

2

The price system Core

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On completion of this core section you should know:

- what a demand curve is and how individual demand curves can be aggregated to give market demand
- what influences demand
- the difference between a movement along a demand curve and shifts of a demand curve
- price, income and cross elasticity of demand – what each means, how they are calculated, what factors affect them and the implications for revenue and business decisions
- what a supply curve is and how individual supply curves can be aggregated to give market supply
- what influences supply
- the difference between a movement along a supply curve and shifts of a supply curve
- price elasticity of supply – the determinants and the implications for business
- how the interaction of demand and supply leads to equilibrium in a market
- what is meant by disequilibrium
- how changes in demand and supply affect the equilibrium price and quantity and how this analysis can be applied
- what is meant by consumer surplus
- how prices act as rationing and allocative mechanisms.

Introduction

Consider these newspaper headlines:

'Price hike sends gold demand to 6 year low' (*Daily Telegraph*, UK, 20 August 2009)

'Fear of food riots as surge in demand hits nations across the Far East' (*The Times*, UK, 8 April 2009)

'Abdullah to flood market with cooking oil to allay shortage fears' (*South China Morning Post*, 9 January 2008)

'Crash of tea market takes fortunes with it' (*International Herald Tribune*, 10–11 January 2009)

The **price mechanism** underpins each of these particular events. It does so within the context of a **market**. In terms of the above headlines, the markets involved are:

- the global market for gold
- the market for rice in many countries in South East Asia
- the market for cooking oil in Malaysia
- a specialist tea market in a region of China.

These are just a few examples of markets. We will look at some of these examples later once you have learned about how markets work.

To many people a market is something that happens in the town or city centre once or twice a week. It is characterised by a large number of traders setting up stalls to sell a whole range of products: food – such as fruit, vegetables, fish; clothing; and a wide selection of other items. Economists, however, take a broader view of the word 'market'. The essence of any market is trade – somebody has something to sell and somebody else wants to buy the product that is offered. So, whenever people come together for the purposes of exchange or trade, we have a market.

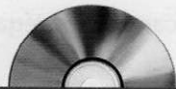
For example, economists talk about the housing market, where people buy and sell houses. Look in the newspapers or in the windows of property agents' offices and you will see evidence of this market. They also refer to the labour market, where individuals' labour power is 'bought and sold' – if any of you have

part-time or full-time jobs, you have participated in the labour market as a seller of labour.

The television newsreaders often refer to the stock market, where shares are bought and sold, and the foreign exchange market, where currencies are bought and sold.

These examples indicate that to an economist a market does not have to have a clearly defined physical presence as the typical town or street market might have. It is simply a term used to describe the process through which products that are similar are bought and sold.

SELF-ASSESSMENT TASK 2.1



How do you participate in the following markets?

- 1 The fast food market.
- 2 The telecommunications market.
- 3 The transport market.

Demand

To an economist:

demand refers to the *quantities of a product that purchasers are willing and able to buy at various prices per period of time, all other things being equal.*

Definitions are of critical importance in Economics, so let us break this definition down to understand in some depth what it means.

- **Quantities** Economists often deal with numerical values and very often try to represent information in a quantitative way. This point is reinforced by using the term 'prices'.
- **Product** This is a general term that simply refers to the item that is being traded. It can be used for goods or services. We could also stretch this to include tradable items like money or other financial assets such as shares.
- **Purchasers** These are the buyers of the product and are often referred to as 'consumers', although they may simply be intermediaries in the production–consumption chain, e.g. Nestlé purchasing large amounts of cocoa to be used in the production of chocolate for sale to the final consumer. We could look at an individual purchaser's demand for a product or, more usefully, we can aggregate this to look at the demand of an overall market.
- **Willing to buy** Clearly purchasers must want a product if they are going to enter into the market to buy it.
- **Able to buy** To an economist, the notional demand for a product, which emerges from wanting it, must be backed by purchasing power if the demand is to become **effective demand**. Companies are only willing to sell a product if the purchaser has monetary ability to pay for the product – the world is full of wishful thinkers who would love to own something they just cannot afford. It is, however, effective demand that is of real importance for economists.
- **Various prices** Prices are crucial to the functioning of a market. Although many things influence demand for a product, it is at the moment of purchase, when we have to hand over our money and pay the price, that we really judge whether the product is value for money – in other words, whether we really are willing and able to buy it. As the price goes up, and provided no other changes have occurred, more and more people will judge the product to be less worthwhile.
- **Per period of time** Demand must be time related. It is of no use to say that the local McDonalds sold 20 Big Macs to consumers unless you specify the time period over which the sales occurred. If that was per minute then demand is probably quite high, but if that was per week then clearly there is little demand for Big Macs in this particular market.
- **Other things being equal** We will see shortly that there are numerous potential influences on the demand for a product. Analysing the connections between the various elements is very difficult if many of these elements are changing simultaneously. So, for simplicity, we start with the assumption that all the other factors influencing demand are constant and analyse the response of purchasers on the basis that price alone changes. This is sometimes referred to as the *ceteris paribus* assumption.

The demand curve

Let us now take the definition of demand and represent it diagrammatically to construct a **demand curve**. We will make up an example based on the overall **market demand** for computers (PCs) to illustrate the point. Let us assume that we can identify a typical PC, i.e. one with a set of standard specifications. Let us also assume that we have collected statistical data about people's preferences and that the quantity of PCs that people are willing and able to buy at various prices per period of time, other things being equal, can be represented by the data in Table 2.1. This is known as a **demand schedule**. We can now plot the market demand schedule on a graph to see how the quantity demanded of PCs relates to variations in price. This demand curve therefore represents the aggregation of many individual demand curves. Figure 2.1 shows the market demand curve for the data in Table 2.1.



PCs have a consistent market demand

Price of a 'standard' PC (\$)	Quantity demanded per week – demand curve D_0
2000	1000
1800	2000
1600	3000
1400	4000
1200	5000
1000	6000
800	7000

Table 2.1 Market demand schedule

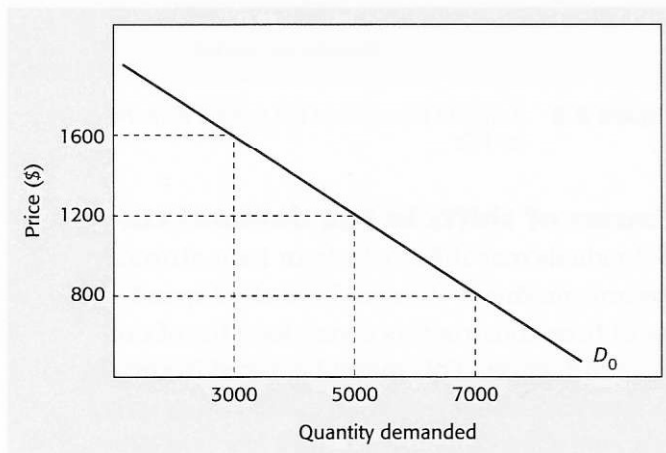


Figure 2.1 The market demand curve for PCs

What the demand curve in Figure 2.1 shows us:

- An inverse or negative quantitative relationship between price and quantity demanded. The **law of demand** is:
 - when price goes up, there is a *decrease* in *quantity demanded*
 - when price goes down, there is an *increase* in *quantity demanded*.

Notice the language that is being used here – changes in price cause a **change in quantity demanded** and we illustrate this by movements up and down the demand curve.

- A causal relationship – changes in price cause changes in the quantity demanded.
- A linear relationship – this demand curve has been drawn, again for simplicity, as a straight line. However, it is perfectly acceptable for price and quantity demanded to be related in a non-linear manner.
- A continuous relationship – we could look at the diagram and find out at what price consumers would be willing and able to buy, say, 1259 PCs.
- A time-based relationship – the time period here is weekly.
- Other things being equal.

Figure 2.1 is a very useful diagram since it allows us to visualise a quite complex relationship – simple pictures are usually easier to understand and remember than a large number of words. It also allows us to estimate how much consumers

SELF-ASSESSMENT TASK 2.2

Using Figure 2.1 and Table 2.1, answer the following:

- 1 How many PCs per week are people willing and able to buy if the price is \$1100?
- 2 What price will persuade people to buy 1350 PCs per week?
- 3 What assumptions are you making when you answer these questions?

may spend when buying PCs or, conversely, how much revenue companies may receive from selling PCs. If the price of each PC is \$1800 and the above information is accurate, then consumers will buy 2000 units and their total spending will be equal to \$3 600 000, which, of course, will be the revenue that companies receive from selling this quantity of the product. (Note that, since we do not know the firm's production and distribution costs, we are as yet unable to say anything about profit.)

SELF-ASSESSMENT TASK 2.3

Using Figure 2.1, explain how the area under the demand curve could be used to illustrate total consumer expenditure/total revenue of the firms selling PCs.

Shifts in the demand curve

Whilst the above analysis is useful, it is clearly limited because the price of a PC is not the only nor, in many cases, the most important factor influencing demand for it – other things play a part and are not always constant. Changes in these 'other things being equal' factors are shown by shifts in the demand curve. A rightward shift indicates an increase in demand; a leftward shift indicates a decrease in demand. Notice how the language changes here when we are talking about a shift in the whole curve rather than simply a movement along it – a **change in demand** rather than a change in the quantity demanded (see Table 2.2 and Figure 2.2). What the horizontal and vertical shifts in Figure 2.2 show:

- Horizontal shift – consumers are now willing and able to buy more PCs at each and every price. So, whereas previously they had only been prepared to buy 3000 units per week at \$1600 each, now they are prepared to buy 4000.
- Vertical shift – consumers previously were prepared to pay \$1600 for 3000 PCs, now they are prepared to pay \$1800 each for that quantity.

Price of a 'standard' PC (\$)	Quantity demanded per week – demand curve D_2
2000	2000
1800	3000
1600	4000
1400	5000
1200	6000
1000	7000
800	8000

Table 2.2 Shifts in the demand curve

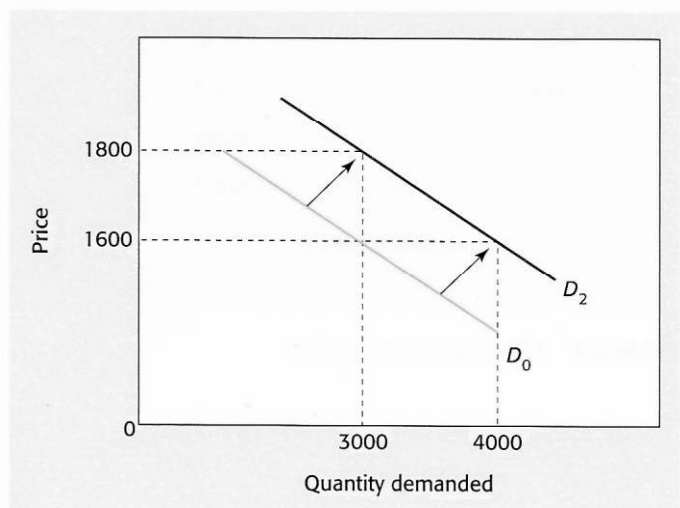


Figure 2.2 A shift to the right in the market demand curve for PCs

Causes of shifts in the demand curve

Individuals may differ widely in their attitudes towards products. We could therefore spend a lot of time constructing a very long list of non-price influences. This might be useful in certain circumstances but not in all cases. Fortunately, economists have identified three key non-price categories that can be used to describe and analyse

SELF-ASSESSMENT TASK 2.4

Use the information in Table 2.3 to draw a demand curve and explain what has happened to that demand curve – you are showing a decrease in demand. Draw in demand curve D_0 from Figure 2.2 as well so that you can use it as the basis for your comparison.

Price of a 'standard' PC (\$)	Quantity demanded per week – demand curve D_1
2000	0
1800	1000
1600	2000
1400	3000
1200	4000
1000	5000
800	6000

Table 2.3

the factors that influence the demand for most products. They are:

- the financial ability to pay for the product
- our attitudes towards the product itself
- the price, availability and attractiveness of related products.

Let us look at each in turn.

The financial ability to pay

We have already noted the importance of effective demand. So what influences someone's ability to pay for a product? The key factors are:

- an individual's income or more specifically, the purchasing power of their income after taxation
- the availability of loans/credit and the interest rate that must be paid on loans or credit card balances.

In general we would expect a positive relationship between the financial ability to pay and the demand for a product. So an increase in the purchaser's

financial ability to pay generally leads to an increase in demand. This is represented by a rightward shift in the demand curve from D_0 to D_2 in Figure 2.2. A decrease in the ability to pay would lead to a decrease in demand, and this would be represented by a leftward shift in the demand curve from D_2 to D_0 .

There is an important qualification to this general rule. The single most important influence on people's financial ability to pay for goods and services is generally considered to be income. In most cases there is a positive relationship between income and product demand – this means that as income rises, the demand for the majority of goods and services also increases; as income falls, so does the demand for most products. Products that are characterised by such a relationship are labelled **normal goods**.

However, there are some products that are characterised by a negative relationship between income and demand. In Asia, for example, as incomes rise, the demand for staple foodstuffs such as rice and vegetables falls. Consumers are able to purchase more meat and fish with their increased spending power. The demand for better clothing and eating out in restaurants will also increase, whilst the demand for second-hand clothing and meals taken at street stalls will fall. Products for which demand decreases as income increases are called **inferior goods**.

SELF-ASSESSMENT TASK 2.5

Draw diagrams and briefly explain how you expect changes in the following to influence the position of the demand curve for PCs:

- an increase in interest rates
- a large increase in unemployment
- a sustained rise in earnings from work
- a reduction in income tax.

Attitudes towards the products

We all buy products for a reason: our behaviour is purposefully motivated, at least at the time of purchase! Economists usually consider our behaviour to be a reflection of our tastes and preferences towards different types of goods and services. You may buy a particular type or brand of PC because

of its reputation for reliability. You may buy a pair of brand-name trainers because you want to play sport and you genuinely believe them to be of better quality or you may buy them simply because they are fashionable and you want to look cool.

Detailed understanding of the psychological motives that determine our behaviour are beyond our scope here, but clearly we are influenced by our own individual likes and dislikes, by peer pressure, and by various forms of advertising and the marketing images that surround us. Nowhere is this more evident than in markets for designer clothing and accessories, where tastes and preferences can be extremely volatile.

SELF-ASSESSMENT TASK 2.6

Would you classify the following products as normal goods or inferior goods? In each case draw a diagram to explain how a decrease in income will shift the demand curve. Explain your reasoning. What difficulties did you have in deciding? What information would you need to resolve these difficulties?

- | | |
|-------------------------------------|------------------------------------|
| a Premium brand orange juice | d Orange cordial |
| b Hotel accommodation | e Guest house accommodation |
| c Standard TV sets | f HD flat screen TVs |

The price, availability and attractiveness of related products

Economists classify types of related products into the following two categories:

- **Substitute goods** are alternatives that satisfy essentially the same wants or needs. The range of substitutability can be fairly narrow, e.g. in terms of different product brands: Acer and Dell computers; Sony and Samsung mobile phones; and Nissan and Toyota cars. The range of substitutability can also be broad e.g. in terms of product groups, such as different types of transport – rail, buses taxis and cars; different types of soft drinks – Sprite, Pepsi Cola or Lipton lemon tea. Changes in the price or attractiveness

SELF-ASSESSMENT TASK 2.7

- 1 What, at present, is the dominant brand of sports clothing? Why do you think it is dominant? Is it because it is of genuinely superior quality or is there another explanation?
- 2 Think of a successful advertising campaign that is running on TV at present. Why is it successful and what impact would you expect it to have on sales over the next six months?



Nike trainers – a fashionable designer brand

of one of these products will have an impact on the demand for all substitutes.

- **Complementary goods** are products that enhance the satisfaction we derive from another product. Common examples are toothbrushes and toothpaste, tennis balls and racquets, laptops and dongles. In some cases, without the complement the main product would be useless. Examples here include: cars and fuel; DVDs and DVD players; and mobile phones and top-up cards. Once again changes in price or attractiveness of one of these products will have an impact on the demand for the complementary good. In such cases this is known as **joint demand**.

Other demand-influencing factors

Clearly, this is not an exhaustive list of the factors that influence demand. Each product will have some factors that are peculiar to it, for instance, the weather may influence the demand for ice cream.

SELF-ASSESSMENT TASK 2.8

- 1 What would you expect to happen to the demand for Dell PCs if Acer cut its prices?
- 2 What would you expect to happen to the demand for all PCs if the price of software and printers came down sharply?

Use a diagram to help explain your answers.



Expectations of the future can be important in determining the demand for certain products. If food prices or share prices are expected to rise, this can be a major influence in boosting demand. If unemployment or interest rates are expected to go up, this can have a dampening effect on the demand for some products.

Another factor may be **composite demand**. This occurs where products are used for more than one purpose, for example, where an increase in demand for sugar cane for biofuel purposes is likely to increase the price and availability of sugar cane for refining.

The skill of the economist is to use the categories above and knowledge or intuition to identify the key influences on demand, in any particular market, to explain past behaviour or to try to predict future behaviour. This is by no means easy.

The concept of elasticity

In our analysis of demand, the focus up to this point has been on understanding the general direction of any change in price or any change in the other factors that influence demand. To add greater meaning to this explanation, it is necessary to look at the extent of any change in price or change

in another influencing factor on the equilibrium position.

A few simple examples will show why this is necessary. For some products, e.g. rice, a small change in price is likely to have only a modest impact on the quantity demanded. For other food products, particularly where there are close substitutes, a small change in price may have a much larger change on the quantity demanded. Similarly, if there is a change in income, there may be little effect on the demand for some products and a much greater effect on demand for others. For example, an increase in income may lead to an increase in demand for restaurant meals yet result in little or no change in demand for eating at local cafés or street stalls.

The concept that explains these variations is referred to in Economics as elasticity. As we shall explain later, this term can be applied to the supply side as well as the demand side of the market. It is defined as 'a numerical measure of responsiveness of one variable following a change in another variable, other things being equal'.

The extent of any change is important, particularly from a business standpoint. Where a small change in price, for example, produces a bigger change in the quantity demanded, then the relationship is said to be **elastic**. Alternatively, if a large change in the price produces only a small change in the quantity demanded, then the relationship is **inelastic**. The distinction is important as you will now see.

Price elasticity of demand (PED)

Price elasticity of demand is a numerical measure of the responsiveness of demand for a product following a change in the price of that product. If demand is elastic, then a small change in price will result in a relatively large change in quantity demanded. On the other hand, if there is a large change in price and a far lesser change in quantity demanded, then demand is price inelastic. A numerical example will help clarify this. First, however, we need a way of expressing PED in a numerical form – the formula we will use at this stage is:

$$\text{PED} = \frac{\% \text{ change in quantity demanded of a product}}{\% \text{ change in price of that product}}$$

Let us take two specific examples of price changes for two general products that we will call product A and product B (see Figure 2.3). Assume that both of these unrelated products are currently priced at \$100 and demand for them is 1000 units per month. Consider what might happen to the demand for A and B if the price rises to \$105. The quantity demanded of product A only falls from 1000 to 990, whereas the quantity demanded of product B falls from 1000 to 900. Now let us put these values into the PED equation to calculate the elasticity.

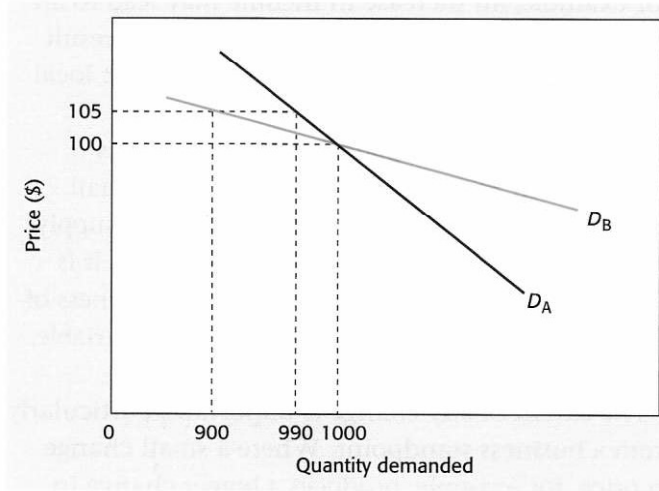


Figure 2.3 Price inelastic and price elastic demand curves

Product A
$$\frac{\% \text{ change in quantity demanded of A}}{\% \text{ change in price of A}}$$

$$= \frac{-1\% \text{ fall}}{+5\% \text{ increase}} = (-) 0.2$$

Product B
$$\frac{\% \text{ change in quantity demanded of B}}{\% \text{ change in price of B}}$$

$$= \frac{-10\% \text{ fall}}{+5\% \text{ increase}} = (-) 2.0$$

Notice that in both cases a negative figure is given. This is because of the negative (or inverse) relationship between price and quantity demanded; in other words, as the price goes up, the quantity demanded goes down. Economists conventionally refer to PED in absolute terms by ignoring the negative sign.

In the case of product A, because the numerical value (0.2) is less than 1, we say that the demand for

this product is relatively inelastic or unresponsive to price changes. Over this particular range of prices, the 5% increase has resulted in a much smaller change in quantity demanded.

In the case of product B, because the numerical value (2.0) is greater than 1, we say that the demand for this product is relatively elastic or responsive to price changes. Over this particular range of prices, the same 5% price change has caused a much bigger change in quantity demanded.

Some special PED values

It is important to realise that mathematically PED values can range from 0 to infinity. These values need explanation. Consider, for example the demand curve shown in Figure 2.4. Irrespective of the price charged, consumers are willing and able to buy the same amount – in this case demand would be said to be **perfectly inelastic**. Let us look at the PED calculation for an increase in price from \$10 to \$11.

$$\text{PED} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{0\%}{+10\%} = 0$$

Hence, when the PED = 0, demand is perfectly inelastic, completely unresponsive to price changes.

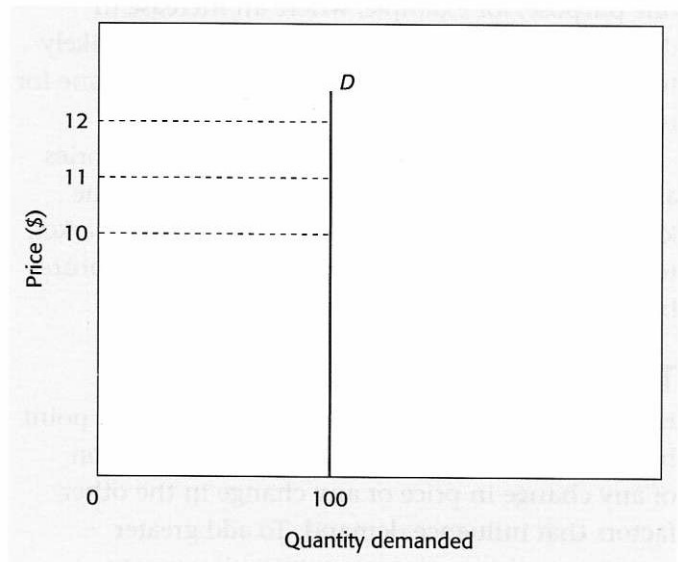


Figure 2.4 A perfectly inelastic demand curve



SELF-ASSESSMENT TASK 2.9

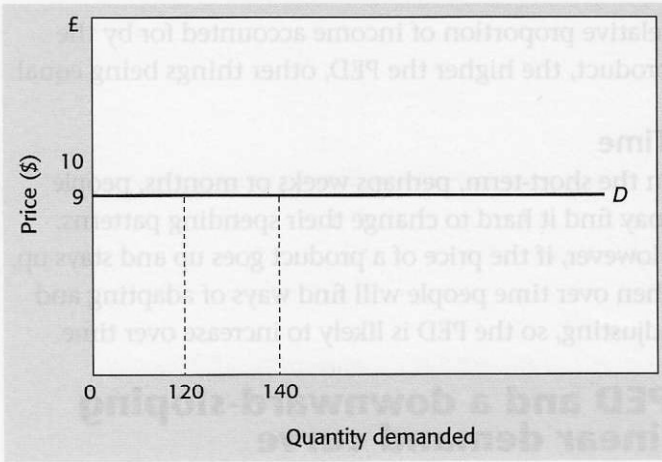


Figure 2.5 A perfectly elastic demand curve

Consider the demand curve in Figure 2.5. At a price of \$10 per unit consumers are not prepared to buy any of this product; however, if price falls to \$9, they will buy all that is available. The relative change in quantity demanded here, of course, is infinite, since the original demand was zero. So:

$$PED = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\infty}{-10\%} = (-)\infty$$

In this case, demand is **perfectly elastic**.

Unitary elasticity

If the relative increase in price is exactly matched by the relative fall in quantity demanded, then the PED value will equal (-)1 and demand will be said to have **unitary elasticity** over that particular price range. So if, for example, the price of the product goes from \$1000 to \$1050 and the quantity demanded decreases from 10 000 to 9500, then the PED will equal (-)1 over this particular range of prices.

Factors affecting price elasticity of demand

There are three key factors that influence whether, over a particular price range, demand for a product is likely to be price elastic or inelastic. These are discussed below.

The range and attractiveness of substitutes

The greater the number of substitute (alternative) products and the more closely substitutable those

- 1 Calculate the PEDs in each of the following cases shown in Table 2.4 and explain whether demand would be considered price elastic or price inelastic.

Original price	New price	Original quantity demanded	New quantity demanded
a \$100	\$102	2000 units per week	1950 units per week
b \$55.50	\$54.95	5000 units per week	6000 units per week

Table 2.4

- 2 With the aid of a numerical example of your choice explain the meaning of these PED values:

a PED = (-) 1.5

b PED = (-) 0.6.

products are, the more we would expect consumers to switch away from a particular product when its price goes up (or towards that product if its price falls).

It is important, however, to distinguish between the substitutability of products within the same group of products and substitutability with goods from other product groupings. For example, different types of orange juice are a group of products in their own right; they are also part of a larger group of fruit juices and part of the even bigger category of products that we could label as 'drinks'. If we are concerned with the price elasticity of demand for a particular type of orange juice produced by a specific manufacturer, then it will probably have a fairly high PED (probably) because of the range of substitutes. As we aggregate products into groupings, such as 'fruit juices', or 'all soft drinks', demand will start to become more price inelastic.

Other substitutability issues to consider include:

- the quality and accessibility of information that consumers have about products that are available to satisfy particular wants and needs
- the degree to which people consider the product to be a necessity

- the addictive properties of the product, i.e. whether the product is habit forming
- the brand image of the product.

The relative expense of the product

A rise in price will reduce the purchasing power of a person's income (real income). The larger the proportion of income that the price represents, the larger will be the impact on the consumer's real income level of a change in the product's price. For example, a 10% increase in the price of a flight to Malaysia will have a bigger impact than a 10% rise in the price of a bus trip into town. The greater the

relative proportion of income accounted for by the product, the higher the PED, other things being equal.

Time

In the short-term, perhaps weeks or months, people may find it hard to change their spending patterns. However, if the price of a product goes up and stays up, then over time people will find ways of adapting and adjusting, so the PED is likely to increase over time.

PED and a downward-sloping linear demand curve

So far PED and the slope of a demand curve may appear to be the same – this, however, is incorrect. Table 2.6 and the associated self-assessment task will help you see the difference.

SELF-ASSESSMENT TASK 2.10

1 Classify the following products into whether, in your opinion, the PED is likely to be relatively high (elastic) or relatively low (inelastic). Justify your classification.

- | | |
|--------------------------------|--------------------------|
| • Coca Cola | • all forms of car fuel |
| • Nike trainers | • soft drinks in general |
| • a particular brand of petrol | • all sweet products |
| • fresh vegetables | • wheat flour. |
| • Cadbury chocolate | |

2 A manufacturer has received a market research estimate of PED values for its shirts currently sold in three markets: independent retailers, prestige fashion stores and via mail order. Explain and comment upon the PED values shown in Table 2.5.

Market	Current price	Current sales	PED value
Independent retailers	\$8	40 000 p.a.	-1.0
Fashion stores	\$15	10 000 p.a.	-0.2
Mail order	\$10	3 000 p.a.	-3.0

Table 2.5 PED values

Price of product R (\$/unit)	Quantity demanded of product R (units per week)
10	0
9	1 000
8	2 000
7	3 000
6	4 000
5	5 000
4	6 000
3	7 000
2	8 000
1	9 000
0	10 000

Table 2.6 Demand schedule for product R

Income elasticity of demand

Income elasticity of demand (YED) is defined as a numerical measure of the responsiveness of demand following a change in income alone. Once again if demand is responsive, then it is classified as elastic; if unresponsive, it is inelastic.

The formula used in this case is:

$$YED = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}}$$

SELF-ASSESSMENT TASK 2.11

Use the information in Table 2.6 to calculate the PED values as prices fall from \$10 to \$9, from \$9 to \$8, from \$8 to \$7 and so on. You should see that the PED value falls as you move down the demand curve. In the top half of the demand curve, $PED > 1$; in the bottom half of the demand curve, $PED < 1$. We could show that for very small changes in price, $PED = 1$ at the mid-point of the demand curve. That is why, in theory, a demand curve with unitary price elasticity throughout can be drawn. Total expenditure (the area beneath this curve) for any price quantity combination is constant.

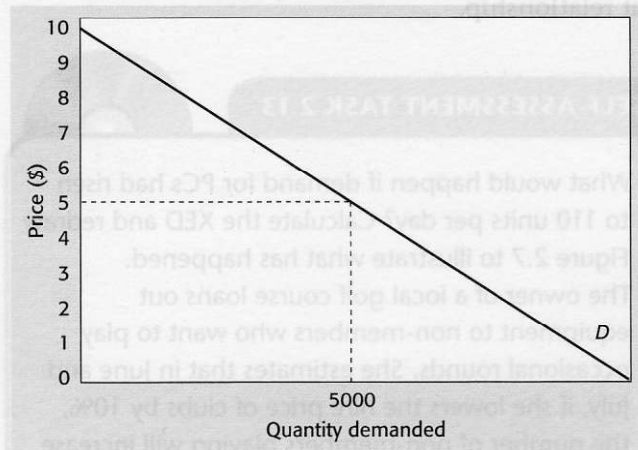


Figure 2.6 The demand curve for product R

It is important to recognise that the relationship between income and demand changes may not always be positive. If an increase in income leads to an increase in demand (or a decrease in income leads to a decrease in demand), then there is a positive relationship and the product is classified as normal, and the YED has a positive value. However, there are some products (inferior goods) that exhibit a negative relationship between income and demand. Here an increase in income would cause a decrease in demand (a decrease in income would cause an increase in demand) and the YED has a negative value. So the sign that precedes the YED tells you the nature of the relationship between income and demand; the numerical value tells you the strength of that relationship.

For example, there has been a 2% increase in consumer income and that has led to the changes in demand shown in Table 2.7.

	Original demand (per period of time)	New demand
Product A	100 units at the current price (\$10)	103 units at the same price (\$10)
Product B	100 units at the current price (\$10)	99 units at the same price (\$10)
Product C	100 units at the current price (\$10)	101 units at the same price (\$10)

Table 2.7 Change in demand

$$\begin{aligned} \text{YED of A} &= \frac{3\% \text{ increase in demand}}{2\% \text{ increase in income}} \\ &= +1.5 \text{ (normal good – elastic response)} \end{aligned}$$

$$\begin{aligned} \text{YED of B} &= \frac{1\% \text{ decrease in demand}}{2\% \text{ increase in income}} \\ &= -0.5 \text{ (inferior good – inelastic response)} \end{aligned}$$

$$\begin{aligned} \text{YED of C} &= \frac{1\% \text{ increase in demand}}{2\% \text{ increase in income}} \\ &= +0.5 \text{ (normal good – inelastic response)} \end{aligned}$$

Cross elasticity of demand

Cross elasticity of demand (XED) is a numerical measure of the responsiveness of demand for one product following a change in the price of another related product alone.

The formula used is:

$$\text{XED} = \frac{\% \text{ change in quantity demanded of product A}}{\% \text{ change in the price of product B}}$$

Products that are substitutes for each other (e.g. different types of laptop computer) will have positive values for the XED. If the price of B goes up, then people will begin to turn to product A because of its more favourable relative price. If the price of B falls, then consumers will start to buy B instead of A. Products that are complements (e.g. computers and printers or software) will have negative values of XED. If the price of B goes up, the quantity demanded of B will drop and so will the complementary demand for A.

Assume the current average market price of a standard type of personal computer is \$1000 and current sales are 100 units per day (see Figure 2.7). Consider what might happen if, following a 2% decrease in the price of laptop computers (a substitute product), demand for PCs falls from 100 units to 98 units per day at the original price (D_0 to D_1). Our calculation becomes:

$$XED = \frac{2\% \text{ fall in demand for PCs}}{2\% \text{ decrease in price of laptops}} = +1$$

The positive sign indicates that the products are substitutes.

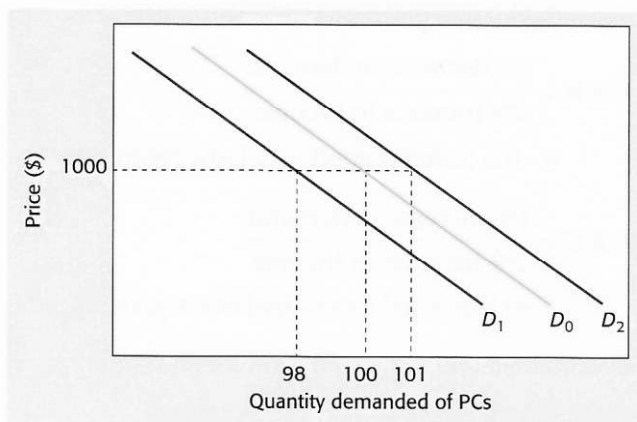
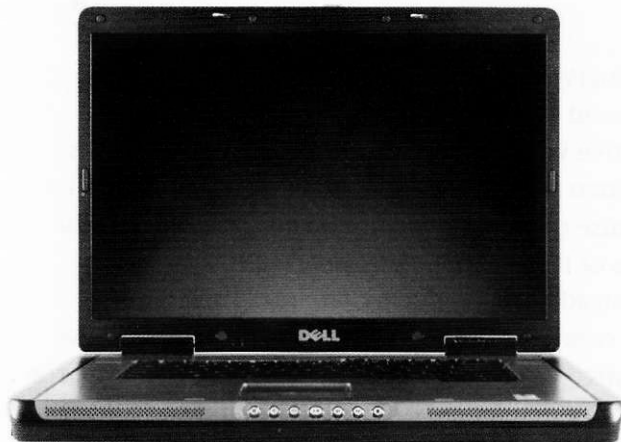


Figure 2.7 A change in the demand for PCs

SELF-ASSESSMENT TASK 2.12

What would have happened to the demand for PCs if, following the same change in the price of laptops, the XED had been +2? Redraw Figure 2.7 to illustrate this.



Now consider that the average price of software (a complement) falls by 5% – this encourages extra sales of PCs so that demand for PCs rises to 101 per day at the original price and the demand curve shifts from D_0 to D_2 .

The cross elasticity calculation is:

$$XED = \frac{1\% \text{ increase in sales of PCs}}{5\% \text{ fall in price of software}} = -0.2$$

Note again that the sign indicates the nature of the relationship (a negative one between complements), and the numerical value indicates the strength of that relationship.

SELF-ASSESSMENT TASK 2.13

- 1 What would happen if demand for PCs had risen to 110 units per day? Calculate the XED and redraw Figure 2.7 to illustrate what has happened.
- 2 The owner of a local golf course loans out equipment to non-members who want to play occasional rounds. She estimates that in June and July, if she lowers the hire price of clubs by 10%, the number of non-members playing will increase by 25%. Calculate and comment on the XED. What other factors should the owner consider?

Business relevance of elasticity

Price elasticity of demand

Knowledge of PED is useful to help understand price variations in a market, the impact of changing prices on consumer expenditure, corporate revenues and government indirect tax receipts.

In Figure 2.8 you can see how variations in PED can lead to price volatility following a change in the conditions of supply (see below). D_e represents a demand curve with $PED > 1$ over the relevant price range. D_i represents a demand curve with PED less than 1 over the relevant price range. A decrease in supply resulting from an increase in, say, production costs, would result in a leftward shift in the supply

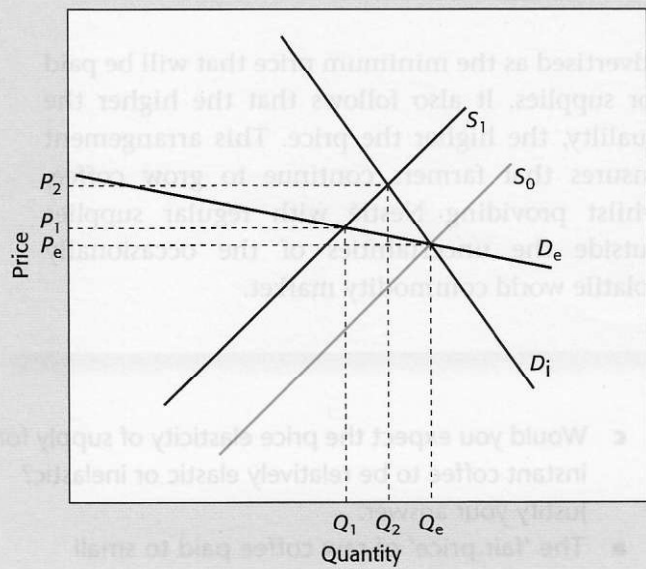


Figure 2.8 Price volatility following a change in supply

SELF-ASSESSMENT TASK 2.14

This question has been adapted from one set by OCR. Read the feature and then answer the questions that follow.

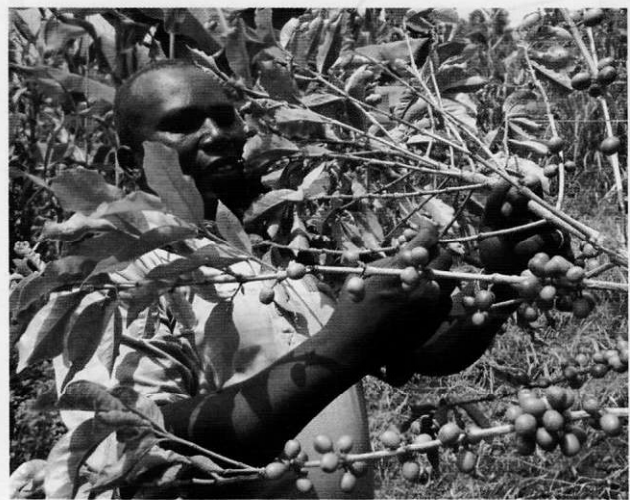
Coffee break

Recent research has shown that 93% of UK households have bought instant coffee in the last year. Moreover, coffee as a drink continues to increase in popularity, as consumers try variations such as cappuccino, espresso, mocha and latte. This expansion in demand has also led to an increase in the types of manufactured coffee available, although instant coffee remains the largest seller.

Raw coffee, when it leaves the plantation, is pale green, hence the name 'green coffee' when it is traded. It is bought and sold on world commodity markets in London and New York. At any one time, the amount to be sold and the quantity that manufacturers and processors wish to purchase are key factors determining its price. Like any product, therefore, the price of raw coffee is determined where market supply and demand are equated.

The final price of raw coffee is very important for the economic well-being of millions of people living in countries such as Costa Rica, Kenya and Colombia which are heavily dependent on this crop. Typically, farmers in such countries practise

small-scale production – their plots of land might be no more than 1 or 2 hectares. It is therefore unrealistic for them to sell their product direct to the world market. So what usually happens is that they sell their crop to a government-controlled agency which in turn releases stocks onto the world market, depending on market conditions.



A Kenyan coffee producer

An alternative approach, practised by major manufacturers such as Nestlé, is for coffee to be bought direct from local farmers. This happens only in countries where Nestlé manufactures locally and for export. In such circumstances, Nestlé offers a 'fair price' to farmers to ensure a regular supply of green coffee. This price is widely

advertised as the minimum price that will be paid for supplies. It also follows that the higher the quality, the higher the price. This arrangement ensures that farmers continue to grow coffee, whilst providing Nestlé with regular supplies outside the uncertainties of the occasionally volatile world commodity market.

- 1 a How is the market price of raw coffee determined on world commodity markets?
 - b Excluding price, state and explain two other determinants of demand for raw coffee in world markets.
 - c Suppose a major coffee-producing country decides to reduce supplies to the world market. Assuming no change in demand, use a diagram to explain how this action would affect the world raw coffee price.
- 2 a Define elasticity of supply.
 - b Would you expect the price elasticity of supply for raw coffee to be relatively elastic or inelastic? Justify your answer.
- 3 a The 'fair price' of raw coffee paid to small farmers by Nestlé in a particular developing country is usually fixed above the normal equilibrium price. With the aid of a diagram, explain how this affects the market for raw coffee in that country.
 - b Briefly describe the benefits of a 'fair price' for the producers of the raw coffee in this developing country.

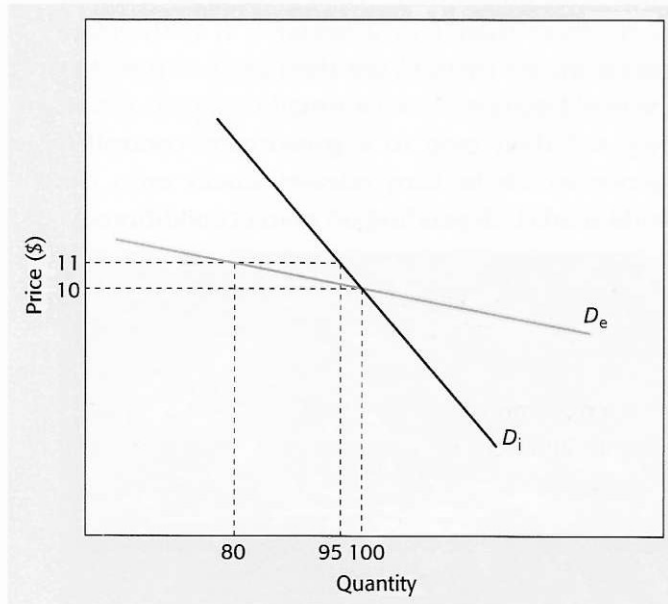


Figure 2.9 Price elastic and price inelastic demand curves

PED and total expenditure/ total revenue

PED can help us understand how total spending by consumers will change as price rises or falls.

$$\begin{aligned} \text{Total expenditure} &= P \times Q \\ &= \text{Total revenue of a firm} \\ &\quad \text{or industry} \end{aligned}$$

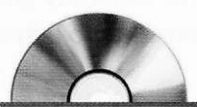
In Figure 2.9, assume there are two products each with the same equilibrium price (\$10) and quantity traded (100 units per day). Total expenditure by consumers per day = \$10 × 100 = \$1000 – this is, of course, equal to the revenue received by companies. Now, if the price rises to \$11, the differences in PED indicate that consumers respond in different ways, and the total expenditure will change:

- D_e is relatively price elastic over the relevant price range, and quantity falls considerably to 80 units (PED = -2). Total expenditure is now down to \$880 per day – the reason, of course, is

that the relative fall in sales is greater than the relative increase in price.

- D_i is relatively price inelastic over the relevant price range and the quantity traded only

falls slightly to 95 units ($PED = -0.5$). Total expenditure actually rises even though less is traded. The reason is that the increase in price exerts a more powerful influence in this case.



SELF-ASSESSMENT TASK 2.15

- 1 You used this demand schedule when we looked at PED on a linear demand curve at the beginning of this section. Figure 2.10 shows the resulting demand curve. Refer back to how PED varies along a linear demand curve – note, in the top half of the demand curve $PED > 1$ whereas in the lower half $PED < 1$.

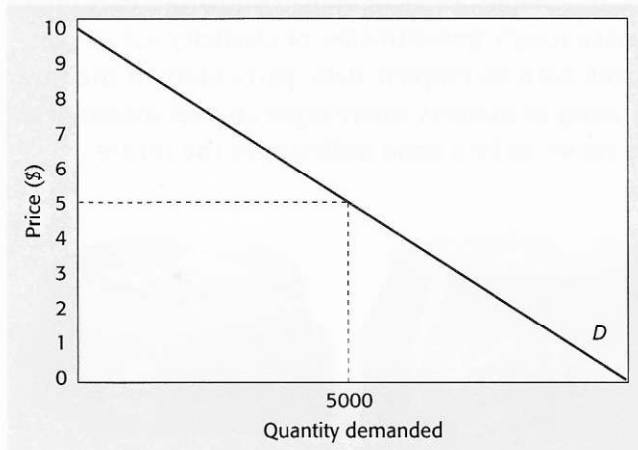


Figure 2.10 The demand curve for product R

- a Use Table 2.8 to help you calculate the total expenditure (TE)/total revenue (TR) figures and graph the resulting values underneath the demand curve (put TE on the vertical axis and quantity on the horizontal axis – it will help if you use the same scale on the horizontal axis).
- b What do you notice about TE/TR figures as the price is cut from \$10 towards \$5 per unit?

Price of product R (\$/unit)	Quantity demanded of product R (units per week)	Total expenditure \$ per week
10	0	
9	1000	
8	2000	
7	3000	
6	4000	
5	5000	
4	6000	
3	7000	
2	8000	
1	9000	
0	10000	

Table 2.8

- c Why does this happen?
 - d What do you notice about the TE/TR figures as price is raised from \$0 to \$5?
 - e Why does this happen?
 - f Where is TE/TR maximised?
- 2 If a government is interested in raising more revenue from indirect taxes, such as VAT or excise duties, should it tax products that are price elastic or price inelastic? Explain and illustrate your answer with diagrams and examples.

Income elasticity of demand

Since YED provides information about how demand varies as income changes, the concept is potentially of great importance to business organisations and governments.

If the YED for a normal good exceeds unity, then demand for that product will grow more rapidly than consumer incomes during normal periods of economic growth – hence considerably greater productive capacity may be required. However, during

a recession, when incomes fall, firms producing this sort of product will be extremely vulnerable, given the large reduction in demand that might be expected.

If YED is negative, then firms producing such inferior goods will see their sales decline steadily over time as the economy grows – however, they may be the sort of business to benefit from the hard times of recession.

SELF-ASSESSMENT TASK 2.16

- 1 What will happen to sales of a product whose $YED = +0.6$?
- 2 How could you use YED values to advise a company on how to produce a mix of goods and services that would reduce the risk often associated with only producing a very narrow range of products?
- 3 Why might government planners be interested in the YED values of different products?

Cross elasticity of demand

Many companies are concerned with the impact that rival pricing strategies will have on the demand for their own product. Remember that substitutes are characterised by a positive XED: the higher the price, the more likely it is that consumers will buy a cheaper substitute. In such cases there is a high degree of interdependence between suppliers, and the dangers of a rival cutting price are likely to be very significant indeed.

Companies are increasingly concerned with trying to get consumers to buy not just one of their products but a whole range of complementary ones, e.g. computer printers and cartridges. XED will identify those products that are most complementary and help a company introduce a pricing structure that generates more revenue. For instance, market research may indicate that families spend most money at restaurants when special deals are offered, even though the PED for meals is low. In this case, for example, the high negative cross elasticity between meal prices and the demand for soft drinks (such as Pepsi Cola and Coca Cola) means that although the revenue from food sales may fall the demand for soft drinks may increase. This indicates that the restaurant may need to introduce a more sophisticated pricing structure by looking at the relationships between the demand for all products and services offered.

Cautionary note

We have assumed that calculating elasticity values is straightforward. In fact there are enormous practical statistical problems, which mean that elasticity values are best seen as estimates. For instance, consider the difficulties of calculating PED values from historical data. Have the price changes only been caused by supply variations? Have there been any non-price demand influences at work? Remember, if we are to calculate the PED value accurately, we need to separate out all the other influences and just measure the impact of the price change alone on quantity demanded – the difficulty encountered here is known as the *identification problem*. Collecting data from other sources, such as market testing or surveys (using questionnaires and/or interviews), is costly in terms of time and money and may not be particularly valid or reliable. As such, many companies may prefer to make rough 'guesstimates' of elasticity values or to work with incomplete data, particularly if they are operating in markets where rapid change means past data ceases to be a good indicator of the future.



Close substitutes

Supply

To an economist:

supply refers to the *quantities of a product that suppliers are willing and able to sell at various prices per period of time, other things being equal.*

Note the similarities below with the definition of demand on page 42:

- **Quantities** Once again we must emphasise that economists often deal with numerical values and very often try to represent information in a quantitative way.
- **Product** As with demand we are using the term to refer to any item that is being traded. It can be used for goods or services. We could also stretch this to include tradable items like money or other financial assets such as shares.
- **Suppliers** These are the sellers of the product and are often referred to as 'producers', although they may not necessarily be manufacturers of the product but again may simply be an intermediary in the production–consumption chain or they may be selling services. We could look at an individual company's supply of a product or, more usefully, we can aggregate to look at the supply for an overall market.
- **Willing and able to sell at various prices** Clearly, in a market economy, companies must gain from selling their products. The ability to earn profits is likely to be a major (but probably not the only) influence on company behaviour – the higher the price, other things being equal, the more profit companies are likely to make.
- **Per period of time** Supply must also be time related. It is of no use to say that Acer supplied 200 computers unless you specify the relevant time period. Clearly this needs to be consistent with the time period being used for demand.
- **Other things being equal** We will see shortly that there are numerous potential influences on the supply of a product. Analysing the connections between the various elements is very difficult if lots of these elements are changing simultaneously. So, we assume these other factors affecting supply remain unchanged.

The supply curve

We need to take the definition and represent it diagrammatically to construct what is known as a **supply curve**. We could do this for an individual firm selling PCs or, by aggregating each company's supply curves, we could get the industry or market

supply curve for PCs. Assume again that we have collected statistical data about companies' selling intentions and that these plans can be represented by Table 2.6 (this is known as a market **supply schedule**). We can now plot this supply schedule to see how the quantity of PCs depends upon variations in price. Figure 2.10 shows the supply curve (S_0) for the data in the table.

Price of a 'standard' PC (\$)	Quantity supplied per week–supply curve S_0
800	1000
1000	2000
1200	3000
1400	4000
1600	5000
1800	6000
2000	7000

Table 2.9 Market supply schedule

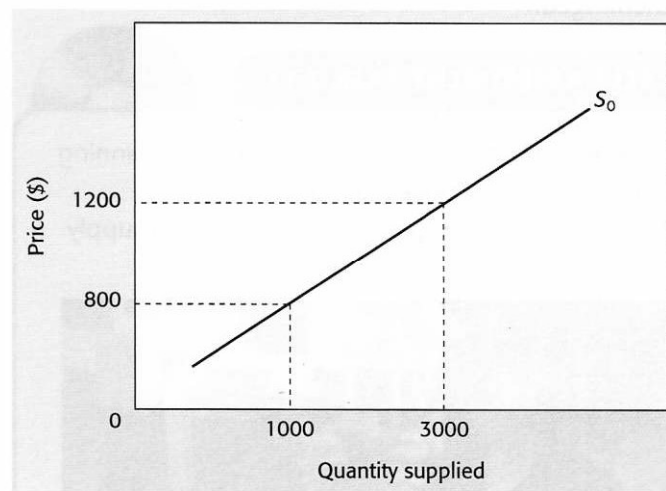


Figure 2.11 The market supply curve for PCs

What the supply curve in Figure 2.11 shows:

- A positive or direct relationship between price and quantity supplied. The **law of supply** is:
 - when price goes up there is an *increase* in quantity supplied
 - when price goes down there is a *decrease* in quantity supplied.

- Again notice the language that is being used – changes in price cause changes in quantity supplied. This is represented by movements up and down the supply curve (again some economists prefer to use the terms ‘extension of supply’ for a movement up the supply curve and a ‘contraction of supply’ for a movement down the curve).
- A causal relationship – we are saying that price changes cause the change in quantity supplied.
- A linear relationship – the supply curve has been drawn for simplicity as a straight line, but of course there is no reason why the supply curve should not be represented in a non-linear way, e.g. in the form of an upward sloping curve.
- A continuous relationship – we could look at the curve to find out how many PCs companies would plan to supply at a price of \$1150.
- A time-based relationship – the time period again is weekly.

Note we are also assuming other things being equal – any other factor influencing supply is assumed to be unchanged.

SELF-ASSESSMENT TASK 2.17



- 1 How many PCs per week are companies planning to supply if the price is \$1100?
- 2 What price would persuade companies to supply 1350 PCs?



- 3 What assumptions are you making when you answer these questions?
- 4 What might be the advantages and disadvantages of using a diagrammatic form such as in Figure 2.11 to represent supply?

Shifts in the market supply curve

Whilst the above is useful, one of the limitations is that companies’ supply intentions are influenced by factors other than the price of the product (which, if you think about it, is the most tangible expression of consumers’ buying intentions). Other things are most certainly not always equal. Changes in these **supply conditions** can be illustrated by shifts in the supply curve. A rightward shift indicates an increase in supply; a leftward shift indicates a decrease in supply. Notice again how the language changes when we are talking about a shift in the whole curve rather than simply a movement along it – a change in supply rather than a change in the quantity supplied (see Table 2.10 and Figure 2.12).

Price of a ‘standard’ PC (\$)	Quantity supplied per week – supply curve S_2
800	2000
1000	3000
1200	4000
1400	5000
1600	6000
1800	7000
2000	8000

Table 2.10 An increase in supply

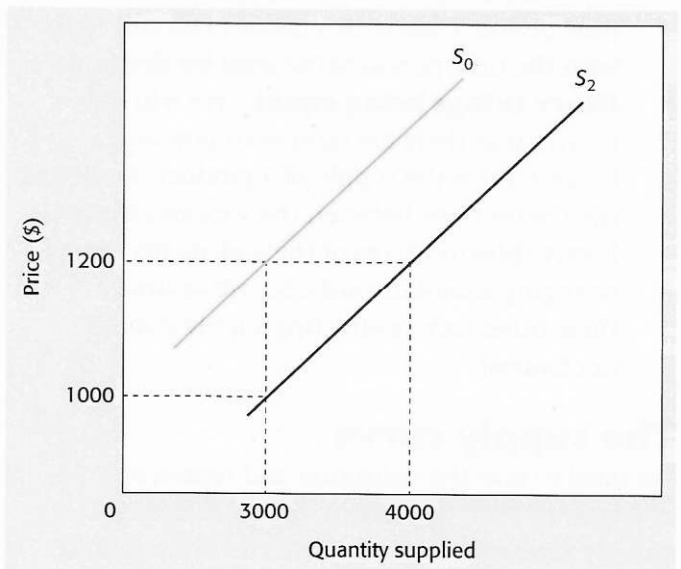


Figure 2.12 A shift to the right in the market supply curve for PCs

What the horizontal and vertical shifts in Figure 2.11 show:

- Horizontal shift – companies are now more willing and/or more able to supply PCs at each and every price. Previously they had only been prepared to supply 3000 units per week at \$1200; now they are prepared to supply 4000.
- Vertical shift – companies previously wanted \$1200 per unit to persuade them to supply 3000 units per week; now they are prepared to accept \$1000.

SELF-ASSESSMENT TASK 2.18

Use the information in Table 2.11 to draw a new supply curve (S_1). Explain what has happened to that supply curve – remember you are showing a decrease in supply. Draw in supply curve S_0 as well so that you can use it as the basis for your comparison.

Price of a 'standard' PC (\$)	Quantity supplied per week – supply curve S_1
1000	1000
1200	2000
1400	3000
1600	4000
1800	5000
2000	6000

Table 2.11

Causes of shifts in the supply curve

Companies clearly differ in their willingness and ability to supply products and, as with demand, we could spend a long time building a list of possible factors other than price that will affect supply. If we were required to conduct a detailed analysis of supply conditions in a particular industry, that might be justified. For our purposes we need to simplify and generalise about the factors that can influence supply in most industries. As with demand, we can focus on three main influences:

- the **costs** associated with supplying the product
- the size, structure and nature of the industry
- government policy.

Let us discuss each in turn.

Costs

In a market-based economy, no firm (in the absence of government support) can exist indefinitely if it makes losses, so companies will make supply decisions on the basis of the price they can get for selling the product in relation to the cost of supplying it. What we are interested in is what factors can influence the position of the supply curve – in other words, what factors can cause an increase or a decrease in the costs of supplying each and every unit, since it is likely that this will impact on the price that companies charge per unit. Below are listed some potentially influential factors – if any factor pushes up costs, there is likely to be a leftward shift in the supply curve or a decrease in supply; if the factor lowers costs, there is likely to be an increase in supply:

- wage rates
- worker productivity (output per worker)
- raw material and component prices
- energy costs
- equipment maintenance costs
- transport costs
- the state of technology.

SELF-ASSESSMENT TASK 2.19

Go through each of the above factors in turn and work out what sort of change in that factor will cause:

- an increase in supply
- a decrease in supply.

The size and nature of the industry

If it is clear that if there is substantial profit to be made by selling a product, then firms inside and outside the industry are likely to react. Firms currently in the industry may invest in capital equipment in an attempt to grow bigger and take advantage of the situation. Firms outside the industry

may try to enter this market and new firms may set up in business. If the size of the industry increases, because there are more firms or bigger firms, then it is likely that the supply of the industry will increase. Equally, if firms in the industry start to compete more intensively on price, it is likely that the supply curve will shift to the right as the effects of this price competition start to affect the price that all companies are willing to accept for their products. Of course if a fierce price war breaks out, then consumers, at least temporarily, may enjoy very much lower prices for any given level of supply.

SELF-ASSESSMENT TASK 2.20

- 1 Why might firms choose to leave an industry?
- 2 What is likely to happen to the industry supply if the size of the industry shrinks?
- 3 What might happen to supply if all firms decide to try and increase the amount of profit they make on each unit they sell?

Government policy

Governments influence company decisions in many ways. Legislation designed to protect consumers or workers may impose additional costs on companies and this may affect the supply curve. Governments may also impose a **specific tax** such as excise duties on the output of companies or an **ad valorem tax** such as value added tax on sales. The impact of tax is like a cost increase because companies may seek to pass the tax on to the consumer in the form of higher prices. As such, indirect taxes often result in a decrease in supply. On the other hand, a relaxation of

SELF-ASSESSMENT TASK 2.21

Refer to the supply curve S_0 in Figure 2.12 (page 58). What would happen to this curve if the government introduced a tax of:

- a \$100 per computer?
- b 10% on the pre-tax selling price?
- c legislation that raised companies' costs by about 20% on average?

certain types of legislation or government subsidies can increase supply by encouraging firms to reduce prices for any given level of output. Government policy in agriculture may involve the release of **stocks** to calm the otherwise volatility of markets associated with a poor harvest.

Other supply-influencing factors

These are varied and often specific to the particular industry or activity. For example, the supply of agricultural produce is often influenced by weather conditions. Adverse weather can lead to a dramatic reduction in supply; good weather conditions in contrast can result in bumper harvests for producers. Some manufacturers may be able to switch production from one product to another fairly easily, so the relative profitability of alternative product areas may be important. In financial markets, such as the stock market or the foreign exchange market, supply may be significantly influenced by expectations of future prices.

There is also the case of **joint supply**. A good example is in the case of soya bean production where part of the crop is used for human food products whilst what is left over is used to produce animal feed.

Once again the skill of the economist is to use theory, insight and observation to identify the key influences on supply in any situation to explain the past or to try to predict the future.

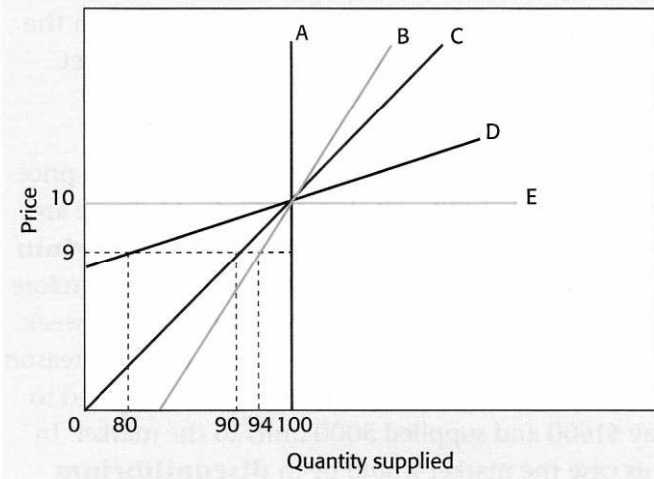
Price elasticity of supply

Price elasticity of supply (PES) is a numerical measure of the responsiveness of supply to a change in the price of the product alone. The supply could be that of an individual firm or group of firms; it could, of course, refer to the supply of the overall industry. It is expressed as:

$$PES = \frac{\% \text{ change in quantity supplied}}{\% \text{ change in price}}$$

Since the relationship between the price and quantity supplied is normally a direct one, the PES will tend to take on a positive value. If the numerical value of PES is greater than 1, then we say that supply is relatively price elastic, i.e. supply is responsive. If the numerical value of PES is less than 1, then supply is relatively price inelastic, i.e. supply is unresponsive.

Figure 2.13 shows five supply curves each with different PES values.



Supply curve	% change in quantity supplied/	/ % change in price	= PES and	Description
A	0	/ 10% decrease	= 0	Perfectly inelastic
B	6% decrease	/ 10% decrease	= +0.6	Relatively inelastic
C	10% decrease	/ 10% decrease	= +1.0	Unitary elasticity
D	20% increase	/ 10% increase	= +2.0	Relatively elastic
E	Firms are not prepared to supply any at a price below \$10 but will supply as much as they can at \$10 (or above!)		= +∞	Perfectly elastic

Figure 2.13 Five different supply curves

Factors influencing PES

The key words in understanding PES are supply flexibility – if firms and industries are more flexible in the way they behave, then supply tends to be more elastic. The main influences on PES include the following:

- The ease with which firms can accumulate or reduce stocks of goods. Stocks allow companies to meet variations in demand through output changes rather than price changes – so the more easily manufacturing firms can do this, the higher the PES. Companies that provide services are, of course, unable to build up stocks.

- The ease with which they can increase production. In the short run firms and industries with spare productive capacity will tend to have a higher PES. However, shortages of critical factor inputs (skilled workers, components, fuel) will often lead to an inelastic PES. This is particularly the case with agricultural products where it takes time to alter the type of crops produced.
- Over time, of course, companies can increase their productive capacity by investing in more capital equipment, often taking advantage of technological advances. Equally, over time, more firms can enter or leave an industry and this will increase the flexibility of supply.

Implications for business

You have already seen how variations in PED will influence the nature of a change in the equilibrium following a given shift in the supply curve. Figure 2.14 also confirms that the PES will influence the nature of a change in the equilibrium following a given shift in the demand curve. The diagram illustrates two alternative supply curves with different elasticities over the relevant price range. S_e is relatively price elastic, S_i is relatively price inelastic.

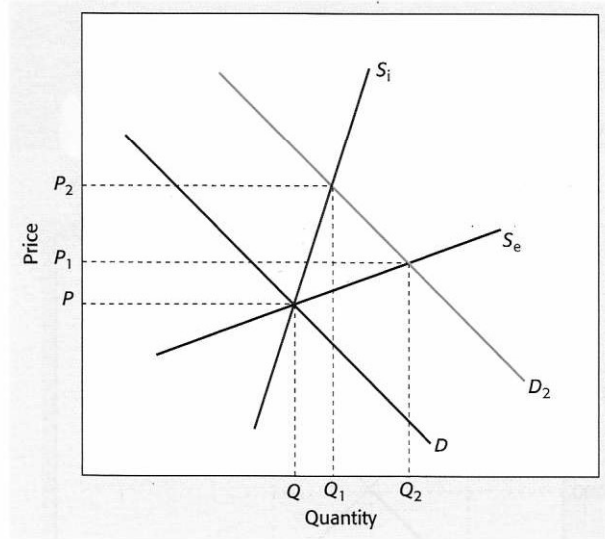


Figure 2.14 Supply curves with different elasticities

If the initial equilibrium is at PQ and then demand for a normal good increases, perhaps because of an increase in income, in both cases the new equilibrium price and quantity are higher. However, in the case of S_e , the greater flexibility

in supply allows companies to respond to this increased demand without raising prices so much. In the case of S_1 , the inflexible nature of supply means that companies raise prices more sharply in response to the surge in demand.

Putting supply and demand all together – markets in equilibrium and disequilibrium

Each side of the market has now been analysed separately and it is time to put it all together. At any point in time, there will be a given set of conditions influencing demand and a given set of conditions influencing supply (see Table 2.12). Let us say that these conditions are reflected in demand curve D_0 and supply curve S_0 from earlier on – these relationships have been combined in Figure 2.15.

Price of a standard PC (\$)	Quantity supplied per week	Quantity demanded per week
800	1000	7000
1000	2000	6000
1200	3000	5000
1400	4000	4000
1600	5000	3000
1800	6000	2000
2000	7000	1000

Table 2.12 Market supply and demand schedules for PCs

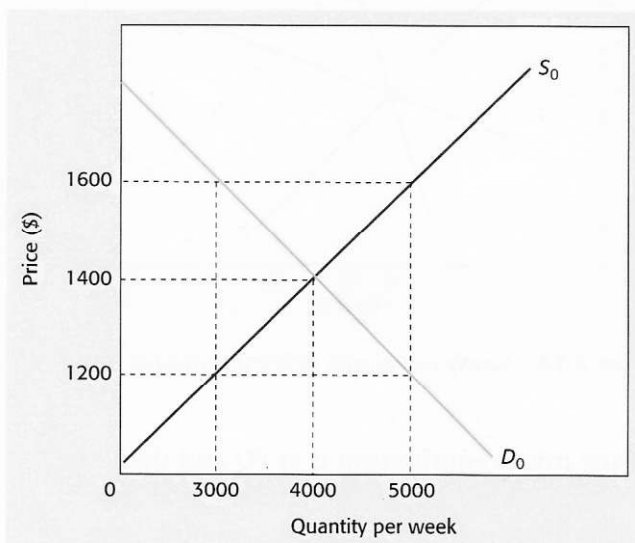


Figure 2.15 Equilibrium price and output in the market for PCs

The term **equilibrium** refers to a situation of balance where at least under present circumstances there is no tendency for change to occur. In this particular situation, equilibrium will exist when the plans of consumers (as represented by the market demand curve) match the plans of suppliers (as represented by the market supply curve).

The market equilibrium will, therefore, be at a price of \$1400 with 4000 units bought and sold. These are referred to as **equilibrium price** and **equilibrium quantity**. Total consumer expenditure (and therefore industry **total revenue**) will be \$5 600 000 per week. Just think about what would happen if for some reason companies thought that consumers were prepared to pay \$1600 and supplied 5000 units to the market. In this case the market would be in **disequilibrium** (an imbalance where change will happen). At a price of \$1600, under present circumstances, consumers are only planning to buy 3000 units. As such companies will build up excess stocks at the rate of 2000 PCs per week. There is disequilibrium due to excess supply. Companies would be irrational to carry on with this unplanned stock building. How might they react?

First of all, they could cut prices; they would also probably start to reduce the quantity they supply to the market. Of course, as they cut prices, some consumers who would not have been prepared to pay the higher price are now attracted back into the market – the disequilibrium starts to narrow. Provided there is no change to any of the conditions of supply or demand, and nothing prevented companies adjusting in this way, then eventually, perhaps through expert decision making or simply trial and error, the market price and quantity should move back to equilibrium.



Consumers can easily compare prices in superstores

Think now what would happen if the price was set at \$1000. Again we have disequilibrium – this time of excess demand. Consumers are now keen to snap up what they consider to be a pretty good deal. However, given the low prices, supplies are fairly low and there are not enough PCs to meet demand – suppliers run out of stocks far quicker than they had expected, so there are unmet orders. Profit-oriented companies, if they are reasonably sharp, will recognise this and will start to raise price and increase the number of PCs available for sale. However, as prices rise, some consumers will decide that PCs have become too expensive and the

quantity demanded will fall. Once again, as a result of trial and error and good management on the part of businesses, the market will adjust back to the equilibrium.

This process of market adjustment may not happen instantly; there will be time lags, perhaps quite lengthy ones if companies cannot react quickly. The point, however, is that there will always be a tendency for the market to move back to its equilibrium because that is where the underlying motives and plans of consumers and suppliers are driving it. When this position is reached, it is said that the market clears.

SELF-ASSESSMENT TASK 2.22

In Figure 2.16 symbols are used instead of numbers.

- 1 What is the market equilibrium price and quantity?
- 2 What area will show the total expenditure by consumers? This will be the same as the total revenue earned by companies.
- 3 What is the state of the market if the price is at P_1 ?
- 4 What is the state of the market if the price is at P_0 ?
- 5 Explain what will happen if the market is in a disequilibrium of:
 - excess demand
 - excess supply.
- 6 What advantages/disadvantages are there in using symbols, such as P_s and Q_s , to analyse markets rather than actual numbers?

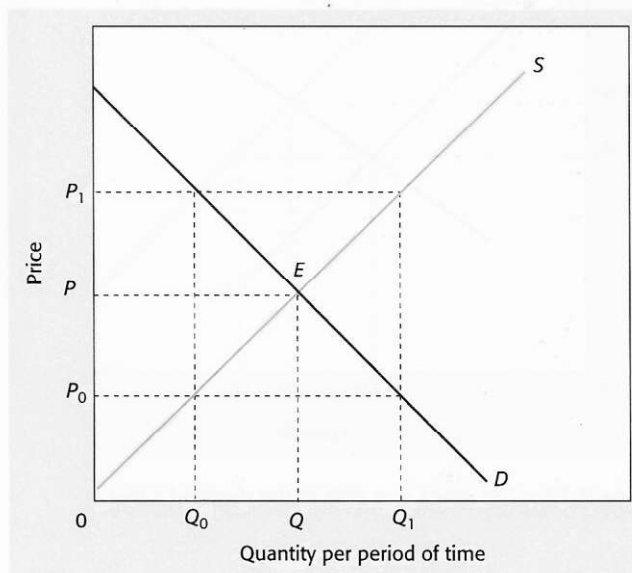


Figure 2.16

SELF-ASSESSMENT TASK 2.23

- 1 Review the factors that can cause the demand curve to shift.
- 2 Review the factors that can cause the supply curve to shift.
- 3 Review how disequilibrium positions are eliminated in a market.

Changes in the equilibrium

The equilibrium will change if there is a disturbance to the present market conditions – this could come about through a change in supply conditions (the supply curve shifts) or a change in demand conditions (the demand curve shifts).

A change in demand

Look at Figure 2.17 – notice we are using P and Q symbols again instead of actual numbers – if there is an increase in demand (D_0 to D_2), then, at the original price, there is now a disequilibrium of excess demand equal to $Q_1 - Q_0$. As suppliers begin to recognise this they will start to raise the price and increase the quantity supplied. The rise in price will lead some consumers to decide they do not want to buy the product at the higher price. Although the process may take some time, the market will move back towards the new equilibrium at $P^* Q^*$, where the market is once more in balance. Note that the new equilibrium is at a higher price with a larger quantity traded than in the original situation.

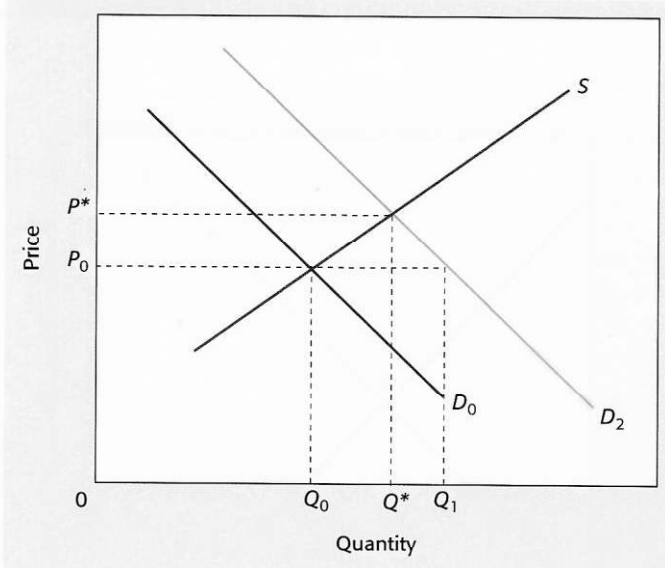


Figure 2.17 *The effect of a shift of the demand curve on equilibrium price and quantity*

A change in supply

Look at Figure 2.18 – if there is an increase in supply (from S_0 to S_2) then, at the original price (P_0), there is disequilibrium due to excess supply ($Q_1 - Q_0$). This would, of course, eventually be eliminated as price falls towards its new equilibrium level and the quantity traded in equilibrium rises from Q_0 to Q^* where the plans of consumers and companies once more coincide.

A change in supply and demand

The above analysis is useful to deal with simple situations. However, in many situations the conditions of both supply and demand may change

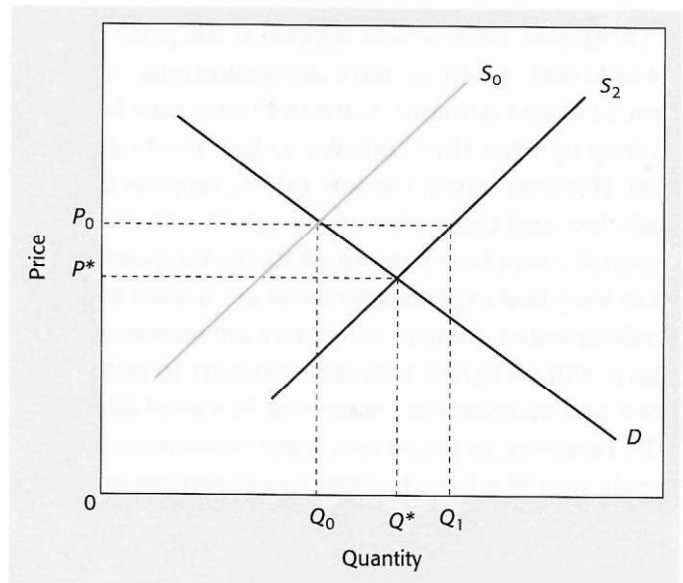


Figure 2.18 *The effect of a shift in the supply curve on equilibrium price and quantity*

simultaneously. Look at Figure 2.19. The initial equilibrium is at P and Q with the demand curve D_0 and the supply curve S_0 . The increase in demand (caused by, say, the increase in the price of a substitute) puts upward pressure on price. However, the simultaneous increase in supply (caused by, say, a fall in raw material and energy costs) puts downward pressure on price. The resulting effect is that the equilibrium price remains unchanged, although of course there is a fairly significant increase in the quantity traded (from Q_0 to Q^*).

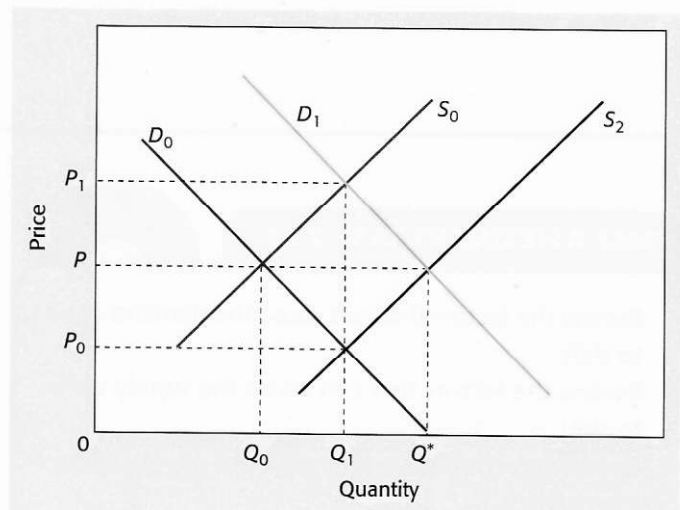


Figure 2.19 *An unchanged equilibrium price and a changed equilibrium quantity*

SELF-ASSESSMENT TASK 2.24

On 1 May 2009, the price of white sugar on the London commodity market reached a two and a half year high of \$441 per tonne. Analysts put this down to an increase in demand from India, the world's largest consumer, and from Russia. A hefty 850 000 tonnes was heading for these two markets in May. With the imminent peak in the Brazilian cane harvest, it was expected that the increase in supply would bring prices down.



Using demand and supply diagrams:

- 1 Show how the increase in demand from India and Russia affected the market
- 2 Show how the increased supply of Brazilian sugar might affect the market.
- 3 What factors might mean that the world price of sugar will continue to increase in the future?

Consumer surplus

The underlying principles behind the demand curve are relatively simple to understand. They are also ones which many of us follow in our daily lives. For instance, when a product is on 'special offer' in a local shop, and its price has been reduced, more will be demanded and purchased.

For any good or service, though, there are always some people who are prepared to pay above the given price to obtain it. Some of the best examples where this happens are in the cases of tickets to popular rock concerts or, in England, to watch Premier League football clubs, such as Manchester United, or to see a major Test cricket series where all tickets are sold out. The stated price of tickets may well be

\$40 per ticket, but there will always be some people who are willing to pay over \$40 to obtain a ticket. Another example might be the case of a chocoholic who is prepared to pay over the odds to get a bar of his or her favourite chocolate. To the economist, such situations introduce the concept of **consumer surplus**.

Consumer surplus arises because some consumers are willing to pay more than the given price for all but the last unit they buy. This is illustrated in Figure 2.19 a where consumer surplus is the shaded area under the demand curve and above the price line. More specifically, it is the difference between the total value consumers place on all the units consumed and the payments they need to make in order to actually purchase that commodity.

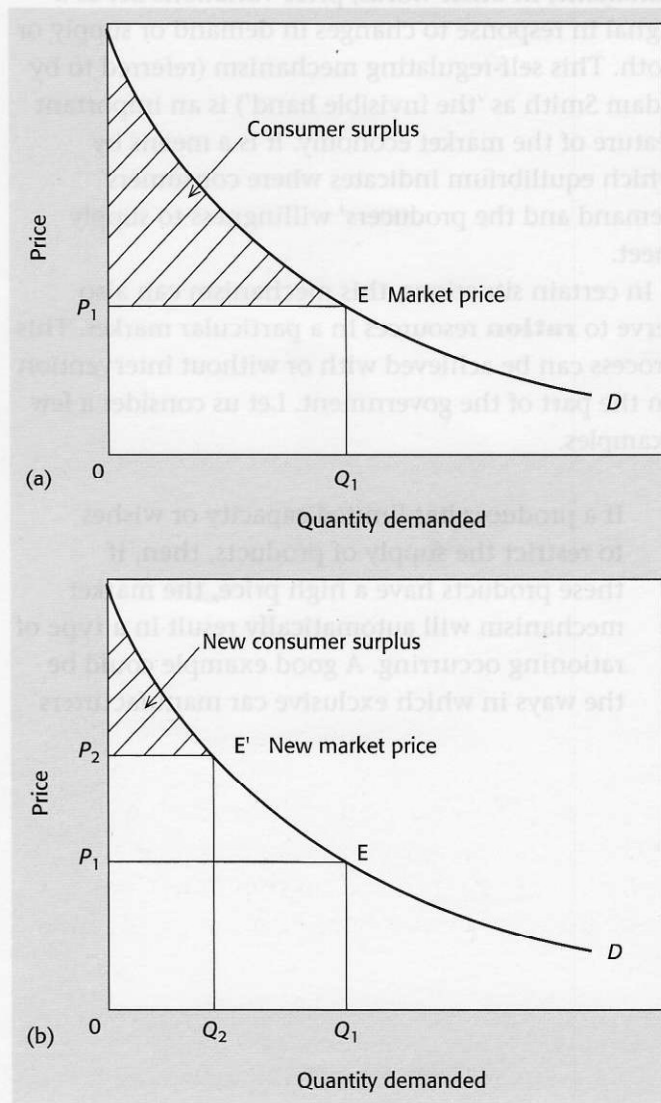


Figure 2.19 Consumer surplus

If the market price changes, then so does consumer surplus. For example, if the price increases, then consumer surplus is reduced as some consumers are unwilling to pay the higher price. This reduction is shown in Figure 2.20 b. The loss of consumer surplus is shown by the area $P_1P_2E^1E$. On the other hand, a fall in the market price will lead to an increase in consumer surplus. This is because consumers who were previously willing to pay above the new market price now end up paying less.

Prices as a rationing and allocative mechanism

It should be clear from the last part of this section that prices play a very important part in the allocation of resources in markets. The workings of the price mechanism as described are in the main automatic; in other words, price variations act as a signal in response to changes in demand or supply or both. This self-regulating mechanism (referred to by Adam Smith as 'the invisible hand') is an important feature of the market economy. It is a means by which equilibrium indicates where consumers' demand and the producers' willingness to supply meet.

In certain situations, this mechanism can also serve to **ration** resources in a particular market. This process can be achieved with or without intervention on the part of the government. Let us consider a few examples.

- If a producer has limited capacity or wishes to restrict the supply of products, then, if these products have a high price, the market mechanism will automatically result in a type of rationing occurring. A good example could be the ways in which exclusive car manufacturers

or designer fashion companies charge very high prices for their products. Price therefore limits demand and in turn seeks to ensure that it is in line with the quantity that is supplied.

- Governments may also wish to use the price mechanism as a means of rationing. A good example could be the way in which some governments try to restrict sales of alcohol or tobacco products through imposing very high rates of taxation on their consumptions. Another example could be the use of minimum price legislation, in this case to ration demand in relation to supply. This is shown in Figure 2.21. To be effective, the minimum price must be above the equilibrium price as determined in a free market.
- At the minimum price producers are willing to supply more than consumers are willing to demand. There is therefore excess supply. The price mechanism used in this way rations demand. In all of these cases, the government is interfering with the workings of the price mechanism in order to meet some other particular objective.

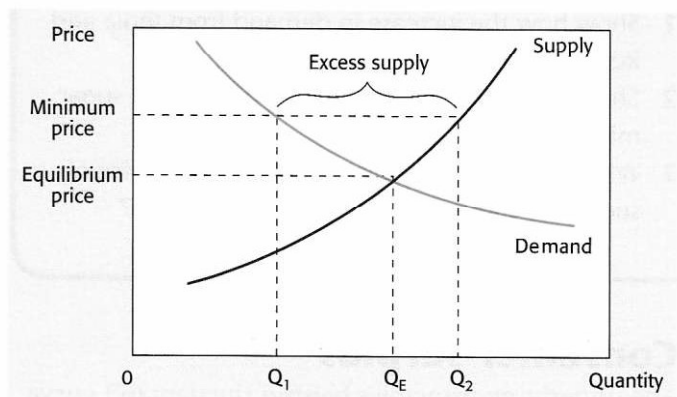


Figure 2.21 *The effects of a minimum price*





The feature below demonstrates how knowledge of demand, supply and the price mechanism can be applied in order to explain the global problem of rising food prices, particularly in the world's poorest economies in Africa and Asia. Read the feature and then answer the questions that follow.

Rising global food prices

In 2009, the World Bank reported that global food prices had almost doubled since 2005 and were forecast to continue to increase. The price of wheat especially had increased at an alarming rate of around 200% from 2008 to the end of 2009. The prices of maize (corn) and rice had also escalated.

In November 2009 the Indian government reported that annual food price inflation was over 21%, the price of pulses had risen by over 30% as had sugar prices. In Pakistan, food prices had also increased at a record rate amidst claims of hoarding by grain processors and retailers.

Normally, price changes for cereals can be attributed to short-term variations in supply caused by disruptive weather conditions. This was not so for the latest set of price increases which were caused largely due to demand side factors which included:

- the rising demand for meat in the booming economies of China and India; large quantities of grain are needed to feed chickens, pigs and cows, driving up prices
- a fall in domestic food production by increasingly affluent families in these countries.
- the increased demand for bio-fuels, especially in the USA and parts of Europe which has resulted in harvests being diverted from food processing to fuel processing factories, particularly for sugar cane and maize.

Supply side factors have exaggerated price increases and include:

- extreme weather conditions in 2008 and 2009, such as prolonged drought in parts of India, Australia and southern Africa and unexpected



frosts in parts of China, which had resulted in poor harvests; Europe's grain harvest was also affected by poor weather

- global stockpiles of grains were at a record low level, meaning that supplies could not be released onto the market to reduce price volatility.

In India, the problems of small farmers have been aggravated by the government's attempts to control prices. When domestic prices are rising, the government restricts export sales; when prices fall, farmers are paid subsidies. These actions seek to protect the interests of consumers and farmers alike. Because of uncertainty, many small sugar farmers abandoned sugar in 2008 when prices fell by 40%. In 2009 and early 2010, sugar prices surged. The obvious response would be for farmers to revert to sugar in the hope that high prices will persist.

Rising food prices have had a heavy impact on the poor in countries such as Bangladesh, India, Pakistan and those in sub-Saharan Africa. For people who have to live on less than \$1 a day the

rising price of food is devastating and can affect rural as well as urban communities. There have been riots in West Bengal in protest against subsidised food being sold on the informal market. In Senegal, Mauritania and in other parts of Africa, there have also been protests over rising food prices.

The World Bank has identified 36 countries where there are grave concerns over food security; 21 are in Africa, including Sierra Leone which lacks access to food from local markets due to its low level of income and the high prices of imported food.

- 1 Consider the factors that have contributed to rising food prices. Split these into demand factors and supply factors.
- 2 Using a demand and supply diagram, explain how the following factors have affected the market for food crops:
 - a the increased demand for crops for biofuel
 - b the increased consumption of meat in China and India.
- 3 The government of Sierra Leone has announced that it would start to produce its own rice, rather than rely on imports, from 2009. How might this affect the price of rice in Sierra Leone and on the global market?
- 4 Discuss whether rationing and an indirect tax on rice might produce a better allocation of resources in this market.

SPECIMEN EXAM QUESTIONS

The following questions have been set in recent CIE examination papers.

- 1
 - a Explain how an equilibrium price for a product is established in the market and how it may change. [8]
 - b Discuss whether a firm's revenue would increase in response to price and income changes if the price elasticity of demand for its product became highly elastic. [12]

[20 marks]

(October/November 2007)

The following question is taken from part of a recent OCR examination paper.

- 2 Air Passenger Duty (APD) is a flat rate indirect tax on passengers who fly from UK airports. It is collected by the airlines who add the tax onto ticket prices. At present, the tax is £5 for economy class passengers travelling on flights within the European Union.

The table below summarises the likely effects of increases in APD on a typical flight.

New tax rate	£10	£15	£25	£35
% change in ticket prices	7%	14%	28%	42%
% change in quantity demanded	-5%	-15%	-40%	-66%

- a Calculate the price elasticity of demand for each of the new tax rates.
- b Explain the meaning of each of the figures you have calculated.
- c Suppose the UK government wishes to reduce the demand for air travel for environmental reasons. Comment on how it might use the price elasticity of demand estimates to achieve this objective.

(June 2009)

SUMMARY

In this core section it has been shown that:

- A market exists whenever people come together for the trade or exchange of goods and services.
- The buying side of the market is referred to by economists as the demand side. It is possible to derive a demand curve for any market – this shows how the quantity demanded varies with the price of a product.
- The demand curve shifts to the left or right when, 'other things being equal', the assumption is changed. Three important causes of this are a change in income, a change in consumer tastes or attitudes and a change in the price of related products.
- Price, income and cross elasticity of demand are relevant concepts that explain the extent of change in the quantity demanded and in demand respectively; they are all numerical measures that have substantial business relevance.
- It is possible to model the selling side of a market through a supply curve. This shows how the quantity supplied varies with the price of a product. The supply curve shifts when there are changes in the costs of supply, the characteristics of an industry and government policy.
- The price elasticity of supply is important in understanding how supply reacts to a change in the price of a product.
- Equilibrium occurs in the market where there is no tendency for change, when the plans of consumers match the plans of suppliers. A change to the equilibrium position will produce a new equilibrium price and quantity.
- Consumer surplus arises because some consumers are willing to pay more than the market price for a product.
- Prices are important in allocating and rationing resources in a market.

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On completion of this supplement section you should know:

- the law of diminishing marginal utility and its relationship to the derivation of an individual demand schedule and curve
- what a budget line is and how it can be used to show the income and substitution effects of a price change
- the short run production function: fixed and variable factors of production and the law of diminishing returns; the long run production function and returns to scale
- why the demand for labour is a derived demand, the factors that affect it and how a firm's demand for a factor of production such as labour can be explained using marginal revenue product theory
- what is meant by the supply of labour, the factors that affect it and the significance of net advantages
- how wages are determined in a free market, the role of trade unions and government in wage determination, wage differentials and economic rent
- the difference between the economist's and the accountant's definitions of costs, how various costs can be determined and how the shape of the short run average cost curve can be explained
- how to explain the shape of the long run average cost curve, the relationship between economies of scale and decreasing costs, internal and external economies of scale
- why firms grow and how small firms can survive
- how to explain the relationship between elasticity, marginal, average and total revenue for a downward-sloping demand curve
- the meaning of a firm and the industry
- the objectives of firms including the traditional one of profit maximisation
- what is meant by market structure and how this can be explained in terms of the number of buyers and sellers, the nature of the product, ease of entry and the nature of information
- the market structures of perfect competition, monopoly, monopolistic competition and oligopoly
- what is meant by contestability and the features of contestable markets
- how firms behave in terms of pricing and non-price policies
- how the performance of firms is assessed in terms of output, profits and efficiency; how the above market structures compare in these terms.

Utility and marginal utility

Economists have long been interested in the way that consumers behave. Aspects of demand theory were introduced earlier in the Core section of this chapter. Here we shall look behind the demand curve and explore why it really is the case that consumers buy more of a good when its price falls.

The starting point is the notion of **utility**. This idea dates back to the nineteenth century and is a term used to record the level of happiness or satisfaction that

someone receives from the consumption of a good. It is assumed that this satisfaction can be measured, in the same way that the actual units consumed can be calculated. Two important measures are:

- **total utility** – the overall satisfaction that is derived from the consumption of all units of a good over a given time period
- **marginal utility** – the additional utility derived from the consumption of one more unit of a particular good.



1 Table 2.13 shows the total utility gained from the consumption of lemonade in a week.

Quantity consumed (bottles)	Total utility
0	0
1	20
2	35
3	45
4	53
5	58
6	54
7	48

Table 2.13

- a Calculate the marginal utility.
 - b Sketch the total utility and marginal utility curves (put utility on the vertical axis, quantity consumed on the horizontal axis).
- 2 If the price of lemonade increases from \$1 to \$2 per bottle, how might it affect consumption? Explain your answer using the data above.



The marginal utility gained from the consumption of a product tends to fall as consumption increases. For example, if you buy an ice cream you will get a lot of satisfaction from consuming it, especially in hot weather. If you consume a second one, you will still get some satisfaction, but this is likely to be less than from the first ice cream. A third ice cream will yield even less satisfaction. This aspect of consumer behaviour is referred to as the law of **diminishing marginal utility**. As consumption increases, there may actually come a point where marginal utility is negative, indicating dissatisfaction or disutility.

In considering the consumer's equilibrium, it is necessary to remember that Economics assumes that consumers have limited incomes, behave in a rational manner and seek to maximise their total utility. A consumer is said to be in equilibrium, assuming a given level of income, when it is not possible to switch any expenditure from, say, product A to product B to

increase total utility. This is referred to as the **equimarginal principle** and can be represented:

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B} = \frac{MU_C}{P_C} \dots = \frac{MU_N}{P_N}$$

where MU = marginal utility

P = the price

A, B, C and N = individual products

It is possible to use marginal utility to derive an individual demand curve. The fundamental principle of demand is that an increase in the price of a good will lead to a reduction in its demand. Using the above principle, this can now be proved. The value of the expression $\frac{MU}{P_A}$ will now fall as the price

of A has increased. So, the marginal utility of A per \$ spent will now be less than on any other goods. The consumer will therefore increase total utility by spending less on good A and more on all other goods. This will in turn reduce the value of their marginal utility. In other words, the consumer only maximises total utility by buying less of good A. The conclusion is that the demand curve for a good is downward sloping.

Budget lines

As shown in Chapter 2 Core, all consumers are constrained in what they are able to buy because of their income and the prices of goods they wish to buy. These two important underpinning principles of consumer behaviour are brought together in the idea of a **budget line**. This shows numerically all the possible combinations of two products that a consumer can purchase with a given income and fixed prices.

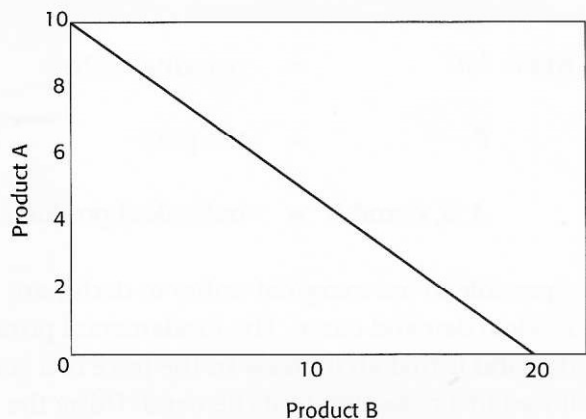
Suppose someone has \$200 to spend on two products, A and B. Assume the price of A is \$20 and the price of B is \$10. Table 2.14 shows the possible combinations that can be purchased. Each of the combinations would cost \$200 in total. Figure 2.22a shows the budget line for this situation. Any point along this line will produce an outcome where consumption is maximised for this level of income.

If there is a change in the price of one good, with income remaining unchanged, then the budget line will pivot. For example, if the price of product B falls, then more of this product can be purchased at all levels of income. The budget line will shift outwards, from its pivot at point A. This is shown in figure 2.22b. So, if the price of B falls by a third, then 30 of good B can now be purchased with an income of \$200.

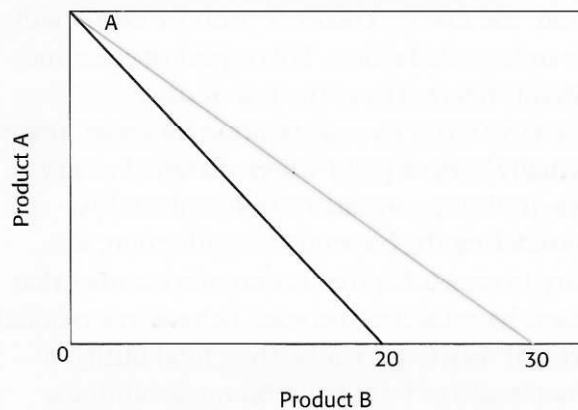
Quantity of A (\$20 each)	Quantity of B (\$10 each)
10	0
9	2
8	4
7	6
6	8
5	10
4	12
3	14
2	16
1	18
0	20

Table 2.14 Combinations of A and B with a budget of \$200

As the price of B has fallen relative to that of A, which is unchanged, consumers will substitute B for A. This is known as the **substitution effect** of a price change. It is always the case that the rational consumer will substitute towards the product which has become relatively cheaper. With the fall in the price of B, the consumer actually has more money to spend on other products, B included. Real income has therefore increased, which may mean that a consumer may now actually purchase more of product B. This is called the **income effect** of a price change.



(a) Budget lines for an income of \$200



(b) Budget lines – a fall in the price of B

Figure 2.22

SELF-ASSESSMENT TASK 2.27

- 1 Re-draw Figure 2.22a to show how it would change:
 - a if the price of B increased, leaving the price of A unchanged
 - b if the price of A decreased, leaving the price of B unchanged.
- 2 In your own words, describe the substitution and income effects of:
 - a an increase in the price of a normal good
 - b a decrease in the price of an inferior good.

Principles of production and the production function

Introduction

At the beginning of Chapter 1 we identified four factors of production. These were land, labour, capital and enterprise. In all cases, the demand for these factors of production comes from a producer who wishes to use them to make various goods or products. The producer is normally a firm or business whose demand for factors of production is derived from the needs of its operations. Let us take the case of a clothing manufacturer to elaborate this important point.

As a consequence of globalisation, many items of clothing are now produced in the developing economies of South East Asia, north Africa and central Europe. Designer labels, such as Nike, Reebok, Ellesse and Kappa, are no longer produced in the home country of their corporate producer. Producers in these countries need all of the factors of production in order to make their products for sale in markets which are mainly in developed economies. Their task is to combine the factors of production in an effective way to be efficient, competitive and profitable in the world market. The most important decision they have to make concerns the relative mixture of labour and capital. Therefore the task for the firm is to find the least cost or most efficient combination of labour and capital for the production of a given quantity of output.

Clothing is a typical example of a business where labour and capital are in direct competition with

each other. If labour costs are relatively cheap, as is the case in developing and emerging economies, then the production process is likely to take place using much more labour than capital. In most developed economies, though, the reverse is true. High-tech machines can often be used to replace labour, largely because it is more cost effective to do so. So, in this case, the same amount of output is produced using more capital and far less labour than if it were taking place in a developing economy.

Firms therefore have to choose between alternative production methods. Returning to the case of the clothing manufacturer, Figure 2.23 shows three different methods of production, each of which combines different levels of labour and capital to make items of clothing. Line A shows a method whereby labour and capital are used in equal proportions; line B shows a production method which uses twice as much capital as labour and line C shows the output resulting from twice as much labour as capital being used. On these lines, points X, Y and Z show the respective amounts of labour and capital that are needed to produce 100 units of clothing. If we join these points, then it gives us what is known as an isoquant, a curve which joins points which give us a particular level of output. This isoquant can of course be extended for other combinations of labour and capital not shown on Figure 2.23.

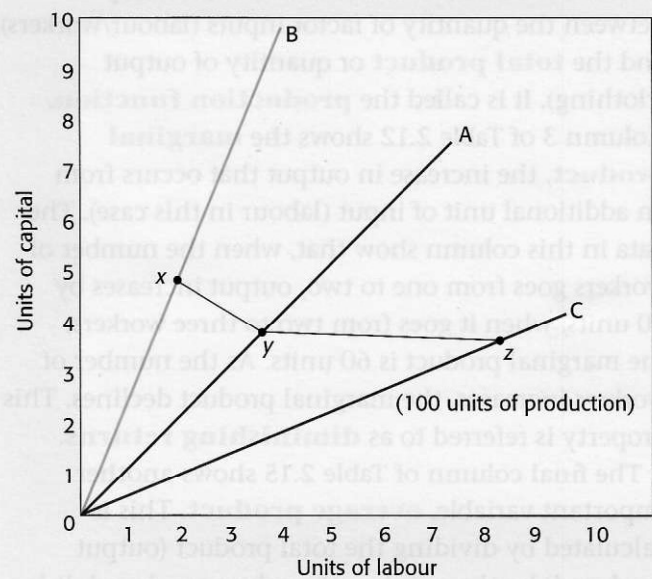
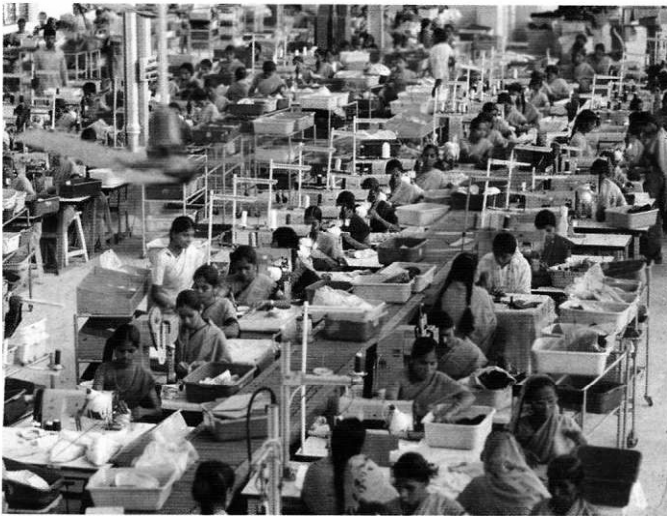


Figure 2.23 Alternative production methods



A clothing factory in India

The production function

To simplify our analysis, let us assume that the size of a clothing factory is fixed and that the only way in which the units of clothing produced can be varied is through varying the input of labour. This is referred to as the **short run**. Table 2.15 shows how the quantity of clothing produced depends on the number of workers employed. For example, if there are no workers in the factory, there is no output; with one worker, output is 100 units. When there are two workers, the total output is 180 units and so on.

Figure 2.24 is a graph of the first two columns of data in Table 2.15. It shows the relationship between the quantity of factor inputs (labour/workers) and the **total product** or quantity of output (clothing). It is called the **production function**. Column 3 of Table 2.12 shows the **marginal product**, the increase in output that occurs from an additional unit of input (labour in this case). The data in this column show that, when the number of workers goes from one to two, output increases by 80 units; when it goes from two to three workers, the marginal product is 60 units. As the number of workers increases, the marginal product declines. This property is referred to as **diminishing returns**.

The final column of Table 2.15 shows another important variable, **average product**. This is calculated by dividing the total product (output produced) by the number of workers employed. It is a simple measure of labour productivity, i.e. how much output is produced by each worker.

Number of workers	Output of clothing	Marginal product	Average product
0	0		0
1	100	100	100
2	180	80	90
3	240	60	80
4	280	20	70
5	295	15	59
6	306	11	51

Table 2.15 Production data

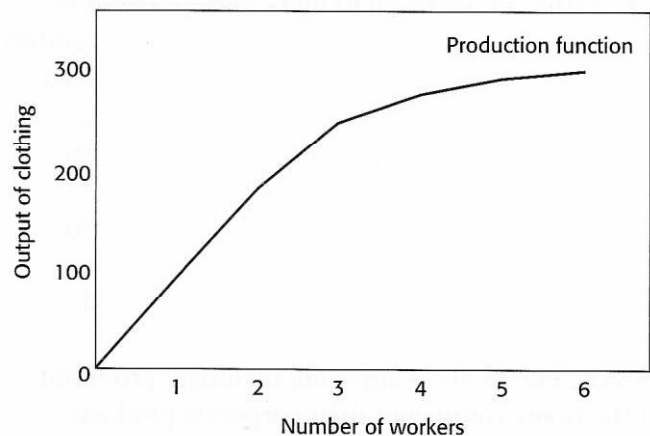


Figure 2.24 A production function

SELF-ASSESSMENT TASK 2.28

- Using data from Table 2.15, draw a graph with lines to show:
 - the marginal product of labour
 - the average product of labour.
- What do you notice about the shape of the two lines?
- What implications do these lines have for a clothing firm planning how much to produce?

From short run to long run

As stated above, the short run is a period of time in Economics when at least one of the factors of production is fixed. The factor that takes the longest to change is capital. The factor that tends to be easiest to change is labour as we have already seen. Students often ask the question, 'How long is the short run?' This is not an easy question to answer, as it tends to differ for different industries. In the clothing **industry** it is likely to be no more than a few weeks: the time that is taken to install new capital equipment and to get this operational to produce clothing. In other industries, it will be much longer. A country building a new hydro-electric power station will, for example, take much longer to plan, install and make such a new facility operational. Ten years may well be a realistic estimate in this case. This time is still referred to as the short run since capital is fixed over this time.

In the **long run**, all factors of production are variable. This therefore gives the firm much greater scope to vary the respective mix of its factor inputs so that it is producing at the most efficient level. So, if capital becomes relatively cheaper than labour, or if a new production process is invented and this increases productivity, firms can reorganise the way in which they produce. Firms must therefore know the cost of the factors of production they use and see this in relation to the marginal physical output which accrues. The right combination of factors can be arrived at as their price varies. Firms should aim to be in a position where:

$$\frac{\text{marginal product factor A}}{\text{price of factor A}} = \frac{\text{marginal product factor B}}{\text{price of factor B}} = \frac{\text{marginal product factor C}}{\text{price of factor C}}$$

and so on for all factors of production they use. For them to be able to do this all factors of production must be variable.

If we go back to the principles introduced in Figure 2.23, it is possible to derive the long run production function for a firm by initially constructing an isoquant map. This shows the different combinations of labour and capital that can be used to produce various level of output. This is shown in Figure 2.25.

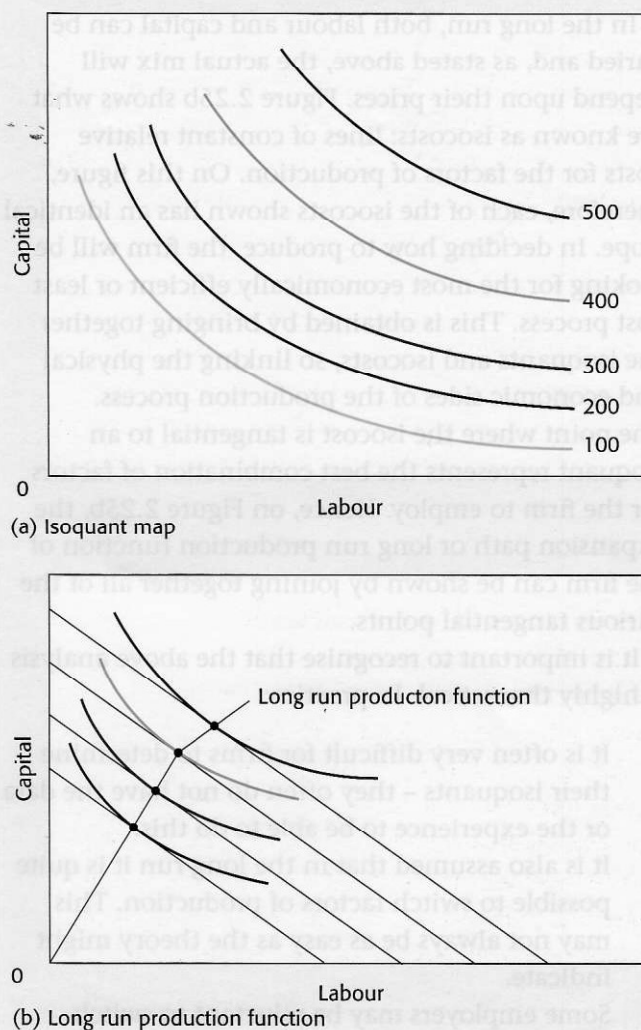


Figure 2.25 Isoquants and isocosts

Let us again assume that this is for a clothing manufacturer. Figure 2.25a consists of a collection of isoquants for output levels 100, 200, 300, 400 and 500 units of production. From this it is possible to read off the respective combinations of labour and capital that could produce these output levels. (Remember that this is only looking at output from a physical standpoint.)

If you look at the diagram carefully you will see that as production increases from 100 to 200, relatively less capital and labour is required per unit of output. This is referred to as **increasing returns**. As production expands further, increasing amounts of capital and labour are needed to produce 100 more units and so move up to the next isoquant. In contrast, this indicates **decreasing returns**.

In the long run, both labour and capital can be varied and, as stated above, the actual mix will depend upon their prices. Figure 2.25b shows what are known as isocosts: lines of constant relative costs for the factors of production. On this figure, therefore, each of the isocosts shown has an identical slope. In deciding how to produce, the firm will be looking for the most economically efficient or least cost process. This is obtained by bringing together the isoquants and isocosts, so linking the physical and economic sides of the production process. The point where the isocost is tangential to an isoquant represents the best combination of factors for the firm to employ. Hence, on Figure 2.25b, the expansion path or long run production function of the firm can be shown by joining together all of the various tangential points.

It is important to recognise that the above analysis is highly theoretical. In practice:

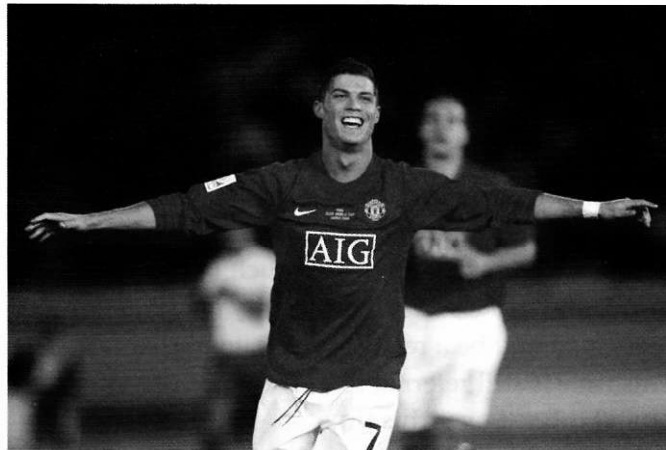
- It is often very difficult for firms to determine their isoquants – they often do not have the data or the experience to be able to do this.
- It is also assumed that in the long run it is quite possible to switch factors of production. This may not always be as easy as the theory might indicate.
- Some employers may be reluctant to switch labour and capital – they may feel that they have a social obligation to their workforce and will therefore not alter their production plans with a change in relative factor prices.

The labour market

Introduction

When you leave school or college (hopefully with a CIE Advanced Level in Economics), the wage or salary you get paid will be determined largely by what type of job you take. If you get a post as a clerk, you are likely to get more pay than if you are a street cleaner. Equally, if you go on to become a teacher, you will get paid more than a clerk. In turn, the manager of a multinational company will get paid more than a teacher. So, why is it that some workers get paid more than others? Why is it that some people with exceptional sporting talent, for example Cristiano Ronaldo, Tiger Woods or Amitabh Bachchan, are

so highly paid? The answer to these questions, like many such questions in Economics, is that it all depends on supply and demand. To understand why some people get paid more than others, economists have looked at the labour market and sought to put forward various principles based on the characteristics of this market.



Why are some sports personalities so highly paid?

Demand for labour

Many of the principles introduced in the Core section of this chapter can be applied to the labour market. However, there is one fundamentally different point: the demand for labour is a **derived demand**. By this, we mean that the firm's demand for labour is due to its decision to produce certain goods or services. Labour is therefore demanded not for its own sake but because it is essential for the production of goods or services. If we go back to our earlier examples, clerks are employed because they are necessary for a firm to carry out its business. The streets need cleaning, therefore street cleaners are employed. Children need education so teachers are required. This may seem obvious but it does underpin the whole basis of labour economics. A small number of film stars, rock idols and sports personalities have exceptional talents – the demand for their services is very high indeed and they can command a high fee for their services.

The analysis that follows is based upon two important assumptions:

- The firm wishing to hire labour is operating in a competitive market. There are many buyers and

sellers of labour, and no single firm or worker can affect the wage that is paid.

- The firm is a profit-maximiser. Its demand and supply of labour are based on it maximising the difference between total revenue and total costs.

The marginal revenue product of labour

So far in our analysis of the demand for labour we have only been concerned with physical inputs and outputs. This is somewhat unrealistic because, in reality, the profit-maximising firm is concerned with how much this output is worth to the firm. We must therefore take into account the cost of employing labour – the wage rate. Let us assume that this is \$600 per month and, using data from Table 2.15, let us assume that a unit of clothing sells for \$10.

When the firm hires the first worker, this worker generates \$1000 of revenue for the firm; this in turn represents \$400 of profit. The amount of revenue generated by an additional worker is referred to as the **marginal revenue product** of labour. Adding a further worker generates another \$800 and \$200 profit. There comes a point when, after the third worker has been employed, a further worker adds more to costs than to revenue (it still costs \$600 to employ the worker but only \$400 worth of clothing is produced). So, above this level of employment, the value of the marginal product that is being produced is less than the wage. This clearly makes no sense to the firm. It can therefore be deduced that the firm should hire workers up to the point where the value of the marginal product of labour equals the wage that is being paid. The demand curve for labour can therefore be represented by the value of the marginal product curve. This is shown in Figure 2.26. So, in general terms:

- a firm should continue to hire labour as long as the additional worker adds more to revenue than he or she adds to the firm's costs
- the market wage is determined by the marginal revenue product of labour
- the marginal revenue product curve for labour is the firm's demand curve for labour
- if the wage rate rises or falls, then fewer or more workers will be employed.

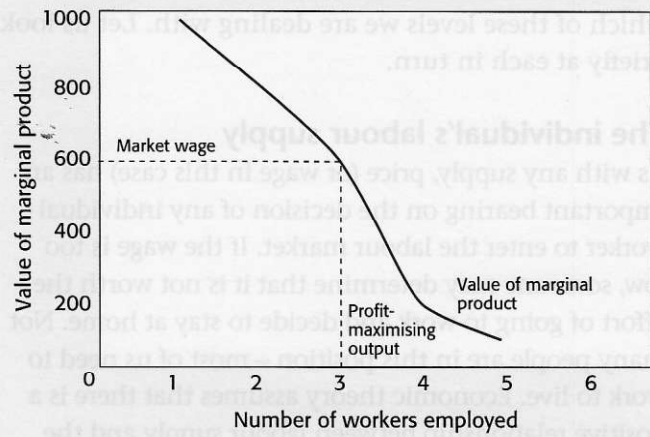


Figure 2.26 The value of the marginal product of labour

It follows from this analysis that the wages paid to workers are a direct reflection of their marginal revenue product. So, a street cleaner has a lower marginal revenue product than a clerk, who in turn has a lower marginal revenue product than a teacher and so on. It also follows that it is actually possible to measure marginal revenue productivity. This is a very big assumption to make. In a manufacturing firm it may be possible to do this, but in many occupations this is not possible. How, for example, can we measure the marginal revenue of a teacher? The answer is 'with great difficulty'. We therefore need to look at the other side of the labour market, that involving the supply of labour, to give a proper explanation of how wages are actually determined.

Supply of labour

The labour supply or supply of labour refers to the total number of hours that labour is able and willing to supply at a particular wage rate. The general principles of supply introduced in the Core section of this chapter apply here. However, it is important to remember that in this case we are talking about people and their willingness to participate (or otherwise) in the labour market depending upon the rate or price that they are offered for their services. It is useful to consider labour supply at three levels: that of the individual worker, that of a firm or industry and that of the economy as a whole. Different factors affect supply depending upon

which of these levels we are dealing with. Let us look briefly at each in turn.

The individual's labour supply

As with any supply, price (or wage in this case) has an important bearing on the decision of any individual worker to enter the labour market. If the wage is too low, someone may determine that it is not worth the effort of going to work and decide to stay at home. Not many people are in this position – most of us need to work to live. Economic theory assumes that there is a positive relationship between labour supply and the wage rate. So, as the wage rate increases, more people are willing to offer their services to employers. This is shown diagrammatically by the labour supply curve, which mainly slopes upwards (as shown in Figure 2.27). Beyond a certain point, though, individuals will take the view that they prefer leisure to work. This point is indicated by the backward-sloping curve from point X. Before this point, an individual worker is more willing to supply his or her labour as the wage rate increases. It must be stressed that this point depends on the individual's attitude to work and leisure – point X on any individual's supply curve will vary.

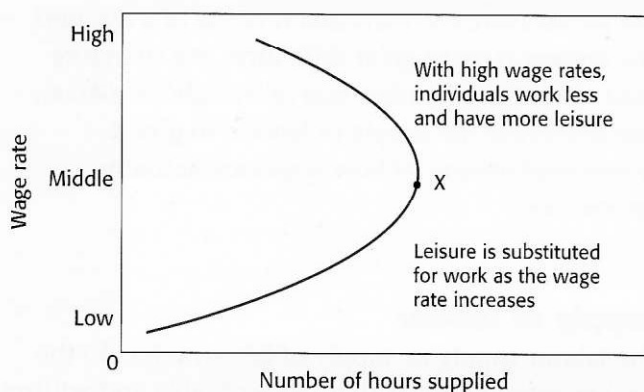


Figure 2.27 An individual's labour supply curve

A further factor that can affect an individual's supply of labour is the income tax rate. In all countries this tends to be progressive. Low-wage workers pay little or no tax. As wages rise, more of the increase is paid in tax to the government. In the UK, for example, the standard rate of income tax in 2009 was 20%, with a maximum rate of 50% for high-income earners. In many other countries this higher rate is above 50%.

The downside could be that a high tax rate stifles the incentive to work. Governments must therefore be very careful to not do this as it will adversely affect economic prospects if key workers are not encouraged to work because of the high tax rates.

Labour supply to a firm or industry

This supply curve consists of the sum of the individual supply curves of all workers employed in a firm or industry. It is usually upward sloping throughout (see Figure 2.28). As happens with an individual worker, the number of workers wanting to supply their labour increases with the wage rate that is offered. The slope of this supply curve is measured by the elasticity of supply of labour – the extent to which labour supply responds to a change in the wage rate. Figure 2.28 shows two different supply curves, one inelastic (L_1) and the other elastic with respect to the wages being paid.

There are various reasons for this difference. An obvious one is the skills required to carry out a particular occupation. In general, the more skills required, the more inelastic will be the supply of labour. This also applies to the amount of education and training that is required to carry out a particular job. Anyone who teaches has to spend at least four years acquiring the necessary qualifications. Supply to such an occupation will be more inelastic than to, say, road sweeping, where no skills and little or no education and training are needed.

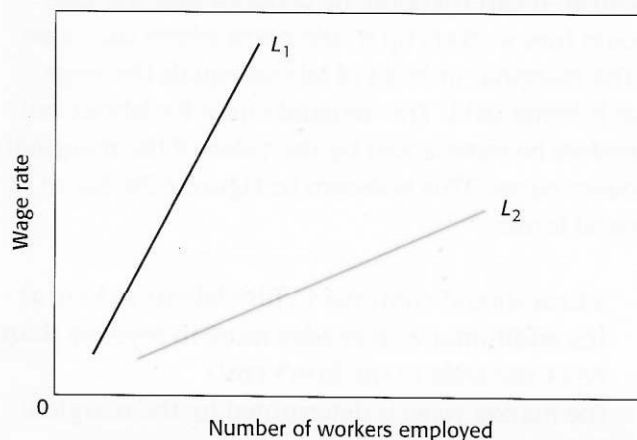


Figure 2.28 The supply curve of labour to a firm or industry

The supply curve L_2 in Figure 2.28 is therefore likely to be that for an industry where wages are low

and where there is a plentiful supply of labour with no particular skills or training.

In a competitive labour market, the wage rates offered in all other industries or occupations will be important in determining the supply of labour to a particular industry. In developing economies, an obvious example could be the difference in wages in agriculture compared with wages in emerging manufacturing industries or food-processing industries which usually pay more to their workers.

The long run supply of labour

This is of particular significance to the economy as a whole. There are important contrasts here between developed and developing economies, involving wider economic factors including the following:

- **The size of the population** In some developed economies, the total population is relatively stable; in others it is increasing at a modest rate mainly due to increasing immigration. In contrast, the population of Italy is actually declining quite markedly. With life expectancy increasing, there are relatively fewer people of working age. In contrast, in most developing economies, there is an increase in the overall supply of labour from within as increasing numbers of young people join the labour market. This means the long run supply curve for labour shifts to the right, indicating that more workers are willing to supply their labour at a given wage rate.
- **The labour participation rate** This term is used to determine the proportion of the population of working age actually in employment. In many developed economies, workers often choose to leave the labour market, by taking 'early retirement', before the normal age for retirement, so reducing the labour participation rate. At the lower end of the age range, with more students electing for higher education, the labour participation rate is also falling slightly. The combined effect of these has been for a slight reduction in the labour participation rate, so shifting the long run labour supply curve to the left.
- **The tax and benefits levels** As we saw in Figure 2.27 for the individual, there comes a point where the work-leisure trade-off affects labour supply. This also affects the supply of labour for the economy as a whole, particularly in developed economies. Governments therefore have to be very careful in their taxation and social security policies to ensure that the long run supply of labour is not adversely affected through a reduction in the willingness of people to work. In the UK, as previously stated, the top rate of income tax is now 50% – 20 years ago it was much more progressive, with marginal tax rates as high as 80% of the increase in income for the highest paid. In such circumstances, there is clearly a huge disincentive for someone to stay in the labour market. The level of unemployment and social security payments can also affect the long run supply of labour in a similar way. Through their supply-side policies therefore governments seek to provide incentives for certain types of labour to remain active in the labour market (see Chapter 7).
- **Immigration and emigration** These affect the long run supply of labour in an economy. Where there are labour shortages, as was the case in the UK during the late 1950s and early 1960s, immigrants moved from Commonwealth countries, often to work in relatively low pay industries and the public services. This increased the supply of labour. Emigration from these countries in turn relieved pressures in their labour markets. In the past, the UK has faced labour shortages in nursing, teaching and 'high-tech' industries as well as in other skilled manual occupations. Since 2004, the geographical enlargement of the EU has seen a huge influx of migrant workers from the new member states in Central and Eastern Europe.

The above factors determine the long run supply of labour. Shifts to the left and to the right in the long-run supply of labour are shown in Figure 2.29.

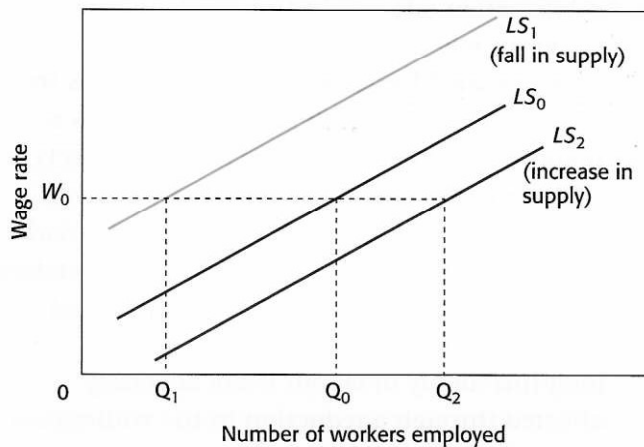


Figure 2.29 Shifts in the long run supply of labour

In the long run, the supply of labour to a particular firm, as distinct from the economy, is influenced

by the **net advantages** of a job. These include **pecuniary advantages** and **non-pecuniary advantages**.

A pecuniary advantage includes things such as the weekly wage or monthly salary, any bonus payments, the opportunity to work paid overtime and pension prospects. Non-pecuniary advantages are numerous and cover an almost endless list of factors that have to be taken into account by a person considering whether to remain in a job, change jobs or even to change occupations. These include the hours of work, job security, holiday entitlement, promotion prospects, location of the workplace and whether the job is pleasant or satisfying. For many workers, these non-pecuniary advantages rather than pecuniary advantages often have a major bearing on their choice of occupation.

SELF-ASSESSMENT TASK 2.29

Read the feature below and then answer the questions that follow.

Polish migrant workers leave Britain in droves

When Poland and seven other Central and Eastern European countries joined the EU in May 2004, the UK experienced one of the largest single waves of immigration the country had ever seen. This was mainly because the UK, unlike other member states, gave free access to the citizens of these eight countries.

By 2008, there were well over 1m new migrant workers registered for work or who were self-employed in the UK. Around 700 000 were from Poland, the largest of the new member states. Their motives for coming to the UK were economic and included high unemployment in Poland, low wages at less than one quarter of the UK average, and an opportunity to send money back home to their struggling families.

Around 80% of the Polish migrants were less than 34 years old. Many went to London and to the Anglia region where there was a desperate shortage of agricultural labour. Unlike former



Commonwealth migrants, Polish workers went to almost every corner of the country in search of work. They continue to play an important part in the manufacturing, construction, hospitality and catering industries as well as in agriculture. Polish-owned businesses, restaurants and shops have also become a common sight.

As recession looms over Britain, Polish workers are leaving the country and going home in droves. Some of those leaving have become unemployed; others have become disillusioned by the high cost of living in the UK and the effects of the depreciation of the Polish zloty. They have also

been attracted by the better state of the Polish economy and the consequent opportunity to work for a more realistic wage in their home country.

Source: Blume, C., VOA News, 31 March 2009 (adapted)

- 1 Use a diagram to explain the effects on the UK labour market of:
 - a the influx of migrant workers
 - b the return of Polish workers following the downturn in the UK economy.

- 2 Discuss the costs and benefits for
 - a the UK economy
 - b the Polish economy
 of labour migration on the scale reported above.

Wage determination under free market forces

So far, we have established two important features of the workings of the labour market. These are:

- the wage paid to labour equals the value of the marginal product of labour
- the willingness of labour to supply their services to the labour market is dependent upon the wage rate that is being offered.

In some respects, it might seem surprising that the wage can do both of these things at the same time. However, it is all tied up with how wages are actually determined in a competitive labour market.

The price of labour, the wage, is no different from any other price in so far as it depends on demand and supply. Figure 2.30 shows how the wage and quantity of labour adjust to balance demand and supply. As the demand curve reflects the value of the marginal product of labour, in equilibrium workers receive the value of their contribution to the production of goods and services. Each firm therefore purchases labour until the value of the marginal product equals the wage. Therefore, the wage paid in the market must equal the value of the marginal product of labour once it has brought demand and supply into equilibrium. The market therefore clears at the equilibrium wage.

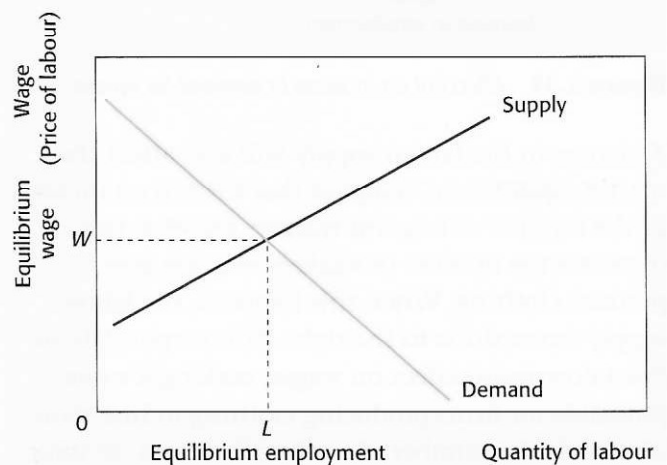


Figure 2.30 Equilibrium in the labour market

However, the labour market is dynamic, like any market – any change in the demand or the supply of labour will change the equilibrium wage. The value of the marginal product of labour will also change by the same amount, as, by definition, it must always equal the wage rate.

Let us now analyse how a change in the demand for labour and a change in the supply of labour affect the market equilibrium.

If we go back to the earlier example of clothing, we can see that an increase in the income of consumers in developed economies will shift the demand curve for clothing to the right, indicating that more will be demanded at any price. In turn, this affects the demand for labour producing the

clothing – this is shown in Figure 2.31 by a shift to the right of the labour demand curve. The outcome is that the equilibrium wage rises from W_1 to W_2 , and employment increases from L_1 to L_2 . As before, the change in the wage rate reflects a change in the value of the marginal physical product of labour.

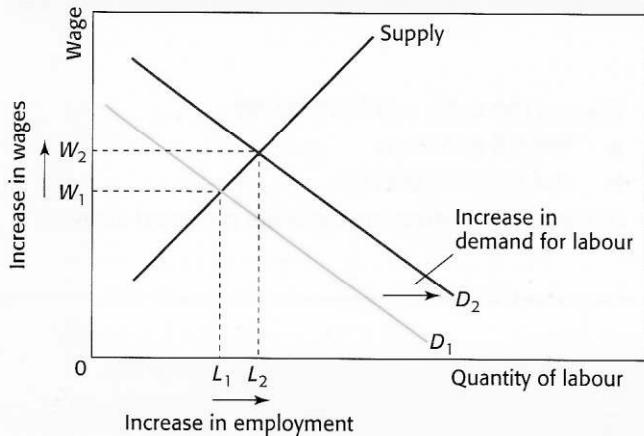


Figure 2.31 Effects of an increase in demand for labour

A change in the labour supply will also affect the market equilibrium. Suppose that there is an increase in the number of migrant workers and that this increases the number of workers who are able to produce clothing. When this happens, the labour supply curve shifts to the right. This surplus labour has a downward effect on wages, making it more profitable for firms producing clothing to hire more labour. As the number of workers increases, so their marginal physical product falls, as does the value of their marginal revenue product. The outcome in this case is that wages are reduced for all workers,

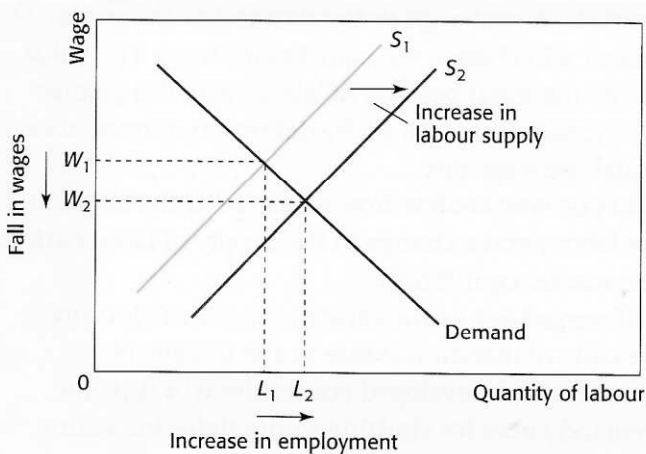


Figure 2.32 Effects of an increase in the supply of labour

although the level of employment rises. This is shown in Figure 2.32.

The role of trade unions and government in wage determination

So far in our analysis of how wages are determined we have assumed that the respective forces of demand and supply operate freely with no intervention. In many respects this is an unreal assumption as in many labour markets, the demand and supply of labour are affected by the actions of trade unions and the government. Such interventions produce what are sometimes referred to as imperfections in the labour market.



Trade union members protesting over job cuts

Trade unions are organisations that seek to represent labour in their place of work. They were set up and continue to exist because individuals (labour) have very little power to influence conditions of employment, including wages. Through **collective bargaining** with employers, they act on behalf of their members to:

- increase the wages of their members
- improve working conditions
- maintain pay differentials between skilled and unskilled workers
- fight job losses
- provide a safe working environment
- secure additional working benefits
- prevent unfair dismissals.

Traditionally, trade unions have been strong in manufacturing and less important in the service

sector, transport excepted. As the structure of the UK economy has changed, so total membership has fallen to just 6 million workers in 2009, less than one in three of the working population. Many of these trade union members are employed in the public sector. Consequently, the power of the trade union movement is not as strong as it was when membership was over 10 million in 1985.

Economic analysis suggests that, in a competitive labour market, a powerful trade union is able to secure wages for its members above the equilibrium wage rate explained in Figure 2.30 (page 81). The basis for this claim is shown in Figure 2.33. At the equilibrium wage, the quantity of labour employed is L . If a strong trade union can force up wages to say W_u , which is above the equilibrium, the number of workers who are offered jobs by employers falls to L_u . At this wage though the number of people who would like to work is higher. This is shown by L_c . Consequently, there is a shortfall between those who want to work and those who can actually work, due to the influence of the trade union. This is shown in Figure 2.33 as the difference between L_c and L_u .

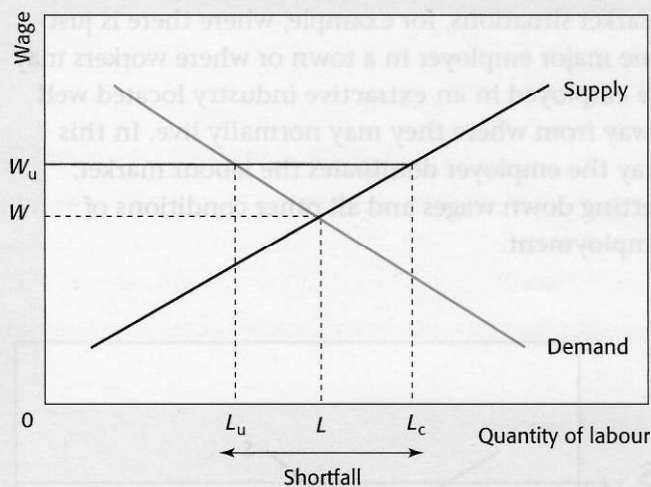


Figure 2.33 *The effect of a strong trade union in a competitive labour market*

In practice, it is really quite difficult to prove whether or not this theory actually applies in labour markets. A much quoted example is that of actors and actresses in the UK and USA where there are very strong unions which restrict the numbers able to work in films, television and theatres. The wages of their members are supposedly supported in this way. Other examples are likely to be in labour

markets where a trade union has a monopoly over workers with a particular type of skill. Increasingly though the **closed-shop** policies of trade unions such as the above have been made illegal, so restricting their powers to act in this way. The case of the print unions in the UK was another example. However, new technology has removed their power to secure exceptionally high wages for their workers.

As globalisation increases, trade unions who try to behave in this way are playing a dangerous game with employers. The fear is that because of high labour costs and restrictive practices employers will go out of business or transfer production to countries where wage levels are lower. This threat has been particularly severe for UK car manufacturers – production has been switched to other EU countries, such as Spain and Poland, where labour costs can be as little as one-fifth of those in the UK. Consequently, trade unions have very little real influence over the wages paid to their members.

The labour market has seen explicit government intervention through the introduction of national minimum wages. In the UK, after considerable deliberation, the government's Low Pay Commission recommended a national minimum wage from early 1999 for all workers above the age of 21. The main aim of a minimum wage such as this is to reduce poverty and the exploitation of workers who have little or no bargaining power with their employers. In the UK, many women employed in shops, small businesses and low-skill jobs, such as home working and cleaning, were being paid very low wages and, in the eyes of the government, were being exploited. The introduction of the minimum wage was of particular significance for them.

Whether there should be a minimum wage is controversial. Some of the aims are given above. Additionally, it was argued that the amount of state benefits being paid to low-income families would be reduced with the introduction of a minimum wage. There might also be a small increase in tax revenue. Opponents were not convinced by these arguments, believing that jobs would be lost and that other low-paid workers would seek an increase to maintain their differential with the lowest paid. Cost-push inflation could well result, so affecting the economy as a whole.

The economics of a minimum wage are shown in Figure 2.34. The effect on an industry is particularly dependent upon the elasticities of demand and supply for labour in that industry. Figure 2.34a shows the effects where there is an inelastic demand for labour. The loss of jobs here is much less than shown in Figure 2.34b where the demand for labour is more wage elastic. In both cases there is an excess supply of labour at the higher minimum wage. This excess is more pronounced in (b) where both the demand for and supply of labour are relatively elastic. It can also be seen that the higher the minimum wage is set above the competitive equilibrium (\$2.50 in the case of Figure 2.34), the greater will be the excess supply of labour willing to work at the national minimum wage.

Monopsony in the labour market

A **monopsony** occurs in the labour market when there is a single or dominant buyer of labour. In this situation the monopoly buyer is able to determine the price which is paid for the services of the workers that are employed. Unlike other examples we have looked at, in this situation we are now dealing with an imperfect rather than competitive market.

Figure 2.35 shows how the monopsonist can affect the market equilibrium. The monopsonist will hire workers by equating the marginal cost paid to employ a worker with the marginal revenue product gained from this employment. This is the profit-maximising position. The wage that the monopsonist pays to hire

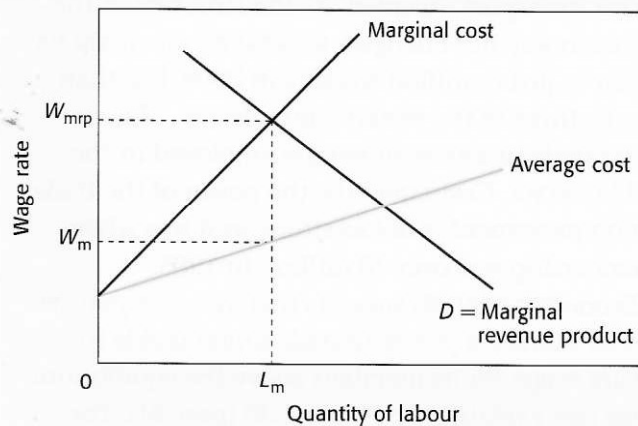


Figure 2.35 A monopsony buyer of labour

labour is W_m . This is actually below the wage that should be paid if they were paying the full value of their marginal revenue product, that is W_{mrp} . The level of employment is L_m .

In this situation the power of the employer in the labour market is of over-riding importance and the employer can set a low wage because of this buying power. Monopsonists often exist in local labour market situations, for example, where there is just one major employer in a town or where workers may be employed in an extractive industry located well away from where they may normally live. In this way the employer dominates the labour market, setting down wages and all other conditions of employment.

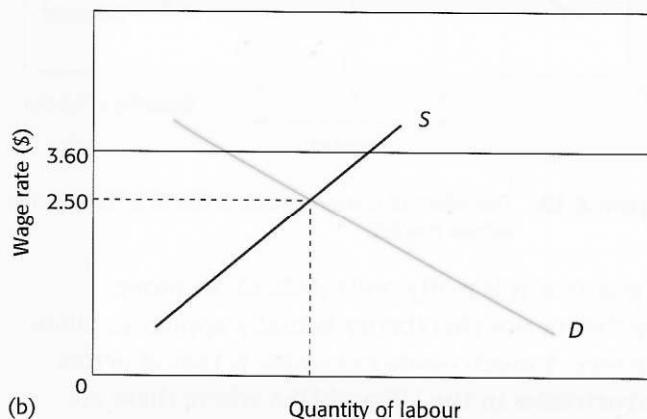
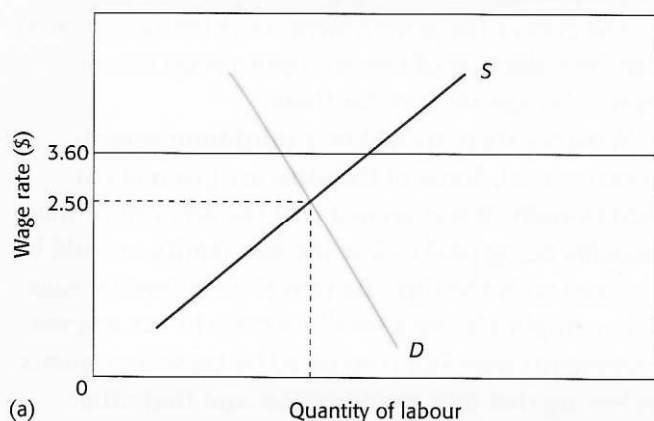


Figure 2.34 The effects of the introduction of a minimum wage

Transfer earnings and economic rent in the labour market

In our introduction to the labour market we posed the question:

Why is it that some people with exceptional sporting talent, for example Cristiano Ronaldo, Tiger Woods or Amitabh Bachchan, are so highly paid?

The answer to this question can in part be given in the same way as to that as to why a teacher is paid more than a street cleaner – supply and demand. In order to answer why these differences in earnings occur, economists find it useful to split earnings into two elements:

- 1 **Transfer earnings** This is the minimum payment necessary to keep labour in its present use.
- 2 **Economic rent** Any payment to labour which is over and above transfer earnings.

Both are shown in Figure 2.36 a. Transfer earnings are indicated by the area under the labour supply curve. As we have seen, this is upward sloping. Although the equilibrium wage is W , at wage rates below this there are workers who are willing to offer their services to employers. In fact, at any wage rate from zero upwards, workers will join the labour market, until at wage W , L (labour supply) is available. In all cases up to W , the wage that a worker receives is their best alternative. For those workers willing to work for less than W , then any wages they get over and above what they will accept is their economic rent. This is shown by the triangular area in Figure 2.36a.

It follows, therefore, that different workers receive different amounts of transfer earnings and economic rent even in the same job. Take a bus driver as an example. Some people are very willing to drive buses for a low wage. These have low transfer earnings and large economic rent. Others though will be attracted just by the equilibrium wage paid to bus drivers. In such cases they have little or no economic rent, the wage almost entirely consisting of transfer payments.

The case of superstars can be explained using Figure 2.36b. Such people have a scarce and, in some respects, unique talent. Their labour supply curve

is completely inelastic and their earnings consist entirely of economic rent. In contrast, workers who have a completely elastic supply, such as many unskilled workers and others in menial jobs, have no economic rent at all as their earnings consist entirely of transfer earnings. Employers can hire an infinite supply of labour at the market wage, W . This situation is shown in of Figure 2.36c.

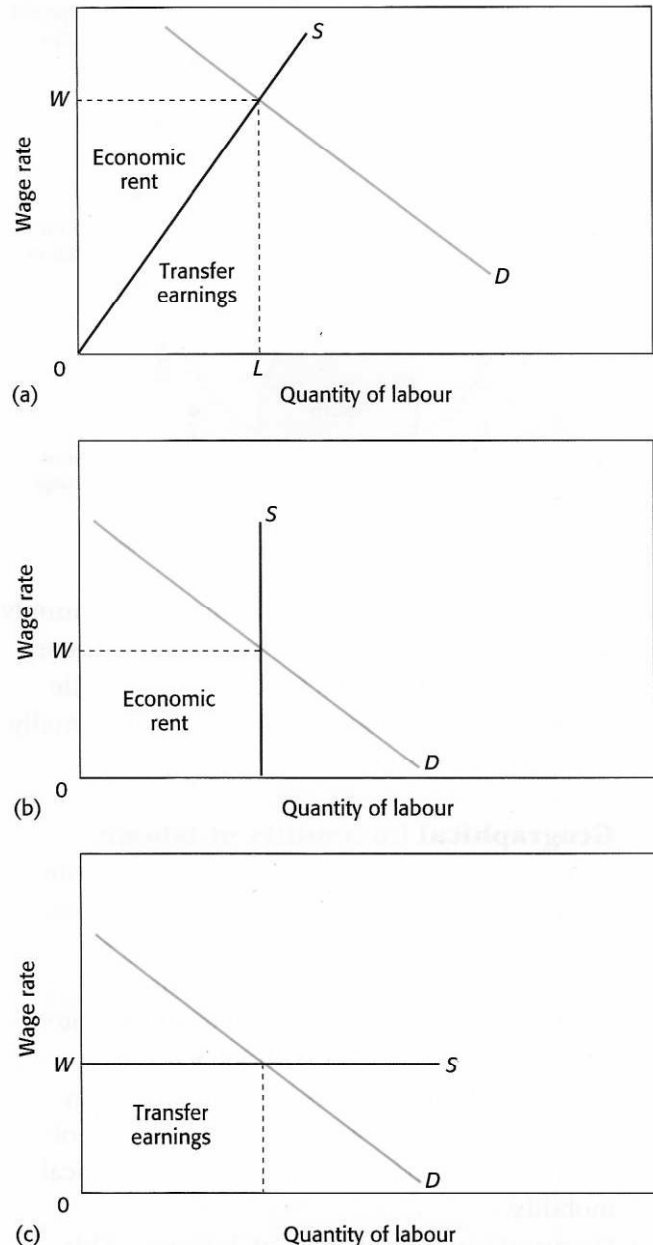


Figure 2.36 *Transfer earnings and economic rent in the labour market*

Other labour market imperfections

The basis of a competitive labour market is that workers are free to move in relation to demand. So, if there are vacancies in one geographical area or in one occupation, unemployed labour will be mobile and fill these vacancies. The **mobility of labour** is shown in Figure 2.37 where, in theory, labour will migrate to the South from the North in order to meet the former's demand for labour.

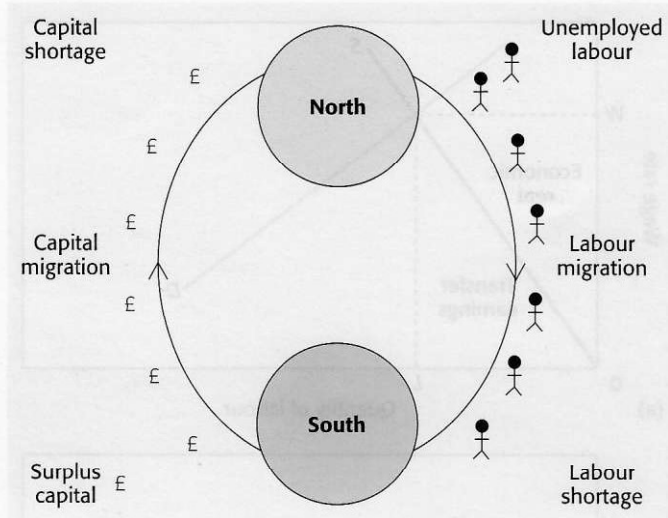


Figure 2.37 Factor mobility in a competitive market

The reality of the labour market is that this seemingly simple operation does not occur as economic theory might expect. In reality, much labour is immobile and not able to flow geographically or occupationally for the following reasons:

- **Geographical immobility of labour**
Many people are reluctant to move away from friends and relatives and their local area even when unemployed. The cost of moving, in financial and personal terms, may also be prohibitive. In capital cities, for example, the cost of housing in areas with job vacancies usually prohibits workers from moving from the lower-cost areas where they live. A lack of information also tends to restrict geographical mobility.
- **Occupational mobility of labour** This refers to a situation where labour is restricted in the type of job that can be taken up. For example, although a street cleaner cannot fill a vacancy for a teacher, a teacher is able to clean streets. This issue becomes much more difficult

in specialist occupations where extensive training is needed to complete a particular job. A good example is that of dentists, who have to study for a minimum of five years in order to be able to practise. An unemployed worker could clearly not take on such a position.

Another particular issue in labour markets is that of **wage differentials**, in other words the differences in wage rates for different groups of workers. The following differentials can be recognised:

- **Between different occupations**
Non-manual jobs tend to pay more than manual posts, due to the high levels of skill that are required. The greater the skill, the higher the marginal revenue productivity of labour.
- **Between different industries** Industries with a strong trade union, as shown earlier, are likely to pay more than those with a weak trade union. Capital-intensive industries usually pay more than labour-intensive industries as worker productivity is likely to be higher. Industries where there are risks, such as the chemical industry, are likely to pay higher wages than many other types of manufacturing.
- **Between males and females** In all countries the average pay for women is below that for men. This is partly due to many women working part time and not full time, but it is also due to many more women being employed in occupations such as nursing and secretarial work, where pay levels are often very low.

SELF-ASSESSMENT TASK 2.30

Think about the labour market in your country.

- 1 What information might you obtain to determine whether labour is mobile, both geographically and occupationally?
- 2 What policies does your government use to improve labour mobility?
- 3 Explain the main wage differentials that apply. What information might you obtain in order to provide evidence for these differentials?

- **Between regions in the same country**
This is certainly true in the UK where the average pay of workers in peripheral regions, such as Scotland and the north of England, is less than in one of the main cities, such as London or Bristol.

Theory of the firm

The firm's costs of production

The remainder of this chapter will concentrate on the **firm**. Although we have already referred to the firm we have not as yet defined it. The term 'a firm' is used by economists to describe a unit of decision making which has particular objectives such as **profit maximisation**, the avoidance of risk-taking and achieving its own long-term growth. At its lowest level the firm may be a sole trader with a small factory or a corner shop. The term is also used for national or multinational corporations with many plants and business establishments. In economic theory all firms are headed by an entrepreneur (see Chapter 1).

An entrepreneur must consider all the costs of the factors of production involved in the final output. These are the private costs directly incurred by the owners. Production may create costs for other people but these are not necessarily taken into account by the firm (see Chapter 3). The firm is simply the economic organisation that transforms factor inputs into goods and services for the market.

An accountant's view of a firm's costs is that they are incurred when the firm makes a recognised expenditure. They are production expenses paid out at a particular time and price. **Profits** are what is left when the expenses are deducted from the firm's income or sales revenue.

The economist's view of costs is wider than this. The accounting view does not fully recognise the private cost of economic activity. As well as money paid out to factors, there must be an allowance for anything owned by the entrepreneur and used in the production process. This factor cost must be estimated and included with the other costs. In addition, the concept of opportunity cost is relevant. As we saw in Chapter 1, opportunity cost involves the sacrifice of the next best alternative and is the value of what has been given up. The

entrepreneur may have capital that could have been used elsewhere at no risk and would have earned an income. The entrepreneur will expect a minimum level of profit, reflecting what his or her capital and labour would have earned elsewhere. This is the concept of **normal profit**. Economists regard this element of the entrepreneur's reward as a cost of production, because without it there would be nothing produced by the firm. Profit, to an economist, is:

Total revenue (unit price multiplied by number of units sold) minus total cost (including normal profit).

If this is positive, then it is **abnormal profit**. The prospect of making abnormal profit motivates the entrepreneur to take the business risks in supplying goods and services to the market. In order to understand cost structures in business, economists split costs into different categories and use specific cost concepts.

Short run costs

- **Fixed costs** These are the costs that are completely independent of output. Total fixed cost data when drawn on a graph would appear as a horizontal straight line. At zero output, any costs that a firm has must be fixed. Some firms operate in a situation where the fixed cost represents a large proportion of the total. In this case it would be wise to produce a large output in order to reduce unit costs.
- **Variable costs** These include all the costs that are directly related to the level of output, the usual ones being labour and raw material or component costs. In other words, costs that are incurred directly in the production process.

Important definitions are:

Total cost (TC) equals total fixed cost (TFC) plus total variable cost (TVC)

From this information all the relevant cost concepts can be derived.

$$\text{average fixed cost (AFC)} = \frac{\text{total fixed cost}}{\text{output}}$$

$$\text{average variable cost (AVC)} = \frac{\text{total variable cost}}{\text{output}}$$

$$\text{average total cost (ATC)} = \frac{\text{total cost}}{\text{output}}$$

Marginal cost is the addition to the total cost when making one extra unit and is therefore a variable cost.

The most important cost curve for the firm will be the ATC, showing the cost per unit of any chosen output. For most firms the decision to increase output will raise the total cost, that is, the marginal cost will be positive as extra inputs are used. Firms will only be keen to do this when the expected sales revenue will outweigh the extra cost. Rising marginal cost is also a reflection of the principle of diminishing returns (see above). As more of the variable factors are added to the fixed ones, the contribution of each extra worker to the total output will begin to fall. These diminishing marginal returns cause the marginal and average variable cost to rise, as shown in Figure 2.38.

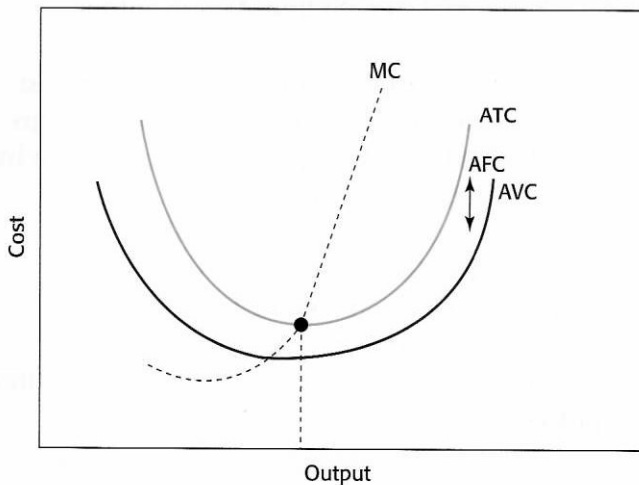


Figure 2.38 Short run cost relationships

The shape of the short run ATC is the result of the interaction between the average fixed cost and the average variable cost: $\text{AFC} + \text{AVC} = \text{ATC}$. As the

firm's output rises the average fixed cost will fall because the total fixed cost is being spread over an increasing number of units. However, at the same time, average variable cost will be rising because of diminishing returns to the variable factor. Eventually this will outweigh the effect of falling AFC, causing ATC to rise. This gives the classic 'U' shape to the ATC. On a graph of cost data, the MC will always cross AVC and ATC at their lowest point. In this situation, the most efficient output for the firm will be where the unit cost is lowest. This is known as the optimum output. It is where the firm is productively efficient in the short run, but the most efficient output is not necessarily the most profitable. For a firm wishing to maximise its profits, its chosen output will depend on the relationship between its revenue and its costs.

Costs in the long run

As we have already seen, the short run for the firm is a period of time when it cannot alter its fixed inputs. The level of production can only be changed by altering the variable inputs, such as labour. The time taken to alter fixed factors differs, depending on how easy it is to get new capital installed.

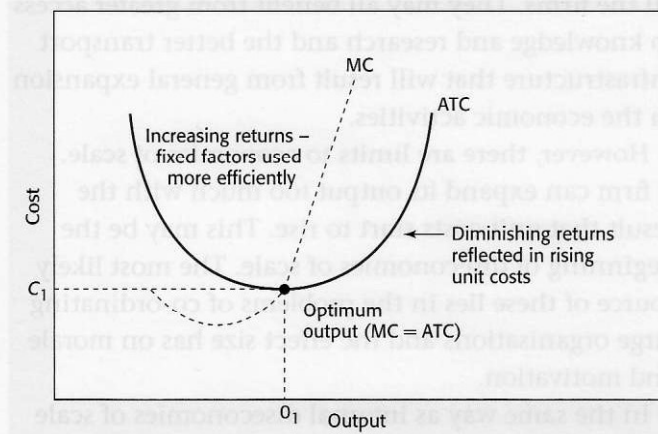
In the long run, the firm can alter *all* of its inputs, using greater quantities of land, capital and labour, operating on a bigger scale. All the factors are now variable.

In the very long run, technological change can alter the way the entire production process is organised, including the nature of the products themselves. In a society with rapid technological progress this will shrink the time period between the short run and the long run and suddenly shift the firm's product curves up and its cost curves down. There are now examples in consumer electronics where whole processes and products have become obsolete in a matter of months as a result of more powerful microchips increasing the volume and speed of the flow of information. In the case of airlines, the introduction of the jumbo jet suddenly raised the passenger miles per unit of input by 50%.

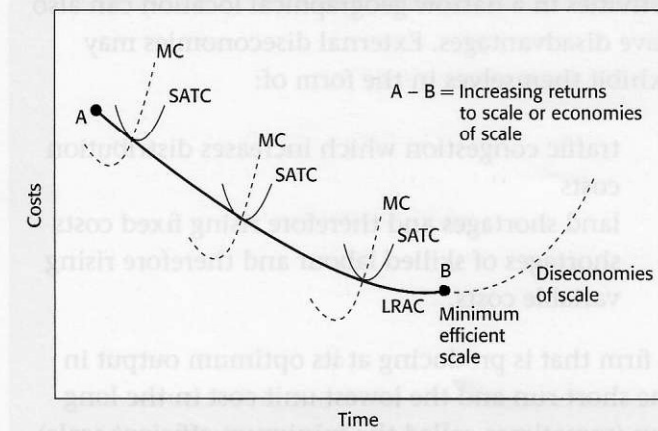
It is possible that a firm can find a way of lowering its cost structure over time. One way might be by

increasing the amount of capital used relative to labour in the production process, with a consequent increase in factor productivity.

The long-run average cost (LRAC) curve shows the least cost combination of producing any particular quantity. Moving from its short run equilibrium shown in Figure 2.39a, part (b) of this figure shows a firm experiencing falling ATC over time. This would enable it to lower the price without sacrificing profit. Products such as laptops, digital cameras, DVD players and MP3 players are examples where prices have fallen through competition and changing technology.



(a) Costs in the short run



(b) Costs in the long run

Figure 2.39 A firm's costs in the short run and in the long run.

Economies of scale

Where an expansion of output leads to a reduction in the unit costs, the benefits are referred to as **economies of scale**. **Internal economies of**

scale are the benefits that accrue to a firm as a result of its decision to produce on a larger scale. They occur because the firm's output is rising proportionally faster than the inputs, hence the firm is getting increasing returns to scale. If the increase in output is proportional to the increase in inputs, the firm will get constant returns to scale and the LRAC will be horizontal. If the output is less than proportional, the firm will see diminishing returns to scale or **diseconomies of scale**.

The key advantage for a firm obtaining economies of scale is a reduction in the cost per unit produced, i.e. a fall in the ATC. The nature of the possible economies depends on the nature of the economic activity. Some of the following may apply in a particular industry:

- **Technical economies** This refers to the advantages gained directly in the production process. Some production techniques only become viable beyond a certain level of output. Economies of large dimensions occur in a number of business applications. For example, if a firm doubles the scale of the production of a box structure, its production costs will double. If it is being used as a container to transport goods, then the operating costs may not increase in proportion. The capacity of the container will have increased eightfold, generating a much larger potential revenue. The trick is to make sure that the extra capacity is fully used.

Making full use of capacity is also important on a production line. Car production is the result of various assembly lines. The number of finished vehicles per hour is limited by the pace of the slowest sub-process. Firms producing on a large scale can increase the number of slow-moving lines to keep pace with the fastest, so that no resources are standing idle and the flow of finished products is higher. This is one of the reasons why in 2009 Tata Motors in Mumbai was able to produce the first of thousands of its Nano cars. At a price of around \$2500, this no-frills vehicle puts car ownership within reach of lower-income poor families.



Car production in India – an example of technical economies of scale

- **Purchasing economies** As firms increase in scale, they increase their purchasing power with suppliers. Through bulk buying, they are able to purchase inputs more cheaply, so reducing average costs. One of the best examples of this is the US retail giant Walmart which uses its purchasing power to stock goods in its stores at rock bottom prices.
- **Marketing economies** Large-scale firms are able to promote their products on television and in newspapers at lower rates because they are able to purchase large amounts of air time and space. They are also likely to be able to make savings in their costs of distribution because of the large volumes of products being shipped.
- **Managerial economies** In large-scale firms these come about as a result of specialisation. Experts can be hired to manage operations, finance, human resources, sales, logistics and so on. For small firms, all of these functions often have to be carried out by a multi-task manager. Cost savings are expected to accrue where specialists are employed.
- **Financial economies** Large-scale firms usually have better and cheaper access to borrowed funds than smaller firms. This is because the perceived risk to the lender is lower.
- **Risk-bearing economies** These might explain why, as firms get larger, they become more diversified. It is a way of spreading business risks. A diversified conglomerate can cover any losses in one activity with the profits from another, an option not open to smaller firms.

Risks can be further reduced by co-operating with rivals on large capital projects.

The last example above may be an illustration of **external economies of scale** since firms can benefit from savings in research and development costs. This particular benefit is received by all the firms in the industry as a direct consequence of the growth of the industry and may be one reason for the trend towards the concentration of rival firms in the same geographical area. The advantages may include the availability of a pool of skilled labour or a convenient supply of components from specialist producers who have grown up to make the items for all the firms. They may all benefit from greater access to knowledge and research and the better transport infrastructure that will result from general expansion in the economic activities.

However, there are limits to economies of scale. A firm can expand its output too much with the result that unit costs start to rise. This may be the beginning of diseconomies of scale. The most likely source of these lies in the problems of co-ordinating large organisations and the effect size has on morale and motivation.

In the same way as internal diseconomies of scale are possible, the excessive concentration of economic activities in a narrow geographical location can also have disadvantages. External diseconomies may exhibit themselves in the form of:

- traffic congestion which increases distribution costs
- land shortages and therefore rising fixed costs
- shortages of skilled labour and therefore rising variable costs.

A firm that is producing at its optimum output in the short run and the lowest unit cost in the long run (sometimes called the minimum efficient scale), has maximised its efficiency. In industries where the minimum efficient scale is low there will be a large number of firms. Where it is high, competition will tend to be between a few large players.

The advantages of size in the form of economies of scale suggest that there will be a tendency for firms to get bigger over time. Why then do some markets feature a large number of small firms? The next section considers this question.



1 The following items are a selection of business costs:

- the rent of a factory
- taxes paid on business premises
- workers' pay
- electricity charges
- raw materials
- advertising expenditure
- interest on loans
- management salaries
- transport costs
- depreciation on fixed capital.

Indicate whether each one is likely to be fixed or variable in the short run.

2 Study Figure 2.40 and then answer the questions that follow.

- a What is the:
- i ATC at output G?
 - ii AVC at output F?

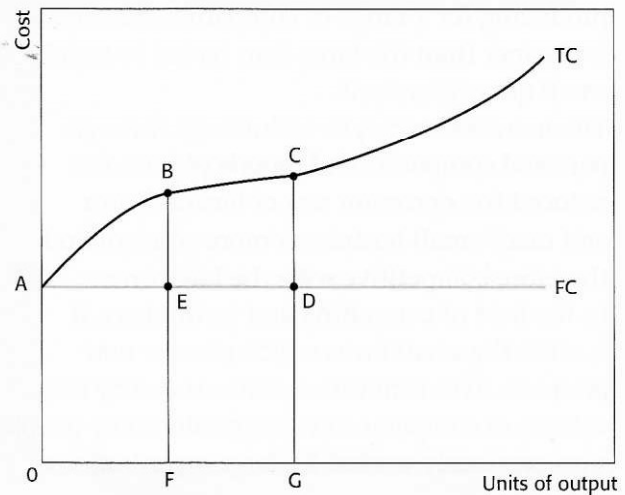


Figure 2.40

- iii AFC at output G?
 - iv TC at output F?
- b What information would be required to determine profits at output G?

Reasons for the survival of small firms

At least 90% of business units in the UK are very small firms employing fewer than ten people. This is typical of most economies. Manufacturing firms tend to be bigger and here the definition of small firms is usually those employing fewer than 100 people. The reasons why so many small firms exist in a world where the economic power lies with big businesses are as follows:

- There are economic activities where the size of the market is too small to support large firms.
- The business may involve specialist skills possessed by very few people.
- Where the product is a service, e.g. solicitors, accountants, hairdressers, dentists and small shops, the firm will be small in order to offer the customers personal attention for which they will pay a higher price.
- Small firms can fill in the market niches left by the big ones.
- Small firms may simply be the big firms of tomorrow. Although the number of small firms

is high, it is misleading because of the fact that they have a very high 'death rate'.

- There are particular obstacles to the growth of small firms. Probably the largest of these is access to borrowed capital because of the perceived risk on the part of banks.
- The entrepreneur may not want the firm to get bigger because extra profit is not the only objective and growth might involve a loss of control over the running of the business.
- Recession and rising unemployment can trigger an increase in the number of business start-ups as former employees try to become self-employed.
- Small businesses may receive financial help under government enterprise schemes because of their employment and growth potential.
- The disintegration of large firms in an attempt to cut costs and focus on the more profitable core activities creates new business opportunities for small ones.
- It is sometimes cheaper for large firms to contract out some of the peripheral tasks such as design, data processing and marketing, to

specialist small firms. Manufacturing firms may buy in components from small suppliers producing for a range of companies, because it is cheaper than the large firm trying to supply small quantities itself.

- The increased access to technology through personal computers and mobile phones has reduced the optimum size of business unit and made small businesses more efficient and therefore competitive with the large ones.
- In the field of computing and technology, it is often the small firms which pioneer new products. This innovation is illustrated by the volume of computer software produced by people who previously worked for large organisations.

The growth of firms

Although the number of large firms is small, it is true that they dominate both national and international trade. Business growth is strongly linked with the pursuit of profit but the motives behind a firm's growth may include the following:

- **The desire to achieve a reduction in ATC over time through the benefits of economies of scale** This allows firms to compete more effectively with rivals because they can afford to cut prices without sacrificing profits.
- **To achieve a bigger market share, which would boost sales revenue and therefore profits** This is sometimes referred to as the monopoly motive, but it could be a defensive strategy to maintain market share in anticipation of action by rivals. In the global economy there is a strong argument that only big firms can compete in markets where multinationals are present.
- **To diversify the product range** A multi-product firm has the advantage of being able to spread business risks. If one branch of its activity is stagnating or going into decline, there will still be the revenue from others to keep the firm afloat. Firms often see new business opportunities in related areas. This is at the heart of successful entrepreneurship. Sometimes

SELF-ASSESSMENT TASK 2.32

Read the feature below and then answer the questions that follow.

SMEs in Africa and Asia

An ever-increasing emphasis in developing economies is being placed on the role of small and medium-sized enterprises (SMEs). Although definitions vary between countries, small enterprises usually have 5–49 workers and medium-sized ones, 50–199 workers. Large enterprises have 200 workers and over. Enterprises that are run by self-employed people are particularly significant throughout large parts of Africa and Asia.

In Africa, SMEs are the main source of employment, comprising over 90% of business operations and contributing over 50% of employment and GDP. Many remain outside the formal economy yet harness their talent in the informal sector. Those that grow move into the formal sector, generating much needed taxes for governments. Over time, a small number of SMEs might even become listed public companies.

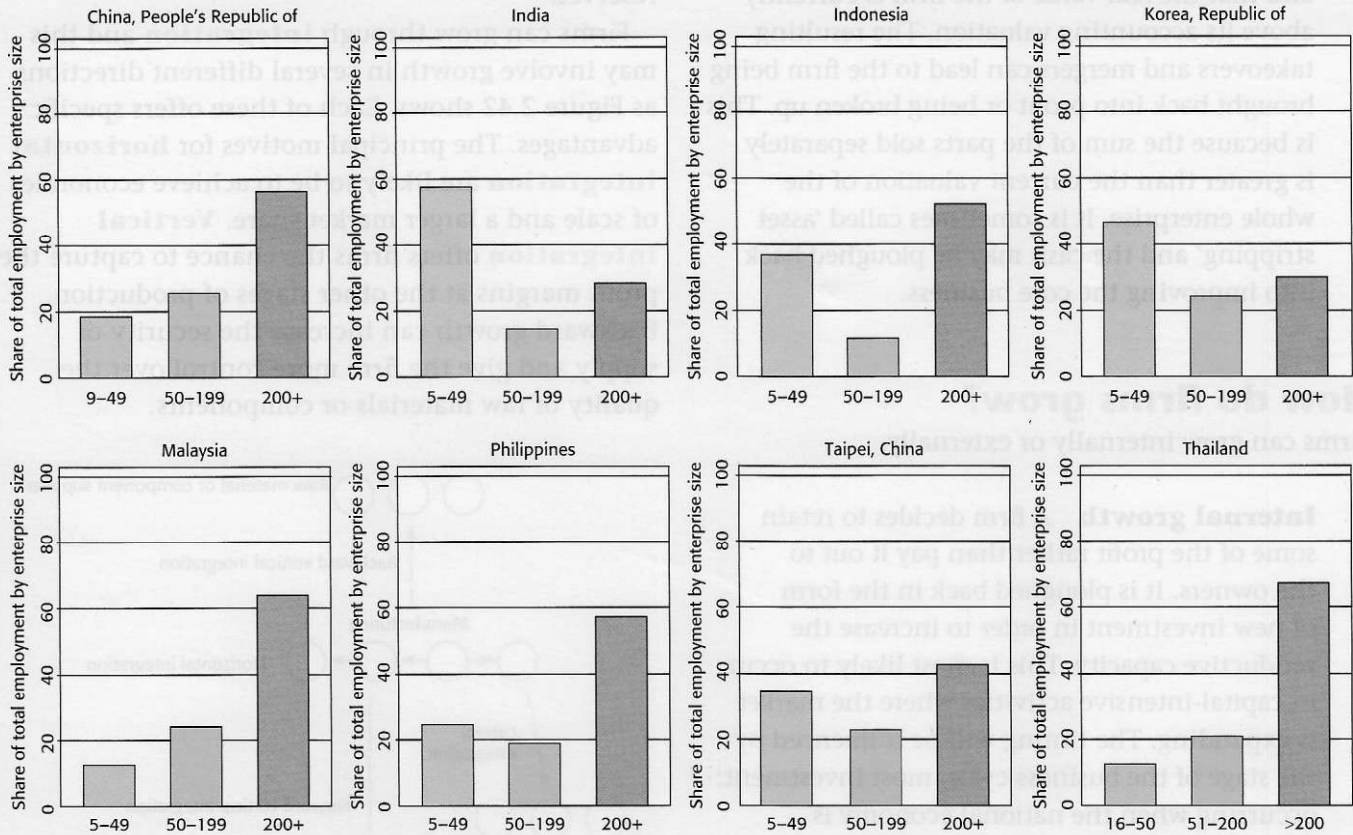


Small businesses in India

The bar charts in Figure 2.41 show how employment in eight Asian countries is distributed between different sizes of enterprise. The variation is striking.

SMEs across Africa and Asia are particularly prevalent in activities such as food provision and

processing, certain types of local retailing, financial services, IT and a range of personal services. They invariably face strong competition from other SMEs and in some cases, increasingly, from multinationals. As such they are vulnerable; many do not survive due to competitive market forces.



Note: Enterprise is measured in terms of the number of workers.

Figure 2.41 Share of total employment by enterprise size groups (%)

- 1 Describe the variations in employment by size of enterprise for the eight Asian countries shown in the bar charts.
- 2 Why is it that in some countries a large percentage of employment is in large enterprises, yet in

- others, SMEs employ the majority of the working population?
- 3 Discuss the extent to which SMEs are important economic agents in your country.

they can use the same production facilities as for their original activity, keeping the costs down. These benefits are called **economies of scope**.

- **To capture the resources of another business** Sometimes, firms may realise that resources are being underutilised in another firm and that the real value of the firm is currently above its accounting valuation. The resulting takeovers and mergers can lead to the firm being brought back into profit or being broken up. This is because the sum of the parts sold separately is greater than the current valuation of the whole enterprise. It is sometimes called 'asset stripping' and the cash may be ploughed back into improving the core business.

How do firms grow?

Firms can grow internally or externally.

- **Internal growth** A firm decides to retain some of the profit rather than pay it out to the owners. It is ploughed back in the form of new investment in order to increase the productive capacity. This is most likely to occur in capital-intensive activities where the market is expanding. The timing will be influenced by the stage of the business cycle, most investment occurring when the national economy is approaching a boom.
- **External growth** The business expands by joining with others via takeovers or mergers. The objective in a takeover bid is to buy sufficient shares from the owners of the firm to get 51% of the total and therefore have control of the business. A merger often has the same result, a new larger legal entity, but the name implies less of a struggle and that both parties have agreed to the action. Mergers may be more numerous when there is a downturn in the economy or where there is a shrinking market and firms are left with excess productive capacity.

In practice, both types of growth can be going on at the same time. External growth may be a quicker and cheaper route for firms than internal growth, especially when there is high fixed cost. For example, it may be cheaper for one oil company to buy the assets of another than to expand existing operations, unless there are large recoverable reserves.

Firms can grow through **integration** and this may involve growth in several different directions as Figure 2.42 shows. Each of these offers specific advantages. The principal motives for **horizontal integration** are likely to be to achieve economies of scale and a larger market share. **Vertical integration** offers firms the chance to capture the profit margins at the other stages of production. Backward growth can increase the security of supply and give the firm more control over the quality of raw materials or components.

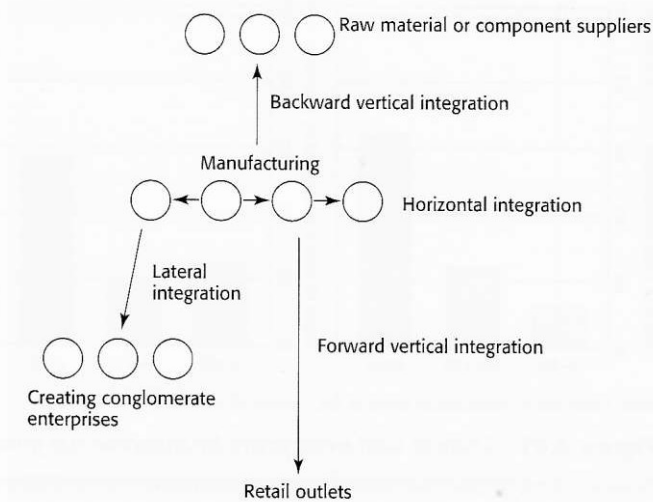


Figure 2.42 The routes to integration

Lateral integration is the beginning of diversification where the company goes into an activity quite closely related to its existing one. Some firms may also launch into new areas that have nothing to do with current production.

- 1 Read the feature below and then answer the questions that follow.

Competition up in the air

The large airline companies are having to cope with a situation of scarcity, not of aircraft but the lack of takeoff and landing slots at major international airports. This is one reason for their interest in a new generation of very large aircraft or superjumbos.

Aircraft production is clearly an effective duopoly. The European Airbus group has definite orders for at least 60 of its new A380s which can carry over 500 passengers at a time. They estimate that it cost at least \$20 billion simply to get the first one in the air. At the same time, the American Boeing group is struggling to produce its prototype double decker superjumbo. These new planes will only make economic sense if they fly at full capacity

all the time. The aircraft will offer operators the prospect of economies of scale and additional benefits of reduced emissions and fuel costs.

Competition between airline operators is fierce. Each firm is trying to strengthen its position through brand loyalty, offering frequent flyer discounts and improving the quality of the provision for business class travellers where demand might be less price elastic. Profits are higher on the long distance routes and new entrants on the European routes have increased competition by offering a lower price no-frills service. Some firms may have to use the long-haul profits to cover losses on the short routes.



- a Why will aircraft production never have many firms competing for sales?
- b Explain why the airline operators are so interested in the new products.
- c What is the economic significance of low price elasticity in business travel?
- d What do you predict will be the motives behind any horizontal integration of airline companies?
- e With reference to both costs and revenue, how might the airline companies be able to increase their overall profits?

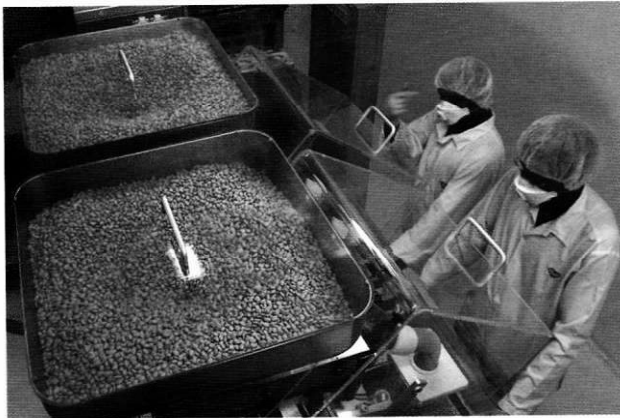
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2 Read the feature below and answer the questions that follow.

Pharmaceutical industry mergers beat recession

Ten years ago the global pharmaceutical industry experienced a spate of mergers. That was when Glaxo and Astra Zeneca were created and Pfizer became the world's number one after taking over Warner-Lambert and in 2003, Schering-Plough.



In early 2009 three new multibillion dollar deals were announced. These were:

- Roche buying Genentech (\$47bn)
- Merck's takeover of Schering-Plough (\$41bn)
- Pfizer's purchase of Wyeth (\$68bn).

Each of the newly merged giants has their specialisms. Roche is big in cancer-treating drugs, Merck in cholesterol-reducing drugs whilst the largest of all, Pfizer, is big in vaccines, anti-depressants, oral contraceptives and impotence aiding products.

The global industry is not short of cash. The reasons for the latest mergers stem mainly from fierce ongoing competition from generic drug manufactures. These companies can make cheaper copies of drugs once patents have expired. Many such products are made in the emerging economies of southern Asia. The knock-on effects are that big conglomerates are cutting back on new product development. Instead they are concentrating resources on new products such as the Tamiflu vaccine which is difficult to copy. They are also buying new products from small businesses and then using their power to produce these for the global market.

Source: Townend, A., Daily Telegraph, 16 March 2009 (adapted)

- a What are typical reasons for business mergers?
- b Why do these reasons not apply to the 2009 mergers in the global pharmaceutical industry?
- c What benefits might consumers get from larger companies?
- d How might increased horizontal integration affect SMEs in the global pharmaceutical industry?

International growth

Firms may take this route to expand either by exporting from a domestic base, setting up licence agreements or joint ventures with foreign firms or setting up directly in other countries. The reasons may include:

- saturation of their domestic market caused by too much competition
- domestic recession
- the prospect of economies of scale

- identification of growth markets
- access to materials, technology, patents or new management techniques
- risk spreading
- low labour costs.

Setting up direct production may also avoid import barriers and reduce some of the difficulties of exporting.

A multinational company is one that owns or controls production facilities in many countries and derives a substantial part of its total revenue from non-domestic sources. Its decisions are made in a global context, even though it has a domestic base. The objective is to maximise its profits by switching investment to areas that offer the highest return on capital employed. This strategy sometimes involves rationalising production and writing off investment in particular locations. Multinational conglomerates can become so large that they are difficult to manage. The decision then is sometimes to break them up, selling off the least profitable parts and concentrating on core activities.

The firm's revenue

In the theory of the firm, there are only two possible revenue relationships. In a competitive market, each firm has to accept the ruling market price. Its demand curve is horizontal at this level. Any firm in any other market will face a downward-sloping demand curve for its product. If the firm chooses to increase its output, the extra sales will depress the price. To look at it another way, the sales will only increase if the price is reduced from its present level. An increase in price would lead to a fall in the volume of sales. The following definitions are used by economists when looking at a firm's revenue:

Total revenue (TR) is price multiplied by quantity.

Average revenue (AR) is total revenue divided by output.

The firm's demand curve therefore is the average revenue curve or the price line.

Marginal revenue (MR) is the addition to the total revenue resulting from the sales of one extra unit. Because the firm can only sell more by reducing the price, it follows that the value for MR will always be lower than AR. Figure 2.43, derived from the accompanying data, shows that when the price moves from 9 to 8, the MR is 7. The addition to TR is gradually falling as the price falls until when five units are sold MR = 0. At this point total revenue is maximised.

Revenue data

Price (P)	Units sold (Q)	TR (P x Q)	MR
10	0	0	9
9	1	9	
8	2	16	7
7	3	21	5
6	4	24	3
5	5	25	1
4	6	24	-1
3	7	21	-3
2	8	16	-5
1	9	9	-7

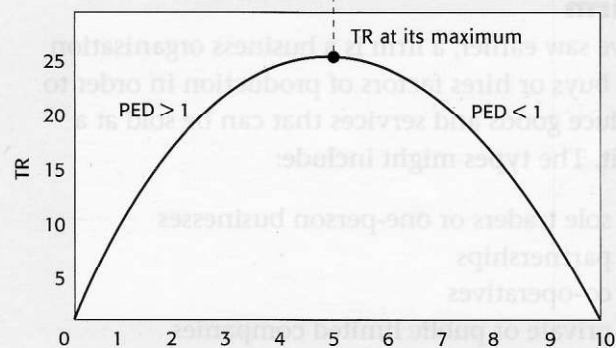
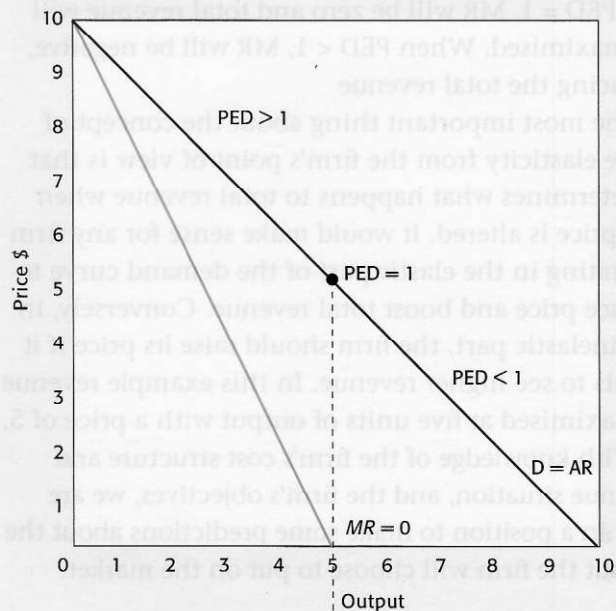


Figure 2.43 The relationship between average revenue, marginal revenue and total revenue

The relationship between price elasticity of demand and revenue

In the above example the firm would be facing a straight-line demand curve. Even so, the consumers' reaction to a price change varies at different prices due to the way in which the price elasticity of demand (PED) varies along the demand curve.

As the price falls in steps from \$10, sales increase more than proportionally, giving PED a value greater than 1, until the output of 5 when total revenue is unchanged. This gives a PED value of 1. Beyond this output PED has a value less than 1 and the result is that further price cuts will reduce total revenue.

A relationship between elasticity and marginal revenue can also be seen. In the elastic part of the demand curve where $PED > 1$, the marginal revenue is positive and total revenue will be increasing. When the $PED = 1$, MR will be zero and total revenue will be maximised. When $PED < 1$, MR will be negative, reducing the total revenue.

The most important thing about the concept of price elasticity from the firm's point of view is that it determines what happens to total revenue when the price is altered. It would make sense for any firm operating in the elastic part of the demand curve to reduce price and boost total revenue. Conversely, in the inelastic part, the firm should raise its price if it wants to see higher revenue. In this example revenue is maximised at five units of output with a price of 5.

With knowledge of the firm's cost structure and revenue situation, and the firm's objectives, we are now in a position to make some predictions about the output the firm will choose to put on the market.

A firm and the industry

A firm

As we saw earlier, a firm is a business organisation that buys or hires factors of production in order to produce goods and services that can be sold at a profit. The types might include:

- sole traders or one-person businesses
- partnerships
- co-operatives
- private or public limited companies
- state-owned firms
- multinational or transnational firms.

SELF-ASSESSMENT TASK 2.34



A small family-run engineering company has a production capacity of 9000 units per year. Market research suggests that the market will take up all of this output at a price of \$8. The firm's cost structure is as follows:

- direct labour \$1.50 per unit
- raw materials \$0.50 per unit
- other variable costs \$1.00 per unit
- the total fixed costs are \$27 000 a year.

1 Calculate:

- a AFC
- b AVC
- c ATC
- d AR.

2 If the factory produced its capacity output, what would the firm's abnormal profit be?

3 Suppose that consumer tastes change away from the product and the firm has to reduce the price to \$6 in order to get rid of unsold stock. What situation is the firm now in?

Firms can range from small simple organisations to ones that are almost too complex to control, and where there is some conflict of interests between the members. The characteristics and behaviour of the firm depend on the type of economic activity and the nature of competition. The factor mix in firms varies enormously, with some firms in the service sector being highly labour intensive. This contrasts with some manufacturing that is capital intensive. The decisions that firms take will vary according to the cost and availability of factors of production in different economic systems. There has been a trend in the rich western economies to make large parts of manufacturing more capital intensive to the point where some major activities, such as car manufacturing, can largely be done by robots and computer-controlled machinery. Another trend has been increased concentration of ownership in the hands of large multinational conglomerates.

The industry

In a competitive market structure, the industry is simply the sum of all the firms making the same product. This is the total market supply.

In other markets, the industry is taken to be the total number of firms producing within the same product group, i.e. things which are close substitutes for each other. It is sometimes difficult to draw the line between different industries, for example, are motor cars and motor cycles in the same product group? In reality many multi-product firms operate in more than one industry at the same time. A multinational conglomerate can be in several industries right across the global economy. A particularly good example is the Indian-owned Tata Group which has global interests in steel, vehicle production, upmarket hotels, telecommunications and electronics.

The industry is therefore a collection of business organisations which supply similar products to the market. When a firm's market share is discussed it tends to be in terms of the sales of the firm divided by the total sales of the entire industry. The terms 'industry' and 'market' are interchangeable in this context.

The firm's objectives

Profit maximisation

The standard assumption made by economists is that firms will seek to maximise their profits, i.e. maximise the gap between the firm's total revenue and total cost (including normal profit). A firm making the minimum level of normal profit is said to be producing at the break-even output. Firms will want to make abnormal profit as a reward for managing the resources and taking business risks.

If the firm produces up to the point where the cost of making the last unit is just covered by the revenue from selling it, then the profit margin will have fallen to zero and total profits will be at their greatest. In Figure 2.44, a firm producing an output to the left of Q is sacrificing potential profit. It can raise total profit by increasing its output, because each marginal unit sold adds more to revenue than it does to costs. A firm producing to the right of Q is making a loss on each successive unit, which will lower the total profit. It would be better off cutting

the output back to Q where $MC = MR$ and the area of abnormal profit will be at its highest.

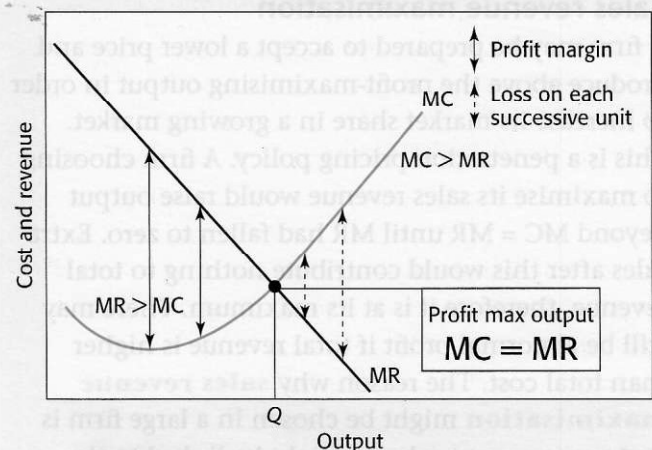


Figure 2.44 The profit maximisation rule

There may be several reasons why firms do not operate at the profit maximisation output:

- In practice, it may be difficult to identify this output. The firm may simply work out the average total cost and add on a profit margin in order to determine the selling price. This cost-plus pricing technique may not result in maximum profit.
- Short-term profit maximising may not be in the long-term interest of the company since:
 - firms with large market shares may wish to avoid the attention of government watchdog bodies, such as the Competition Commission in Britain
 - large abnormal profit may attract new entrants into the industry
 - high profits may damage the relationship between the firm and its stakeholders, such as the consumers and the company workforce
 - profit maximisation may not appeal to the management, who may have different objectives
 - high profits might trigger action by the firm's rivals and it could become a target for a take-over bid.

Alternative objectives to profit maximisation

Dissatisfaction with the simple assumption of profit maximisation has led to a number of alternative

assumptions that have been labelled as managerial or behavioural theories.

Sales revenue maximisation

A firm may be prepared to accept a lower price and produce above the profit-maximising output in order to increase its market share in a growing market. This is a penetration pricing policy. A firm choosing to maximise its sales revenue would raise output beyond $MC = MR$ until MR had fallen to zero. Extra sales after this would contribute nothing to total revenue, therefore it is at its maximum. There may still be abnormal profit if total revenue is higher than total cost. The reason why **sales revenue maximisation** might be chosen in a large firm is that management salaries might be linked to the value of sales. Shareholders might be more interested in profit. The solution to this conflict of interests is to offer management some shares as a bonus or link their salaries to profits.

Sales maximisation

This option maximises the volume of sales rather than the sales revenue. In **sales maximisation** the firm would increase output up to the break-even output where the total revenue just covered the total cost. A higher output implies loss-making behaviour. The only situation where this would be possible is where the firm could use the profit from some other activities to cover these losses using the principle of cross-subsidisation. It could be that in a state-owned firm, there are social objectives lying behind price and output decisions. The company might be instructed to keep prices down, to cover their ATC , or to make sufficient profit to be self-financing when it comes to new investment.

A firm in the private sector would not go beyond the break-even output in order to expand sales unless it is part of a diversified grouping where cross-subsidisation is being practised. Deliberately cutting the price to reduce profit might be a strategy to deter new entrants into the market. If they still appear, a price war may be a tactic to squeeze them out.

Satisficing profits

This behaviour would occur when a firm is determined to make a reasonable level of profits, sufficient to satisfy the shareholders but also to keep the other stake-holding groups happy, such as the workforce and, of course, consumers. The firm is seen as a coalition of interest groups, each with its own objectives which may change over time. Workers will expect pay rises and improvements in working conditions which may raise costs. Consumers may expect to see prices falling, particularly if there are rival producers. This is a long way from the simple profit-maximising theory as firms may choose to sacrifice some potential short-term profits to satisfy these expectations.

Where the firm's shareholders are divorced from control of the firm, there may be a conflict of interests. The management's motives may be concerned with growth rather than profit. They may place a lot of importance on comfortable working conditions, job security, status and fringe benefits, such as company cars, private health care and pension rights. Time and money spent on these issues can raise costs. If the firm has close rivals, it may make management more cautious because the risk of failure will threaten their job security and career advancement prospects. Firms may have charitable or environmental objectives which must be financed at the cost of profit.

Satisficing profits can also be a feature of firms that have enjoyed a high market share over a long period of time. Complacency can lead to firms losing their focus on the cost structure or failing to devote resources to either product or process innovation. Either situation can lead to a loss of profits.

One must be careful of sweeping statements concerning firms' short run behaviour and recognise the difference in objectives that can exist in different countries. Extra long run profits may follow from short-term sacrifices. As a working assumption, it is still valid to see profit maximisation as the major long-term objective of privately owned firms operating in a free market system. The search for abnormal profit will be a major factor in explaining firms' behaviour throughout the world.



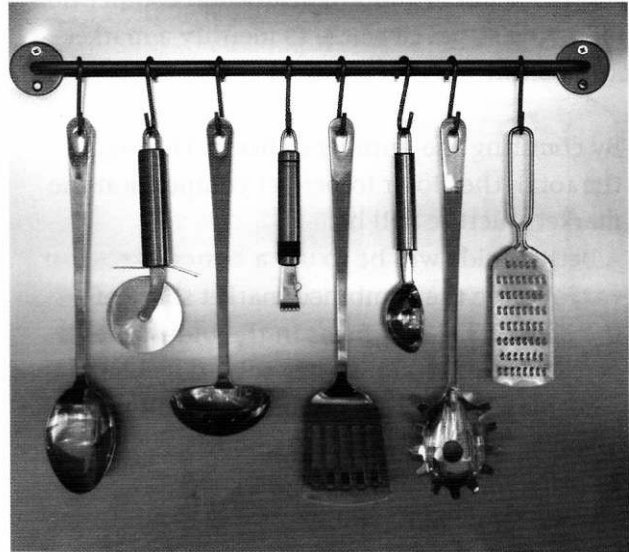
Read the feature below which looks at some of the objectives of the firm, and then answer the questions that follow.

Chefaid plc

A row has broken out in the boardroom of Chefaid plc, a kitchenware company, over the firm's prospects and future direction. The marketing director announced a record level of sales for the last quarter and suggested that there should be a 10% target for the growth of sales revenue over the coming year. It was suggested to him that this was unwise. The firm's latest product, an exclusive set of kitchen tools, has yet to break even. The sales record owes a lot to the current popularity of cookery programmes on TV, but there is a danger that the sales boom is a flash in the pan.

The managing director was more interested in the firm's profitability. He was under pressure to declare higher future dividends and to get the funds to finance the planned new factory. He believed that a profit-maximisation strategy was the best way forward. The production director warned the meeting that cost pressures were building up and that industrial relations with the workforce were fragile because of the beginning of talks about wages and new working conditions. Management in general had been delighted with the new share option scheme and the bonus linked to sales performance.

It was suggested that the prospects for growth in general were good, because of the increase



in consumer confidence, and the firm's market share had benefited from the closure of two large rivals during the recession. It was argued that the market was becoming less competitive and this might give an opportunity for price rises. The company must not lose sight of its long-term drive to raise profitability by reducing unit costs. This sparked further disagreement over the firm's sponsorship commitments, its promotions budget and its charitable contributions.

- 1 What do economists mean by the phrase 'the market is becoming less competitive'?
- 2 What will be the best output for the firm if the profit-maximising strategy wins the day?
- 3 What are the risks associated with this strategy?
- 4 What output would maximise turnover?
- 5 What does the phrase 'fail to break even' mean? What advice would you give to improve the performance of the new product?
- 6 Explain why the management may not favour profit maximisation.
- 7 To what extent does the case study show that businesses have a range of objectives?
- 8 Discuss the idea that each business decision to reach an objective has risks attached to it.

Market structures

The term 'market structure' describes the way in which goods and services are supplied by firms in a particular market. In economic theory, a range of models has been developed within what is called the spectrum of competition. These models are shown in Figure 2.45. The extreme or limiting models may only exist in theory but give a framework for understanding real-world competition. The following stages can help to identify a market structure within this spectrum of competition:

- By counting the number of firms. The bigger the total, the closer to perfect competition the market structure will be.
- A better guide will be to use a **concentration ratio** to see the combined market share of the biggest 3, 4 or 5 firms in the industry as a percentage of total industry sales. The bigger the percentage, the closer the industry will be to the **oligopoly** and **monopoly** models.
- By considering how easy or difficult it is for new firms to set up and how easy it is for firms to exit the industry. These barriers are indicative of market structures on the right-hand side of the spectrum.
- By considering the importance of economies of scale to the firms. The more important they are, the closer the industry will be to an oligopoly.

Figure 2.46 provides an elaboration of the above. Understanding this figure is very important for the rest of this chapter.

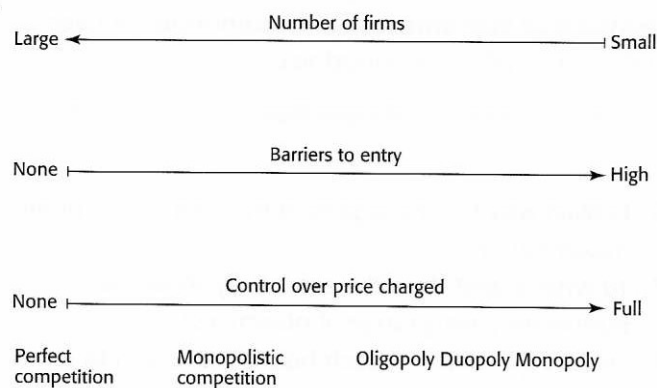


Figure 2.45 *The spectrum of competition*

Perfect competition

Perfect competition is a theoretical extreme. The main point of studying this model is that it acts as a benchmark for real-world competition. The performance of actual firms can be judged against this most efficient model. (Some of the characteristics are shared by the next most competitive model, which somewhat confusingly is known as monopolistic competition).

Perfect competition has the following characteristics:

- 1 There is a large number of buyers and sellers who have perfect knowledge of market conditions and the price.
- 2 No individual firm has any influence on the market price. Firms are described as being price takers. The ruling price is determined by the forces of market demand and the output of all the firms.
- 3 The products are homogeneous. This means that they are all of the same quality and are identical in the eyes of the consumer.
- 4 There is complete freedom of entry into and exit from the market.
- 5 Each firm will seek to maximise its profits.

The only industry which comes anywhere near this theoretical model is agriculture. The problem in searching for an example is in finding products that are homogeneous. Perfect competition has a lot of appeal as a yardstick because if it were to operate, there would be consumer sovereignty and efficient production with no possibility of exploitation.

In perfect competition, the firm cannot do anything that will influence the market price. Each individual firm makes such a small contribution to the industry output that no alteration in its own output can significantly affect the total supply. The firm can choose to produce any quantity it likes and will be able to sell all of it at the ruling price. The demand curve facing the firm is therefore perfectly elastic at this price. In this situation if the firm sells an extra unit of output, it will get the same price as the one before. The marginal revenue is therefore equal to the price or

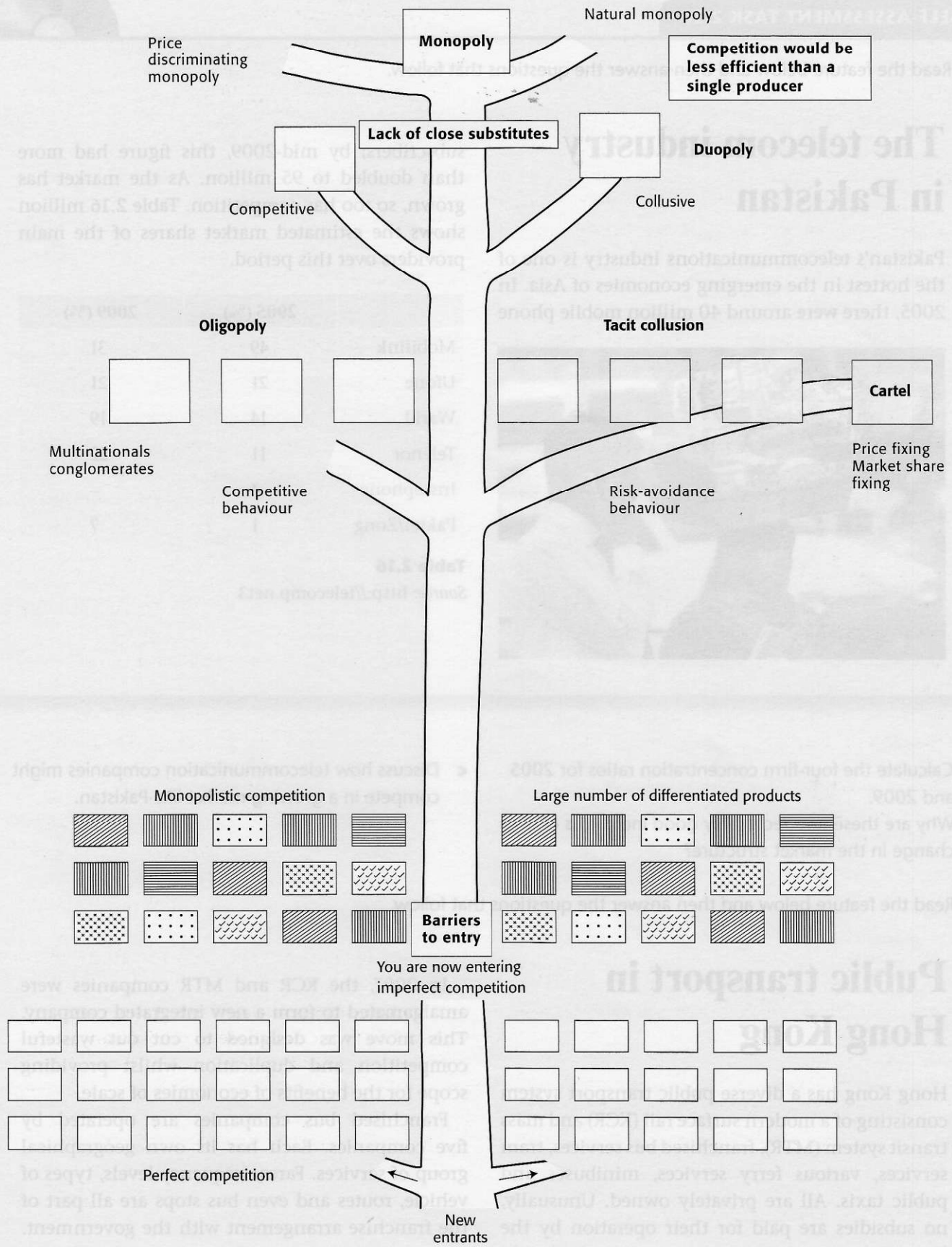


Figure 2.46 A competition road map



- 1 Read the feature below and then answer the questions that follow.

The telecom industry in Pakistan

Pakistan's telecommunications industry is one of the hottest in the emerging economies of Asia. In 2005, there were around 40 million mobile phone



subscribers; by mid-2009, this figure had more than doubled to 95 million. As the market has grown, so too has competition. Table 2.16 shows the estimated market shares of the main providers over this period.

	2005 (%)	2009 (%)
Mobilink	49	31
Ufone	21	21
Warid	14	19
Telenor	11	22
Instaphone	4	–
Paktel/Zong	1	7

Table 2.16

Source: <http://telecomp.net3>

- a Calculate the four-firm concentration ratios for 2005 and 2009.
- b Why are these not necessarily good indicators of change in the market structure?
- c Discuss how telecommunication companies might compete in a growing market like Pakistan.

- 2 Read the feature below and then answer the questions that follow.

Public transport in Hong Kong

Hong Kong has a diverse public transport system consisting of a modern surface rail (KCR) and mass transit system (MTR), franchised bus services, tram services, various ferry services, minibuses and public taxis. All are privately owned. Unusually, no subsidies are paid for their operation by the Hong Kong government.

In 2007, the KCR and MTR companies were amalgamated to form a new integrated company. This move was designed to cut out wasteful competition and duplication whilst providing scope for the benefits of economies of scale.

Franchised bus companies are operated by five companies. Each has its own geographical group of services. Fares, frequency levels, types of vehicle, routes and even bus stops are all part of the franchise arrangement with the government.



There are a few pinch points and stretches of route where they compete with each other.

The famous Star Ferry, with cross-harbour services, and the Hong Kong Tramways Company

charge very low fares. They are the only providers of their modes of transport although buses, taxis and road tunnels as well as private cars compete with them. They do though have a unique brand and a loyal customer base.

Hong Kong has 4400 minibuses, known locally as public light buses. The 2800 green topped ones can carry 16 seated passengers on fixed routes. The remaining red ones are more flexible and not as strictly regulated. The fares charged are competitive and can be determined by the driver. Many are owned by the driver or by small companies.

Finally, Hong Kong has 15000 red urban Toyota taxis. Fares are strictly regulated by meter and vehicle numbers fixed by the government. Most are privately owned or leased from local companies by their drivers.

- a Use the evidence above to provide examples of monopoly, natural monopoly, oligopoly and monopolistic competition. Justify your answers.
- b Explain what additional information you might need to be more certain of these market structures.
- c Discuss the extent to which similar market structures can be found in the public transport system in your own country.

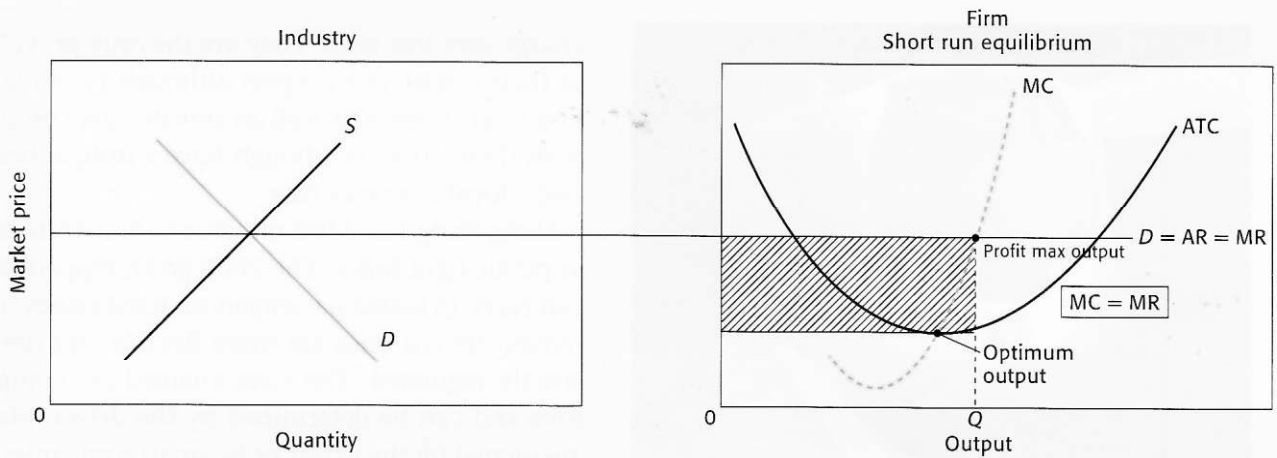
the average revenue. In Figure 2.47 (page 106), all the firm's revenue information is in the line:


$$D = AR = MR$$

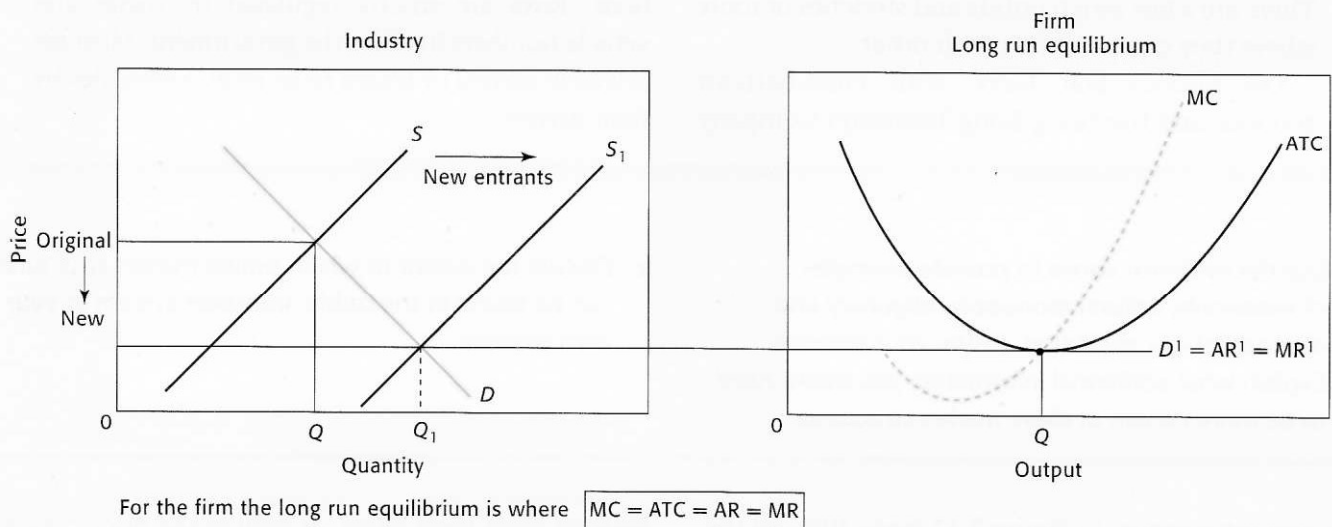
Choosing the output is the only decision that the firm has to make. This will be done by considering the relevant costs of production. Given the assumption that the firm wants to maximise profits, the chosen output will be where $MC = MR$.

The firm's total revenue is the price multiplied by the output sold. If the total cost of producing this output is lower than the total revenue, then the firm will be making an abnormal profit. This is also known as **supernormal profit**. If $TC = TR$, then the firm would break even and be making a normal profit. It is possible that the costs could be higher than the revenue, in which case the firm may be about to exit the industry. This may not be immediate: a firm can continue in production

making short-term losses, as long as the price covers the AVC, that is the cost of paying the wage bill and buying the materials for production. This is the shut-down price. The firm would be making a loss equivalent to the amount of fixed costs. In this situation the firm's only hope is that the market price will rise to increase its revenue or that it can take action to reduce its costs of production. Firms where the revenue is lower than costs will be leaving the industry. If a lot of them do, the effect will be a reduction in the overall market supply which will raise the market price giving the rest an opportunity to continue producing and at least make normal profit. In the long run, firms will only supply the market if they can cover all their costs and make a normal profit. The minimum supply for the firm will be the optimum output. In perfect competition, firms will only make different amounts of profit from each other if they have different cost structures. Their behaviour is strictly limited and the only way



It is the existence of abnormal profit  which attracts new entrants, increasing the market supply



For the firm the long run equilibrium is where $MC = ATC = AR = MR$

Figure 2.47 *The perfect competition model*

to boost profit would be to increase productivity and lower average total cost.

Abnormal profit will only be a feature of perfect competition in the short run. This is because its existence will act as an economic incentive for the entry of new firms. The absence of barriers means that the total supply in the market will rise. The effect of this on the existing firms is that the market price will fall and the abnormal profit will diminish. When the abnormal profit goes, the entry of new firms dries up, and the existing ones will simply be covering costs. It is the competitive force of large numbers of new entrants that destroys abnormal profit.

The long run equilibrium is therefore where the only firms left are the most efficient ones, making a normal profit.

In this situation, there is no action that the firm can take to prosper at the expense of rivals. It has no market power. Firms' behaviour is easy to understand. The appeal of this model is that abnormal profit is competed away and the only firms that participate in the market in the long run are productively and allocatively efficient. It is the efficient economic performance which occurs in perfect competition that can be used to criticise real-world competition.



1 Study the diagrams in Figure 2.48 and then answer the questions that follow.

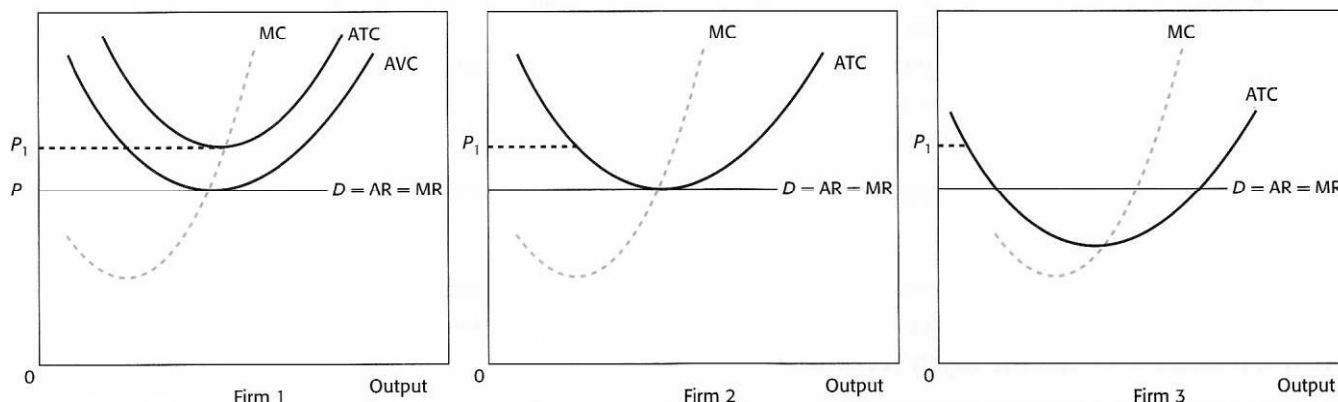


Figure 2.48 Perfect competition – three different cost situations

- a Describe each firm's situation with respect to profit.
- b If market demand increased and the price rose to P_1 , how would it affect each of them?
- c According to the theory what will happen next?
- d What output does a firm in perfect competition choose?
- e How can an individual firm increase its profits?

2 Read the feature below and then answer the questions that follow.

Shedding light on the competition

In Guangdong, people do not hide their light under a bushel. 'Guizhen: Lighting Capital of China', proclaims the sign beside the highway into the village (more of a town), which two decades ago was an unpaved track. Factory after factory, every one of them advertising light fittings, lines the road. In town, hundreds of shopfronts display their variations on a theme: street lights, chandeliers, bedside lights, halogen lights, lights of any sort, from the modern to the eternally tasteless. Guizhen has 60000 registered inhabitants, says the party secretary, Mr Wu, frantically talking on his cellphone, and though there are officially



1000 lighting factories, 'there are also 600 or so underground ones... they all count.'

One resident in every 40 men, women and children, then, is a factory owner, and that does not

take into account the wholesalers and shop owners. On top of that there are some 40 000 migrant workers. It is an intensely competitive industry. The Guizhen factories on average change their designs every fortnight. The specialist designers of light fittings have to come up with three new ideas a day. In return, they are paid 600 000 yuan (\$72 000) a year, many times the salary of China's prime minister.

Since the first factory opened in 1986, little-known Guizhen has captured 46% of China's total domestic lighting market. One in every two light fittings you see in China has been trucked out past that bragging highway sign.

Source: Economist survey of China, 8 April 2000 (adapted)

- a** Is this an example of perfect competition or monopolistic competition? Justify your choice.
- b** Why is product innovation so highly rewarded?
- c** What is the economic significance of the migrant workers in this industry?

Monopolistic competition

This is the market structure closest to the model of perfect competition because of the large number of competing suppliers.

Monopolistic competition has the following characteristics:

- 1 There is a large number of buyers and sellers.
- 2 There are few barriers to entry into the market and it is easy for firms to recoup their capital expenditure on exit from the market.
- 3 Consumers face a wide choice of differentiated products. Each firm has a slight degree of monopoly power in that it controls its own brand.
- 4 Firms have some influence on the market price and are therefore price makers.
- 5 Each firm will seek to maximise profits.

Each firm is competing with a large number of similar producers. In this situation the demand curve facing the individual firm will be downward sloping but relatively price elastic because of the presence of substitutes. It might be an option for firms to reduce their price in order to increase total revenue. As in perfect competition, the firms can make abnormal profit in the short run but the key restraint on their power is the free entry of rivals. In the long run, the prediction is that the profit-maximising firms will only be able to achieve a normal profit covering all

the production costs and the opportunity cost of capital.

The clue to the behaviour of firms in this market structure lies in the concept of product differentiation. The development of a strong brand image must be seen as an act of investment on the part of the individual firm. This highlights the important role that advertising and promotions play in this market structure. Successful advertising will not only shift the firm's demand curve to the right at the expense of the rivals but will also reduce the price elasticity of demand if the consumers feel there are no close substitutes. This is what is meant by brand loyalty – people will not easily shift back to rival products. There are problems associated with advertising because it will be a competitive tool taken up by all the firms. In this case one could argue that the advantage will be temporary and that advertising will simply add to the firm's costs and bring little benefit to its demand curve. If advertising is not equally effective, the successful firms might take advantage of their greater market share and brand loyalty to charge a higher price. It would increase its sales revenue by doing this in the portion of the demand curve where price elasticity of demand has a value less than 1.

It is easy to see how each firm can try to strengthen its market power in the short run. The constraint on firms is that there is freedom of entry into

the market, which will threaten the existence of abnormal profit in the long run. By a combination of marketing and product innovation, the individual firms may be able to postpone the long run equilibrium if the total market is growing.

At the heart of this model of competition is the fact that there are a large number of competitors using a combination of price and non-price competition to try and increase their market power. If there are few barriers to entry, then their success will only be temporary. There are many typical examples of this market structure in operation. Take-away food outlets and local privately owned restaurants are particularly good examples. They may appear to be selling similar products, but in reality, their products depend upon the skills and recipes of their owners. Local hairdressers' shops, driving schools and travel agents also exhibit the characteristics of this market structure.



Take-away food outlets in Singapore

Figure 2.49 shows the equilibrium price and output in monopolistic competition. In the short run, the profit-maximising firm will be seen to make abnormal profits. In time these will be competed away by the entry of new firms which will shift the original firm's demand curve to the left. The process will continue until all firms in the industry are making normal profit. A key point though is that in both the short and the long run the firm is inefficient. It operates above the minimum point of its average total cost curve giving a situation of excess capacity.

Barriers to entry

The existence of substantial **barriers to entry** of new firms into an industry differentiates oligopoly and monopoly from monopolistic competition and perfect competition.

Barriers to entry are a range of obstacles that deter or prevent new firms from entering a market to compete with existing firms. They give firms a degree of market power in that decisions can be made by existing firms without the risk of their market share or price being challenged from outside. The construction and maintenance of these barriers can become part of the firm's behaviour. Below are some of the main barriers:

- In some countries, it may be impossible for new firms to enter an industry because the economic activity is state owned or the good is produced

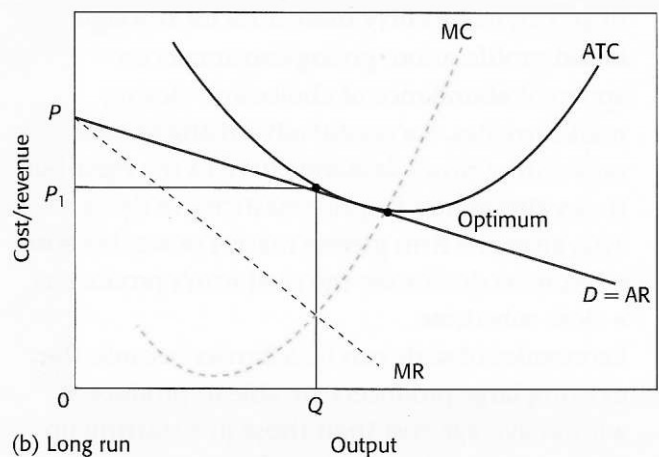
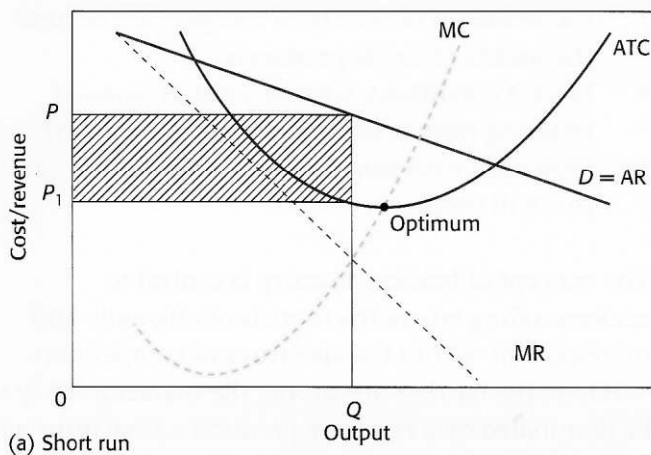


Figure 2.49 Monopolistic competition in the short and the long run

under licence from the government. This is a legal monopoly created to achieve social and political objectives. The economic justification might lie in the concept of a **natural monopoly**, where it is more efficient to have a single producer than to have competing firms. In countries where the state-owned resources have been privatised and the market has been deregulated, the economic justification has been that the injection of competition will bring economic and social benefits.

- The high fixed cost or setup cost in activities such as electricity generation, aircraft and car production and pharmaceuticals may deter potential entrants. The barrier here is access to capital. Only very large firms will be able to fund the necessary investment. Research and development costs will represent a high proportion of total costs and it will require high sales over a long period of time before the activity becomes profitable.
- If a firm is shutting down and these costs cannot be recovered because the resources are specialised and are not easily transferrable to other uses, they are regarded as sunk costs and act as a **barrier to exit** from the industry because the capital investment will be lost. It is therefore the risk of entering and the high cost of failure that deters potential entrants.
- Advertising and brand names with a high degree of consumer loyalty may prove a difficult obstacle to overcome. This explains why firms regard their expenditure on advertising and promotions as a type of investment. Existing firms can make entry more difficult through brand proliferation, giving consumers an apparent abundance of choice and closing market niches. Successful advertising cannot only shift a firm's demand curve to the right but it can also reduce its price elasticity of demand. This gives the firm greater market power because consumers do not see the rival firm's product as a close substitute.
- Economies of scale can be a barrier because the existing large producers are able to produce at a lower average cost than those just starting up. They also give the large firm an opportunity to cut its price in order to eliminate any high-cost

producers. This is the concept of predatory pricing which can be used to eliminate any new firms that do enter the industry.

- The production process or the products of a firm may be protected by a legal monopoly in the form of a patent, whereby competitors cannot copy without the permission of the owner. The idea is to guarantee a reward to entrepreneurs with original ideas for a reasonable period of time. The barrier here is access to either technology or information.
- Some existing firms may have a monopoly access to raw materials, components or retail outlets, which will make it difficult for new entrants. Vertically integrated manufacturing businesses will be protected by the fact that their rivals' costs will be higher.
- In activities such as consumer electronics, the pace of product innovation is so rapid that the existing firms will be working on the next generation of products whilst launching the current range. Unless the new entrants have original ideas or can exploit a new market segment, they are destined to fail.
- It may be possible for existing firms to hide the existence of abnormal profit by what is called entry limit pricing. This involves deliberately setting a low price and temporarily abandoning profit maximisation. It may be in the interest of all the players to do this and it therefore becomes a form of collusion through **price agreements**.
- Collaboration between existing producers to develop new products may act as a barrier in that the resources necessary to compete are beyond the means of single producers.
- Market conditions, such as a fall in demand resulting from economic recession, can leave producers with surplus production capacity and this will deter entry.

The concept of barriers to entry is central to understanding where the models of oligopoly and monopoly fit within the spectrum of competition.

Where the barriers are strong, the market is likely to be dominated by a few large producers. New firms will only enter if they think that the economic returns will be greater than the cost of breaking the barriers.

Oligopoly

Oligopoly is defined as a market situation where the total output is concentrated in the hands of a few firms. It is possibly the most realistic economic model but ironically the theory does not provide the definite predictions regarding the price and output of the firm that exist in every other model. An effective oligopoly can exist in an apparently competitive industry if a handful of firms dominates the market. Duopoly, where the market is shared between two big players, can be seen as an extreme form of oligopoly.

An oligopoly has the following characteristics:

- 1 The market is dominated by a small number of firms.
- 2 Their decisions are interdependent. Firms must decide their market strategy to compete with close rivals, but they must also try to anticipate their rivals' reactions and think what the next step should be in the light of this response.
- 3 There are high or substantial barriers to entry.
- 4 The products may be homogeneous or differentiated.
- 5 The uncertainty and risks associated with price competition may lead to price rigidity.
- 6 Firms may or may not choose to maximise profits.

The difficulty in studying oligopoly is that the behaviour can follow two very different routes. There are examples of aggressive competition in some industries whilst in others there is a suggestion of co-operation and even collusion.

Oligopolists are price makers but one of the dangers of using this weapon is that the firm can get drawn into a price war. An oligopolist would only start a price war if its costs of production were significantly lower than its rivals. A price war may be the natural outcome of economic events, such as overcapacity in the industry or the entry of new firms. Where the firms are highly diversified, a firm may be prepared to sacrifice profits by cutting the price, in an attempt to increase market share. Profits from some of its activities may be used to cover short-term losses on others.

Although they each have market power in the form of influence over the prices they charge, the uncertainty surrounding the outcome of competitive

tactics means that firms may prefer non-price competition. The observation that prices tend to be similar between oligopolists and are stable with time might be explained by the kinked demand curve theory as shown in Figure 2.50.

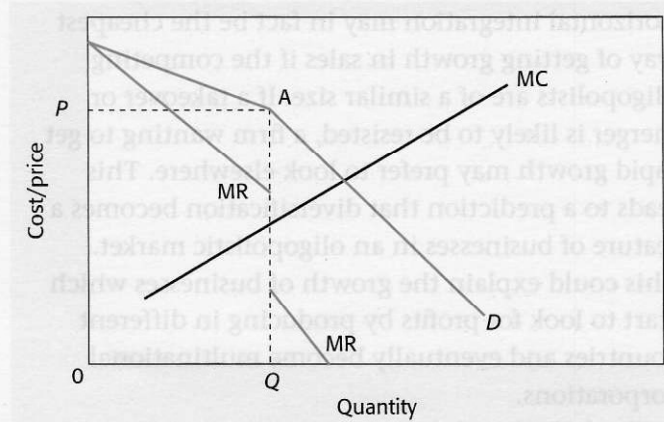


Figure 2.50 The kinked demand curve

The diagram illustrates a situation where one firm suspects that it faces a relatively elastic demand curve below the existing price. The temptation would be to cut the price in an attempt to increase total revenue. The outcome depends on the rivals' response. If they also cut their price, then the firm will sell relatively little extra output. It could even be worse off than it was before the price cut. It can also be seen that the firm could lose out if it chose to raise the price. Whatever the elasticity was, if rivals do not copy the price increase, then the firm will lose a disproportionate amount of sales because the product will look overpriced against that of rivals. The firm would be better off concentrating on non-price competition to increase revenue. This may include the following:

- advertising and promotions
- product innovation – the attempt to make the products more appealing to consumers.
- brand proliferation – where the firm produces lots of brands to saturate the market and to leave no gaps for rivals
- market segmentation – producers may decide that there are markets where the consumers have different characteristics and needs, and these market niches will be catered for through product innovation

- process innovation – usually seen as a way of reducing average costs, allowing the firm to cut the price without sacrificing profits.

One way for a firm to grow rapidly would be to take over one of its rivals. As seen earlier, this so-called horizontal integration may in fact be the cheapest way of getting growth in sales if the competing oligopolists are of a similar size. If a takeover or merger is likely to be resisted, a firm wanting to get rapid growth may prefer to look elsewhere. This leads to a prediction that diversification becomes a feature of businesses in an oligopolistic market. This could explain the growth of businesses which start to look for profits by producing in different countries and eventually become multinational corporations.

The difficulty of choosing competitive strategies and of predicting the response of rivals may change the objectives of the firm. Profit-maximising strategies may be replaced by satisficing (see page 100). The firm's management becomes more cautious, preferring to make just enough profit to keep the shareholders happy. The focus shifts towards maintaining market share.

Co-operation and collusion between oligopolists

There are situations where big firms find that it is in their interest to co-operate with rivals. One of the best examples is where the research and development costs are a high proportion of the total costs and where the pace of technical change is very rapid. It is in the interests of all the firms to pool their knowledge and agree on technical standards, perhaps taking part in joint ventures.

Collusion is altogether different. It is an anti-competitive action by producers. Informal or tacit collusion usually takes the form of **price leadership**, where firms automatically follow the lead of one of the group. The objective is to maximise the profits of the whole group by acting as a single monopolist. This illegal activity is difficult to prove since there is invariably no written evidence. A price agreement or output agreement is known as a **cartel** arrangement.

Collusion of any kind will work best when:

- there is a small number of participants
- a strong element of trust exists between them
- they have similar cost structures
- there is a clear leader
- the agreement can be policed
- there is no danger from new entrants
- the market conditions are stable
- the government will not intervene.

Collusion is more likely to be tacit where the behaviour of each firm is the result of an unwritten rather than formal agreement. One of the simplest forms is a follow-the-leader agreement, where each firm will only adjust its price following a move by the dominant firm. There are other price leadership models, such as using a typical firm as the yardstick for price. This will only change if a rise in costs affects the profit margin. The principle is the same: each firm will act in the same way in the interests of the group as a whole.

In practice, it is difficult to identify either tacit or formal agreements. This is because price similarities can be the result of either aggressive pricing in a competitive oligopoly or the outcome of a collusive agreement.

Monopoly

In theory, a monopoly is where a single firm controls the entire output of the industry. It is at the opposite end of the spectrum to perfect competition. In practice, a monopoly situation can arise when a firm has a dominant position in the market in terms of its market share. For example, in the UK, a legal monopoly is when a firm has more than 25% of the total market; if the share exceeds 40%, then the monopoly is seen as dominant.

A monopoly is protected from competition by the barriers to entry explained earlier. The word 'monopoly' conjures up an image of giant powerful firms. However, a local monopoly can exist where a relatively small firm dominates a local market either because it is too costly for others to enter or the prospect of profit is not high enough. Even when monopolists are large, the extent of power must not be exaggerated. Sometimes a domestic monopoly can be suddenly broken by new competition, say, from imported goods and services.

A single firm or pure monopolist in theory would face a downward-sloping market demand curve. In this situation it can decide on the price to charge or the quantity to supply, but not both. There may be situations where the monopolist is unable to make abnormal profits in spite of having market power. One such example would be where the fixed costs are so high that the necessary price would be outside the range that the consumers could afford. It may be that all the monopolist can hope for is that the revenue covers the production costs.

Figure 2.51 shows the equilibrium output of a monopolist. A profit-maximising monopolist would choose the output where $MC = MR$. This output will be somewhere over the price range where demand is price elastic and will be sold at the price consumers will pay. If the total revenue is higher than the production costs, it will make abnormal profit. This will be a permanent feature. In monopoly, there is no distinction between the short run and the long run because of the barriers that prevent the entry of competitors. There is no economic incentive for the monopolist to move away from the profit-maximising output Q .

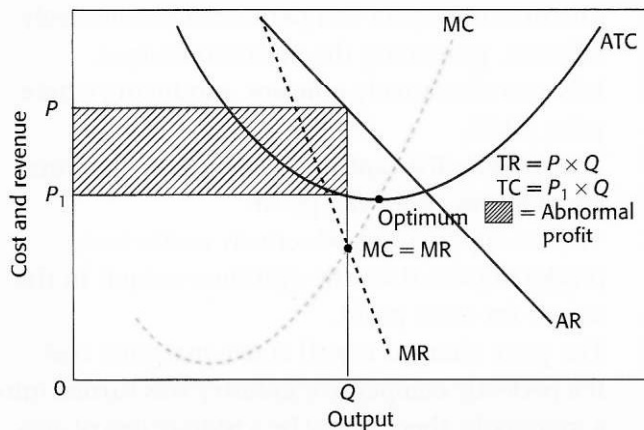


Figure 2.51 *The equilibrium of a monopoly*

The monopolist's profits could be increased in certain circumstances by a practice known as **price discrimination**. Price discrimination occurs where the monopolist chooses to split up the output and sell it at different prices to different customers. It is only true price discrimination if the quality of the product is identical in all market segments. The monopolist is making use of the fact that some consumers would have been prepared to pay more

than the single price (see Figure 2.52). At this price they would be enjoying some consumer surplus. The monopolist's aim is to charge what the consumers will pay and turn the consumer surplus into producer surplus in the form of abnormal profit.

It may be possible for a monopolist to use price discrimination to produce at a profit when competitive firms or a monopoly charging a single price could not cover costs. Figure 2.52 shows that at the single price profit maximisation output, the total revenue would be $3 \times 40 = 120$ and the total cost would be $3 \times 45 = 135$, giving a loss of 15. If the output was sold separately for what consumers would pay for each individual unit, the revenue would be $60 + 50 + 40 = 150$, giving an abnormal profit of 15. The monopolist has effectively tapped into the consumer surplus and turned it into producer surplus or profit. If triangle A in the diagram is the same size as triangle B, which is the shortfall in cost, the firm will break even, but if it is larger then it makes abnormal profit. As long as the consumers are prepared to pay the higher price, there is no consumer exploitation. The competitive market price would generate losses and therefore there would be zero output in the long run.

Price discrimination can only exist in particular circumstances and there are situations where it can

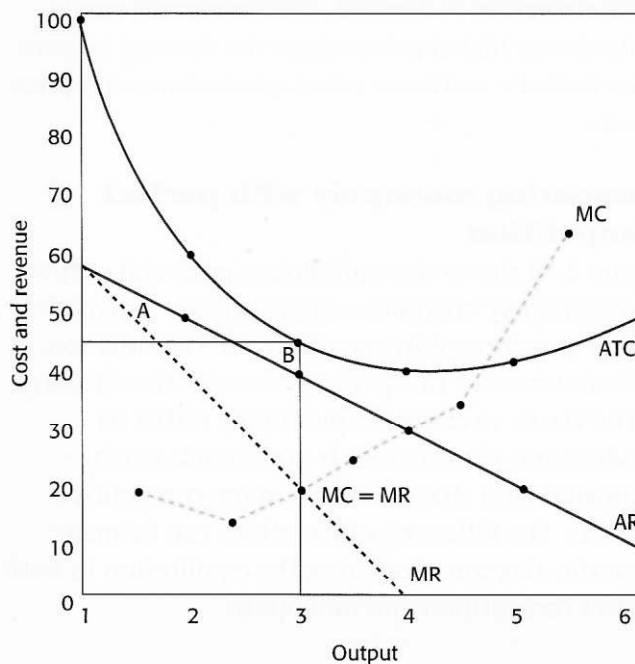


Figure 2.52 *A price discriminating monopolist*

be justified on economic grounds. If different groups of customers are charged different prices because the cost of providing the service differs, then it is quite acceptable. For example, at peak times of demand a firm might have to employ more staff. Price discrimination might in fact be used as a way of spreading out demand. This would account for out-of-season air fares and the lower price for off-peak telephone calls. Spreading out demand may improve efficiency, giving a further benefit to consumers. Price discrimination could be used to generate revenue on parts of a service, such as a rail network, so that the operator can cover losses on the least popular routes. Transport provides several examples of travellers being split into definite categories and charged different prices. There may be social motives for charging older people and children less than others. Consumer loyalty may be rewarded by discounts. The price of a journey may vary with the time of day or the day of the week.

If a firm wishes to split the market up into different segments and charge different prices, it must have a mechanism for keeping the markets separate. It must avoid the possibility of consumers buying in the cheaper part and the product being resold at a higher price. Price discrimination will only make economic sense if the market segments have different price elasticities of demand. The simple rule would be to charge higher prices where the demand is more price inelastic and lower prices where demand is price elastic.

Comparing monopoly with perfect competition

Figure 2.53 shows the equilibrium price and output of a monopoly charging a single price in a market free of government intervention and the situation that would occur in a perfectly competitive industry.

The classic case against monopoly is that its conduct and performance is undesirable when compared with that of firms in more competitive markets. The following observations can be made from the diagram comparing the equilibrium in both perfect competition and monopoly:

- The price in monopoly will be higher than it would be in perfect competition.
- The monopoly output is lower.

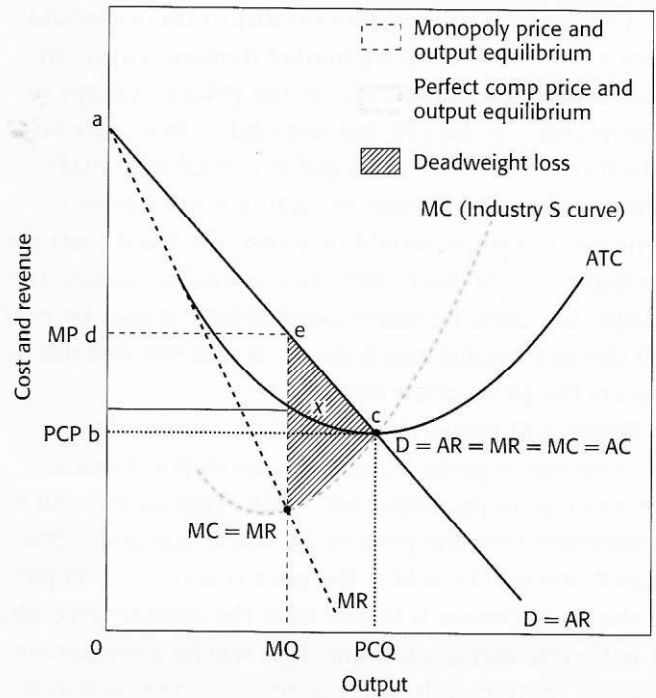


Figure 2.53 A comparison of a perfectly competitive industry with a profit-maximising monopolist

- The monopolist is making short and long run abnormal profits.
- The firm in perfect competition is productively efficient, producing the optimum output.
- It is also allocatively efficient, producing where price = MC.
- The monopolist captures consumer surplus and turns it into abnormal profit.
- The monopolist is productively inefficient, producing less than the optimum output in the search for extra profit.
- The price charged is well above marginal cost.
- If a perfectly competitive industry was turned into a monopoly, there would be a welfare loss of area *x* in addition to greater allocative inefficiency.

The criticisms of real-world monopolies based on a comparison with perfect competition may not be valid for two reasons:

- 1 Perfect competition is a theoretical ideal. Monopoly must be compared with the real-world models of monopolistic competition and oligopoly. These are also characterised by productive and allocative inefficiency. In addition they may involve a waste of resources in competitive advertising.

2 Figure 2.53 is drawn under the assumption that the costs in monopoly will be the same as in perfect competition. This ignores the possibility that the monopolist can achieve internal economies of scale which would reduce unit costs. It is possible that a monopolist could charge a lower price than would occur in perfect competition, making consumers better off, even though the monopolist is making abnormal profits.

A positive case can be made for monopoly in the following circumstances:

- A monopolist cannot always make abnormal profit – it depends how high its costs are. There may be situations where the fixed costs are so high relative to the total cost that the market price can just cover the average costs. In this case the monopolist would only make normal profit. This is a case of natural monopoly, where it would make no economic sense to have the product supplied by competing firms.
- The concept of abnormal profit must be considered carefully. One of the criticisms of a competitive market is the uncertainty of profits in the long run. A monopolist however can plan future investment and finance it through what are guaranteed profits. This may offer customers better products and the workforce greater security.
- The investment may take the form of process innovation, implementing new techniques of production with the objective of lowering unit costs.

- Alternatively, the profit could be used to finance product innovation which will add to consumer welfare in the future, either through an improvement in the product's performance or through widening consumer choice.
- If the benefits of economies of scale and greater investment are passed on to consumers, it could be argued that they have gained from the existence of abnormal profit.

One of the criticisms raised against state-owned monopolies is that the absence of competition makes them become less efficient. The essence of the argument is that firms with a guaranteed market can be complacent. Monopolists are said to suffer from *x*-inefficiency, which means that their cost levels are higher than they would be in competitive firms because they do not have the incentive for process innovation. They become less dynamic, doing things in a particular way simply through tradition. In addition, some of their investment may take the form of erecting barriers to maintain the level of abnormal profit by excluding potential rivals. This will add to costs in the short run. This may be true but there is the possibility that these inefficiencies are outweighed by economies of scale which lower the unit costs.

It is clear that monopolies can operate in ways that lead to inefficiency or consumer exploitation. However, one can make a positive case for monopoly. This explains why the investigation of monopoly practices is difficult and each case must be judged on its own merits. It is dangerous to assume that monopoly is always harmful; the performance of a monopolist may be little different from that of firms in oligopoly.

SELF-ASSESSMENT TASK 2.38



Read the feature below and then answer the questions that follow.

Does OPEC have a monopoly in the supply of oil?

The Organization of the Petroleum Exporting Countries (OPEC) is a cartel set up in 1960 by five countries. The membership has now risen to 11. OPEC is responsible for 40% of the world production

of crude oil and 14% of the world's natural gas. However, its exports of oil represent 60% of the oil that is traded internationally, and it has 77% of the world's proven oil reserves. Its declared objective

was to secure fair and stable prices for producers, an efficient, economic and regular supply of oil to consuming nations and a fair return on capital for those investing in the oil industry.

The cartel was in a very strong position. It had a geographic monopoly because the distribution of world oil deposits is uneven. The demand for oil has been rising on trend and has been an essential raw material with a low price elasticity of demand because of the lack of a close substitute. In this situation, any reduction in supply will increase the market price without much reduction in the volume traded. The revenue of the OPEC members will certainly increase. OPEC cut production in 1973–74 and 1979 in what have been described as oil crises. In the 1980s, oil prices fell because supply was greater than demand.

The only thing that will weaken OPEC's economic power is if new suppliers outside of the cartel appear or consumers take action that will reduce consumption. Technology may provide alternatives to oil in the future. The monopoly will weaken further if there is disagreement over the target price or the production quotas allocated to each member country.

OPEC denies that it is acting as a single monopoly, cutting output in order to charge high prices to consumers and points out that western



governments make more money from the tax on oil than the producing countries receive in revenues from selling the oil.

At the retailing end of the industry, the supply is in the hands of an oligopoly of oil companies who deny that they are charging too much, insisting that the profit margin is low because of fierce competition. Profits are only high because of the large turnover.

Some analysts predict that there will be further horizontal integration between oil companies that are already vertically integrated. The oil industry will continue to be dominated by a few big players mainly because of the high fixed cost and risks associated with exploration and drilling.

- 1 Is OPEC a monopoly or an example of collusive oligopoly? Justify your answer.
- 2 Explain the economic logic behind OPEC's decision to reduce output.

- 3 What factors may reduce the demand for OPEC oil over time?
- 4 How can the oil companies boost their profits if they have little control over the market price?

Contestable markets

So far, in dealing with market structures, the models shown in Figure 2.45 (page 102) have been analysed. A **contestable market** is not listed here although contestability increasingly features in many markets throughout the world. By definition, a *perfectly* contestable market is one in which there are no costs of entry and exit. So, only perfect competition matches this ideal; monopolistic competition, with few relatively costless barriers to entry and exit, can match it to some extent, as can oligopoly in certain situations.

A contestable market is not so much a market structure as a means by which governments have sought

to regulate industry and the provision of services. It has had particular significance in the UK since 1979, when the principle of contestability became central to the tremendous structural changes that have been made especially to the service sector of the economy.

The important features of a contestable market are as follows:

- Free entry, which implies that new and existing market providers will have the same cost structure as in a perfectly competitive market.
- The number and size of firms are irrelevant. If a contestable market has only a few large firms, any

cost differences should be a reflection of a decision by a particular firm to charge a given price.

- Normal profits only can be earned in the long run. If firms are making supernormal profits, then this is the signal for others to enter the market. This could be on a 'hit and run' basis – a firm sees an opportunity, enters the market, collects the gains and leaves at no cost.
- The threat of potential entrants into the market is over-riding. Oligopolists and even a monopolist are obliged to offer consumers the benefits that they would receive in a more competitive market structure. Otherwise, new firms will enter from the pool of potential entrants.
- All firms are subject to the same regulations and government control irrespective of size.
- Mechanisms must be in place to prevent the use of unfair pricing by established firms to stop new entrants from entering the market.
- Cross-subsidisation is eliminated since firms cannot make normal profits if they sell any of their services below cost.

The application of contestability to the airline market is particularly interesting since, prior to deregulation, routes were strictly regulated by governments and there was little competition. The 'open skies' policy of a deregulated market has led to lower fares and a greater choice of airline for passengers. This has

particularly been the case in the US domestic market and in Europe, where new low-cost airlines such as easyJet and Ryanair have entered the market and challenged the established national carriers. A further outcome has been the response of these carriers to form alliances.

There are other examples of contestable markets in the UK including:

- local bus services and rail services
- the provision of public services such as electricity, gas and water supplies
- telecommunications, particularly through the choice of network suppliers.

In theory and in practice, any market, even a monopoly, can be contestable. This state of affairs will come about if there is a pool of potential entrants waiting to enter a market if they see existing firms making abnormal profits. The cost of entry and exit is the main factor that determines whether a market really is contestable. Deregulation, the removal of barriers to entry, is the main way in which markets can be opened up to competition.

This policy is one that has been implemented by many governments worldwide, often in markets where previously the government has been the only provider of a service. The global air transport market is a particularly good example.

SELF-ASSESSMENT TASK 2.39

Read the feature below and then answer the questions that follow.

Airline alliances

The international airline business is a particularly good example of an oligopoly. It has moved from an industry where 20 years ago individual carriers competed with each other on particular routes to

one where networks compete with each other on a network basis. These networks are known as alliances. Three alliances cover most of the world's airlines. These are shown in Table 2.17.



Oneworld:	British Airways, American Airlines, Cathay Pacific, Qantas, JAL Japan Airlines plus 6 others
SkyTeam:	Air France, KLM, Aeroflot, China Southern Airlines, Delta Airlines, Kenya Airways plus 6 others
Star Alliance:	Lufthansa, Swiss, bmi, Singapore Airlines, Air China, Air Canada, United, Continental Airlines, Air New Zealand, Turkish Airlines plus 16 others

Table 2.17 Airline alliances

Continental Airlines is the latest addition to the Star Alliance. Having pulled out of merger talks with United Airlines, in August 2009 it announced its intention to withdraw from SkyTeam. Analysts see this switch as the next best thing, not least because United is also a member of the formidable Star Alliance.

The way the new battleground is shaping up since the US and the EU entered into an 'open skies' agreement earlier this year, Star competes

with SkyTeam and both compete with Oneworld. Continental's switch to the Star Alliance was approved by the US Department of Transportation in July 2009 on the grounds that it will give the airline 'more flexibility, benefit consumers, enhance competition and preserve jobs'. In addition, it will create new service options and a wider range of fares for travellers.



Source: Airlinealliances.org

- 1 Explain the possible benefits to an airline of becoming a member of an alliance.
- 2 Explain the possible benefits to passengers of airline alliances.
- 3 The US Department of Justice remains concerned about the anti-competitive behaviour of airline alliances. Comment on this concern.

Conclusions – the conduct and performance of firms

The conduct or behaviour of firms has been discussed in each of the four main market structures. The ways firms carry out their businesses will be determined by their objectives and the actual market conditions. As we have already seen, a firm's market power, and hence its conduct, is directly linked to the ease or difficulty of entry into the market.

In setting their prices, only in perfect competition are firms truly price takers. Any firm that moves away from a policy of charging more or less than the prevailing market price will have to leave the industry in the long run. In all other market

structures, firms are price makers to some extent, although there may be some **price competition**. Consequently, **non-price competition**, where firms compete in terms of product promotion through branding, packaging or advertising, is relevant in monopolistic competition and oligopoly. A monopolist though has complete control over the prices that are charged.

Other aspects of pricing were discussed in the cases of oligopoly and monopoly. Price leadership was stated as being prevalent in oligopoly. Here, a market leader may be the price leader. This firm sets prices and others follow. The rigidity of prices in this market was illustrated by the kinked demand curve,

a clear recognition of the mutual interdependence of firms.

So, in imperfect competition, firms compete with others on a mixture of price and non-price competition. It is only when there are very close substitutes that their conduct becomes less predictable. In this way, firms are interdependent. The extent to which they feel they can take risks with regard to their rivals' responses can lead to a change in a firm's pattern of behaviour. The outcome is often one of collusion.

The perfect competition model is an ideal. All other market structures fail to match it in terms of efficiency and performance. Monopolistic

competition, for example, is said to have excess capacity with firms operating at less than the optimum level of output. The prices charged will be higher than what they could charge if they were bigger.

The models of competition make an assumption that, whatever the market structure, each firm will seek to maximise its profits all of the time. In reality this is clearly not the case. There is a particularly strong argument for relaxing this assumption when investigating how oligopolists operate. Alternative motives therefore often make it difficult to predict the conduct of firms in respect of price and output.

SPECIMEN EXAM QUESTIONS

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The following questions have been set in recent CIE examination papers.

- 1 a** Explain how a knowledge of long run average costs might be useful to a profit-maximising firm. [10]
b Discuss whether firms want, and are able, to maximize profits as suggested by economic theory. [15]
[25 marks]

(October/November 2008)

- 2** Airbus, a large aircraft manufacturing company, announced in 2007 that its goal was to increase its \$475 million research budget by 25% in order to try to develop a more environmentally friendly aircraft that had lower fuel consumption.

- a** Explain why Airbus is likely to be in an imperfect rather than perfect market structure. [10]
b Economics textbooks sometimes criticise firms in imperfect competition as being against the public interest. What does this mean and how far does the Airbus announcement prove the textbooks wrong? [15]

[25 marks]

(May/June 2009)

In this supplement section it has been shown that:

- The principle of diminishing marginal utility can be used to explain the shape and derivation of the demand curve.
- A consumer will choose a combination of goods where the value of the marginal utility divided by the price of the good is equal for all goods.
- A price change for a good can be divided into a substitution effect and an income effect.
- In the short run at least one factor of production is fixed; all factors are variable in the long run.
- The short run production function shows how the quantity produced varies with changes to the input of a variable factor of production, normally labour.
- The demand for all factors of production is a derived demand; in the case of labour, the firm's demand curve can be derived from the value of the marginal revenue product.
- The supply of labour to a firm depends upon the wage rate; the shape of the supply curve for labour depends upon the responsiveness of labour supply to a change in the wage rate.
- The wage rate in a market is like any other price and is determined by supply and demand; labour markets can be influenced by the actions of trade unions and the government.
- Transfer earnings and economic rent can be used to explain why some workers are paid more than others.
- Economists split a firm's costs of production into fixed and variable costs; marginal and average costs are particularly useful in explaining how costs vary with a firm's output.
- In the long run, as output expands, the benefits from falling average costs are known as economies of scale; these benefits can accrue both within and from outside of a particular firm.
- Although economic power rests with large firms, small firms are more typical and are able to survive for many reasons.
- The normal objective of a firm is profit maximisation; other objectives may also be relevant in some types of business activity.
- The structure of markets can be explained by various characteristics including the strength of barriers to entry, the number and size of firms, the nature of the product and the availability of information.
- Economists recognise various models of market structure, namely perfect competition, monopoly, monopolistic competition and oligopoly; these models are useful for making comparisons with real markets.
- Many real-world markets are increasingly contestable in their structure.
- Firms compete in various ways depending upon the market structure in which they operate.
- The main models of market structure themselves can be compared in terms of their relative output, profits and efficiency.