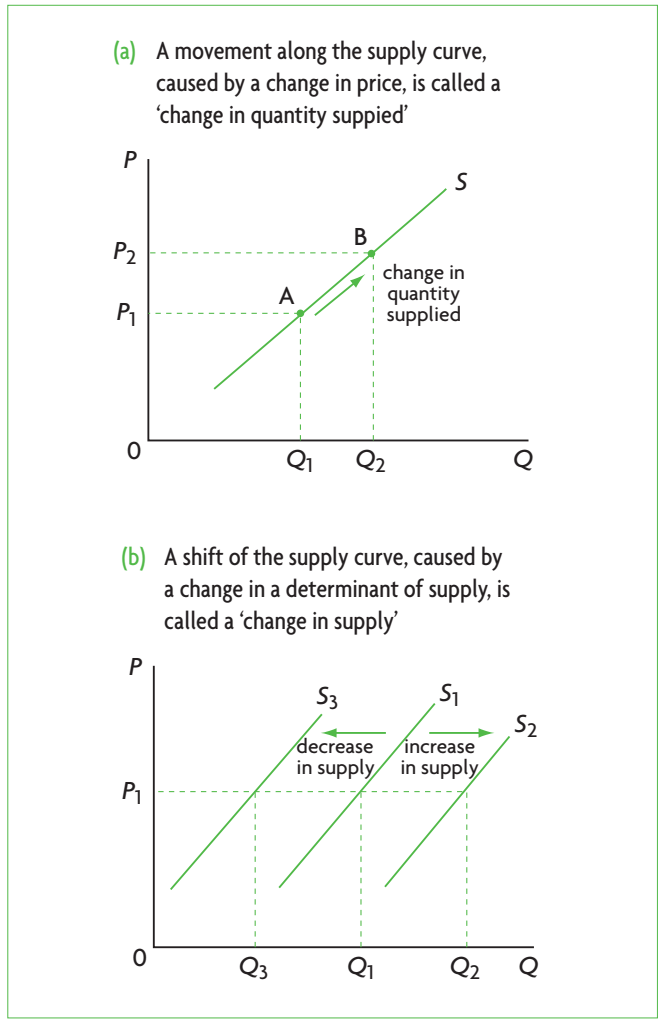

Figure 2.8 Movements along and shifts of the supply curve

an increase in wheat supply and a rightward shift of the supply curve.

- **Prices of related goods: joint supply.** **Joint supply** of two or more products refers to production of goods that are derived from a single product, so that it is not possible to produce more of one without producing more of the other. For example, butter and skimmed milk are both produced from whole milk; petrol (gasoline), diesel oil and heating oil are all produced from crude oil. This means that an increase in the price of one leads to an increase in its quantity supplied and also to an increase in supply of the other joint product(s).[1]
- **Producer (firm) expectations.** If firms expect the price of their product to rise, they may withhold some of their current supply from the market (not offer it for sale), with the expectation that they will be able to sell it at the higher price in the future; in this case, a fall in supply in the present results, and hence a leftward shift in the supply curve. If the expectation is that the price of their product will fall, they increase their supply in the present to take advantage of the current higher price, and hence there is a rightward shift in the supply curve.
- **Taxes (indirect taxes or taxes on profits).** Firms treat taxes as if they were costs of production. Therefore, the imposition of a new tax or the increase of an existing tax represents an increase in production costs, so supply will fall and the supply curve shifts to the left. The elimination of a tax or a decrease in an existing tax represents a fall in production costs; supply increases and the supply curve shifts to the right. We will study the effects of taxes in more detail in Chapter 4.
- **Subsidies.** A **subsidy** is a payment made to the firm by the government, and so has the opposite effect of a tax. (Subsidies may be given in order to increase the incomes of producers or to encourage an increase in the production of the good produced.) The introduction of a subsidy or an increase in an existing subsidy is equivalent to a fall in production costs, and gives rise to a rightward shift in the supply curve, while the elimination of a subsidy or a decrease in a subsidy leads to a leftward shift in the supply curve. We will study the effects of subsidies in more detail in Chapter 4.
- **The number of firms.** An increase in the number of firms producing the good increases supply and gives rise to a rightward shift in the supply curve; a decrease in the number of firms decreases supply and produces a leftward shift. This follows from the fact that market supply is the sum of all individual supplies.
- **'Shocks', or sudden unpredictable events.** Sudden, unpredictable events, called 'shocks', can affect supply, such as weather conditions in the case of agricultural products, war, or natural/man-made catastrophes. For example, the Louisiana oil spill in 2010 resulted in a decrease in the supply of locally produced seafood.

Movement along a supply curve and shift of the supply curve

- Distinguish between movements along the supply curve and shifts of the supply curve.
- Construct diagrams to show the difference between movements along the supply curve and shifts of the supply curve.

Just as in the case of the demand curve, so in the case of the supply curve we distinguish between movements along the curve and shifts of the entire curve. Movements along a supply curve can occur only as a result of changes in price. In Figure 2.8(a), as price increases from P_1 to P_2, quantity supplied increases from Q_1 to Q_2. There has been a movement along the supply curve from A to B. This is called a *change in quantity supplied*. If there is a change in a non-price determinant of supply, supply will increase or decrease, and the entire curve will shift to the right or to the left, as in Figure 2.8(b). This is called a *change in supply*.

Any change in price produces a *change in quantity supplied*, shown as a movement on the supply curve. Any change in a determinant of supply (other than price) produces a *change in supply*, represented by a shift of the whole supply curve.

[1] This requires that the joint products are produced in more or less fixed proportions, so that it is not possible to vary the supplies of each of the joint products individually.