# 6

# MONOPOLY

Chapter 5 dealt with the market structure known as perfect competition. One of the main characteristics of perfect competition is that many buyers and sellers operate in the market and that the market mechanism determines both the price and the quantity traded. A monopoly is the opposite. A pure monopoly occurs when there is only one manufacturer of a product for which there are no close substitutes. Although the monopolist is also faced with a market demand curve for his product, because he is the only one offering the product, he himself can decide (within limits) at which point on the market demand curve he would like to be. The monopolist can therefore decide on both the price and the quantity of the product that he is prepared to offer – without expecting any repercussions from other market participants. A pure monopoly, like perfect competition, is seldom found in practice. The reasons for this will be explained later.

On completion of this chapter, you should know

- what a monopoly is
- the characteristics of a monopoly
- how a monopoly maximises profit
- the equilibrium condition for a monopolist
- how a monopolist can apply price discrimination
- how a monopoly and perfect competition compare
- why and how governments act against a monopolist

## CHARACTERISTICS OF A MONOPOLY

The main characteristics of a monopoly are that there is only one manufacturer or seller of a product, there are no close substitutes for the product, and there are obstacles that impede other participants' entry to the market. Thus consumers cannot buy the product from anyone but the monopolist. Typical examples of monopolies in South Africa are diamond sales by De Beers's Central Selling Organisation (CSO) and SA Breweries' (SAB) production of beer. As far as SAB is concerned, there are a few small producers of beer, but their market share is so tiny that they are hardly worth mentioning. However, SA Breweries cannot be regarded as a pure monopoly but rather as a quasi-monopoly.

Other producers cannot provide the same product as a monopolist because obstacles make entry to the product market difficult. These obstacles may assume different forms – some are of an economic nature, and are referred to as *natural monopolies*. An example is exclusive ownership of raw materials such as a unique kind of mineral water which makes the manufacturer a monopolist. Another example of a natural monopolist is when there is an exceptionally high development cost, as was the case with Iscor in the 1920s. Finally, if there is room for only one firm to produce a product efficiently in an industry (ie when one firm can serve the entire market at a lower price than two or more firms), economists also speak of a natural economy.

**Natural monopoly**

**Artificial monopoly**

If the obstacles to the entry of other firms are not economic in nature, one speaks of *artificial monopolies*. An example of such an obstacle is a *patent*, which is the legal right whereby the holder of the patent has the exclusive right to manufacture a product or use a specific technique or process. A case in point is the Polaroid camera – during the period for which the patent was valid other manufacturers were not allowed to copy this type of camera. *Licensing* is another way in which an artificial monopoly comes into being. A pertinent example here is the SABC, which was issued with a radio broadcasting licence in 1936 and a TV broadcasting licence in the 1970s. If there are no such obstacles to entry by other firms, one cannot really speak of a real monopoly, even if the firm is the only producer of a product – without obstacles to entry, monopoly profits would immediately attract competitors to the industry. In a town, for example, there may be only one producer of milk, but although such a supplier will have a certain degree of monopolistic power, this does not satisfy the definition of a monopolist. (This is why SA Breweries cannot be regarded as a pure monopolist – there are no obstacles that make it impossible for other producers to enter the market.)

Although a monopolist is the only supplier of a product, the product is still influenced by market forces in the economy. First, consumers have limited budgets and a monopolist cannot ask excessive prices for his product. As such,

the product of a monopolist has to compete with all the other products available in the economy for the favour (and money) of consumers. Also few products have no close substitutes whatsoever. For many years in South Africa, for example, there was no competition in the provision of telephone services (ie before cell phones appeared on the scene), but even then consumers could consider alternative means of communication such as letters, messengers and amateur radio links. This applies to other products too.

Although one seldom finds a pure monopoly in practice, a study of this market form provides useful insight should market conditions move in the direction of a monopoly. These insights are essential to the formulation of public policy for industries with the characteristics of a monopoly. Knowledge of the theory of monopolies also provides a point of reference on the opposite end of the spectrum of market structures from perfect competition. Such knowledge is also important for any person planning an enterprise in which he or she may have the characteristics of a monopolist.

## THE MARGINAL REVENUE CURVE AND AVERAGE REVENUE CURVE OF A MONOPOLIST

We have already mentioned that a monopolist is the sole provider of a product to the market. The demand for the product of a monopolist, however, is also determined by the market – hence the monopolist is confronted by a normal market demand curve that runs downwards from left to right. (This is in sharp contrast to the horizontal demand curve of the individual firm in perfect competition.)

Any point on the demand curve of a monopolist is an indication of the quantity of the product that can be sold and also an indication of the price at which it will be traded. In Figure 6-1(a), for example, one can see that the monopolist can sell the quantity $Q_1$ at price $P_1$. Because *each* of the individual units (comprising $Q_1$) can be sold at $P_1$, this means that $P_1$ is also the average price or revenue that the monopolist will obtain per unit at the particular point on the demand curve. This applies to any price-quantity combination on the demand curve, which means that the *demand curve* of the monopolist is also its *average revenue curve*.

**D = AR**

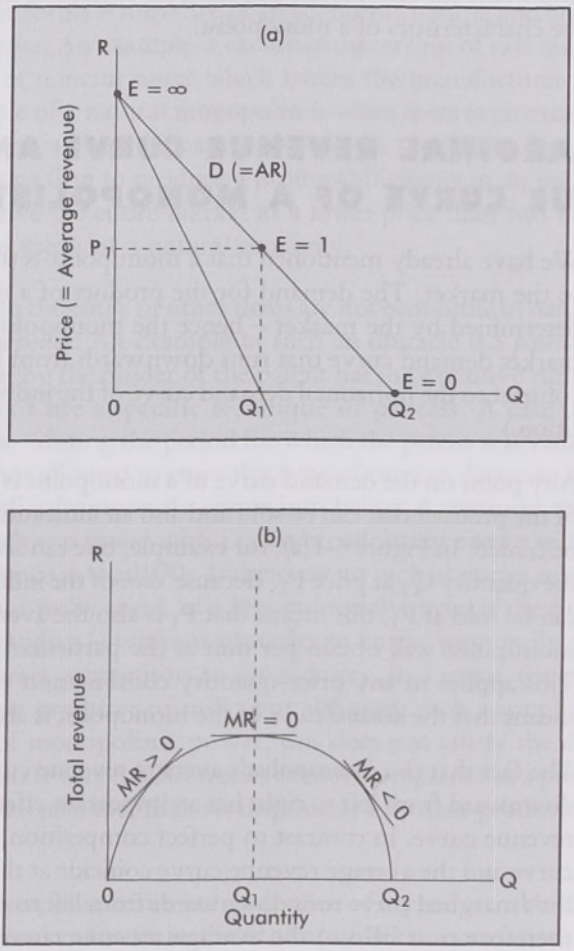
The fact that the monopolist's average revenue curve (or demand curve) slopes downward from left to right has an important effect on the path of the marginal revenue curve. In contrast to perfect competition, where the marginal revenue curve and the average revenue curve coincide at the market price, the monopolist's marginal curve runs downwards from left to right but it is steeper than (and therefore runs below) the average revenue curve. Because of the downward sloping demand curve, the monopolist can only increase his sales (by, say, one

unit), by asking a lower unit price for his product. Because this reduction in price relates not only to the marginal unit, but also to all previous units, the increase in total revenue (ie marginal revenue) that follows the sale of the additional unit is less than the asking price (ie average revenue). The marginal revenue curve therefore runs below the average revenue curve. (For a numerical explanation of this, read Box 6-1.)

**Figure 6-1**

**Average, marginal and total revenue**

The AR curve is also the monopolist's demand curve. The MR curve can be derived by calculating the slope of the TR curve. The intercept of the MR curve on the horizontal axis is precisely half of that of the AR curve. Thus $0Q_1 = Q_1Q_2$.

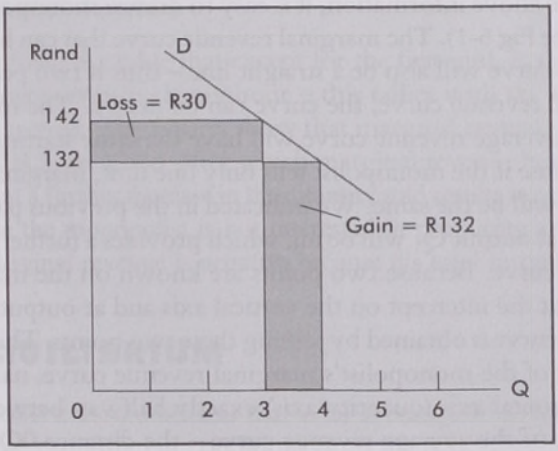


**Box 6–1**

## AVERAGE REVENUE (PRICE) AND MARGINAL REVENUE IN A PURE MONOPOLY

The figure below shows an imaginary demand curve for a monopolist. At the price of R142, a monopolist can sell three units and at the price of R132, four. This means that if he reduces his price from R142 to R132, he can sell one additional unit and therefore increase his total revenue by the price of the additional unit, that is by R132. It is now assumed that if the monopolist reduces his price to sell the fourth unit for R132, he will also have to sell the first three units for the same price. However, the price reduction of R10 on the first three units means of a 'loss' of R30 on those units. The net change in total revenue (ie marginal revenue) resulting from the sale of the fourth unit is therefore R102 (ie R132 minus the loss of R30). Hence marginal revenue is considerably less than average revenue (marginal revenue = R102 and average revenue = price = R132).

**Price and marginal revenue in a pure monopoly**




## Location of the marginal revenue curve graphically

The marginal revenue curve has a very specific location in relation to the average revenue curve, namely it cuts the horizontal axis (quantity axis) precisely halfway between the origin and the intercept of the average revenue curve. Thus

if the average revenue curve is known, it is very easy to determine the marginal revenue curve. The following explanation should simplify this.

Figure 6-1(a) shows a demand curve with the usual slope, namely sloping downwards from left to right. In the previous section it was apparent that this demand curve is also the average revenue curve of the monopolist. Figure 6-1(b) depicts a total revenue curve, which is obtained each time by multiplying the price by the corresponding quantity in Figure 6-1(a) (see the discussion of Fig 2-4 in Chapter 2).

By definition, marginal revenue reflects the change in total revenue stemming from the sale of one additional unit of a product. A change in total revenue (ie marginal revenue) is also indicated by the slopes of the tangents of the total revenue curve. See the total revenue curve in Figure 6-1(b). For a production level between 0 and $Q_1$, the slope of the total revenue curve is positive – hence the marginal revenue in this area is also positive. When output is exactly equal to $Q_1$ the slope of the total revenue curve is 0 – hence marginal revenue is also 0 at output $Q_1$. For production levels between $Q_1$ and $Q_2$ the total revenue curve has a negative slope, which means that marginal revenue in this area is also negative.

With the above information, it is easy to draw a monopolist's marginal revenue curve (see Fig 6-1). The marginal revenue curve that can be derived from a linear demand curve will also be a straight line – thus if two points are known on the marginal revenue curve, the curve can be drawn. The marginal revenue curve and the average revenue curve will have the same starting point on the vertical axis because if the monopolist sells only one unit, marginal revenue and average revenue will be the same. We indicated in the previous paragraph that marginal revenue at output $Q_1$ will be nil, which provides a further point on the marginal revenue curve. Because two points are known on the marginal revenue curve, namely at the intercept on the vertical axis and at output $Q_1$ on the horizontal axis, the curve is obtained by joining these two points. This is an important characteristic of the monopolist's marginal revenue curve, namely that it intercepts the horizontal axis (quantity axis) exactly halfway between the origin and the intercept of the average revenue curve – the distance $0Q_1$ is just as long as the distance $Q_1Q_2$. The slope of the marginal revenue curve is therefore twice that of the average revenue curve.

## Total revenue, average revenue and marginal revenue: a numerical example

Average revenue and marginal revenue can also be deduced with the aid of a numerical example. Table 6-1 contains such an example.

**Table 6-1**
**Average and marginal revenue**

| P | Q | TR | AR | MR |
|---|---|---|---|---|
| 6 | 0 | 0 | – | – |
| 5 | 1 | 5 | 5 | 5 |
| 4 | 2 | 8 | 4 | 3 (8 – 5 = 3) |
| 3 | 3 | 9 | 3 | 1 (9 – 8 = 1) |
| 2 | 4 | 8 | 2 | –1 (8 – 9 = –1) |
| 1 | 5 | 5 | 1 | –3 (5 – 8 = –3) |
| 0 | 6 | 0 | 0 | –5 (0 – 5 = –5) |

In Table 6-1 the first two columns represent a demand schedule for a monopolist's product – in other words, P shows the different prices and Q the quantities asked at each of the prices. Total revenue (TR) is calculated each time by multiplying price (P) by quantity (Q). Average revenue (AR) is calculated by dividing total revenue (TR) by quantity (Q). Marginal revenue is obtained by calculating the change in total revenue for each unit change in quantity (calculations appear in the table).

It is clear from the table that except for the first unit, marginal revenue is lower than average revenue throughout – this tallies with the graphic analysis in the previous section. The figures show that marginal revenue remains positive until a price of R3 is reached, after which marginal revenue becomes negative, which means that a further increase in the quantity sold results in a decline in total revenue. Of course the monopolist is not interested in producing an output in the area in which marginal revenue is negative because his total revenue will decline there.

## MARKET EQUILIBRIUM

At this point it should be clear that as far as competition is concerned, a monopolist is subject to different conditions from the perfectly competitive firm. When it comes to production, however, it is reasonable to assume that the monopolist has the same costs as the perfectly competitive firm. Hence the general shape of the monopolist's cost curves will be the same as that of the perfectly competitive firm.

### Short-run equilibrium

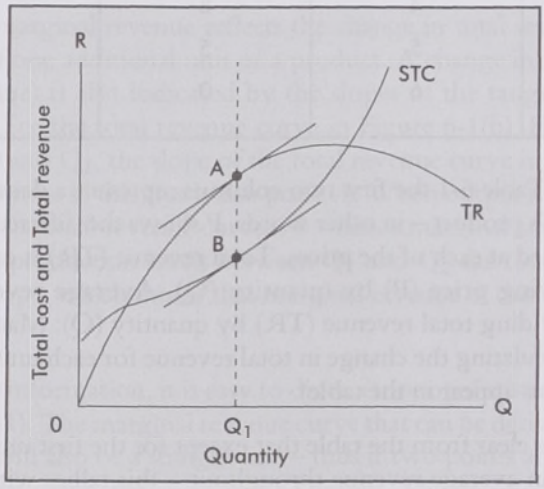
As in perfect competition, it is assumed that a monopolist will try to maximise profit in both the short and long run. Figure 6-2 shows the total revenue curve

(TR) and short-run total cost curve (STC) of a typical monopolist. The STC curve cuts the vertical axis at a positive value which indicates the existence of fixed cost – hence the diagram illustrates a short-run cost function.

**Figure 6-2**

**Total revenue and short-run total cost curve of a monopolist**

Profit is maximised at output $Q_1$ where the positive difference between TR and STC is a maximum.




Total profit can be defined as the difference between total revenue and total cost. In Figure 6-2 profit is maximised at an output of $Q_1$ where the positive difference between TR and STC is a maximum. According to the principles explained in Chapter 4, the slope of the total revenue curve indicates the marginal revenue, while the slope of the short-run total cost curve indicates the marginal cost. At points A and B the slope of these two curves is the same – hence one can say that when the monopolist's total profit is maximised in the short run (and the short-run equilibrium is therefore reached),

**Maximising profit**

MR = SMC

applies.

The same condition for profit maximisation is encountered in perfect competition, with one difference. In perfect competition, MR = P and the condition for profit maximisation can therefore be written as SMC = MR = P. In the monopolist's case, MR is smaller that P (the MR curve runs below the AR), and if profit maximisation occurs, MR = SMC but MR is smaller than P. This will become clear in the discussion of Figure 6-3.

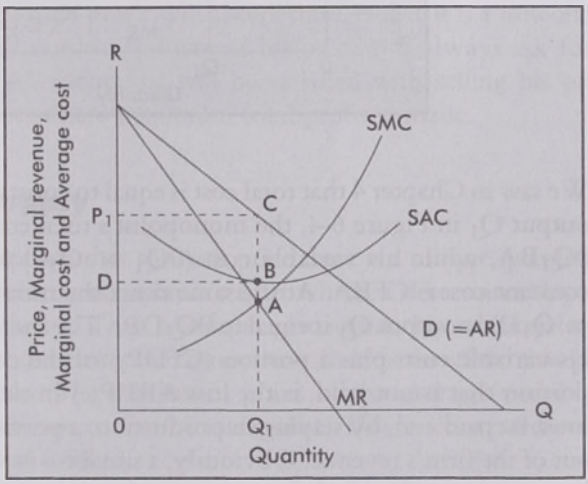
The short-run equilibrium situation of the monopolist can also be illustrated in another way, as depicted in Figure 6-3. The demand curve of the monopolist is a straight line and the MR curve is constructed as explained in a previous section. The cost curves are the typical SMC and SAC curves derived in Chapter 4. The way in which this information is used to determine the price-quantity combination when the monopolist is in short-run equilibrium is important: At point A, SMC = MR, which determines the profit-maximising output $Q_1$ on the horizontal axis. The price at which $Q_1$ can be sold is obtained by moving upwards from point A as far as C on the demand curve. The price that corresponds to C is indicated by $P_1$ on the vertical axis.

The short-run average cost curve (SAC) indicated in Figure 6-3 enables us to calculate the monopolist's short-run profit. The monopolist's total revenue is $P_1 \times Q_1$, which is equal to $0P_1CQ_1$. Total cost equals average cost multiplied by the quantity produced, or the area $0DBQ_1$. The difference between the two areas is the monopolist's total profit, which is indicated by the area $DP_1CB$ in Figure 6-3. Because total revenue is greater than short-run total cost, the monopolist in this example makes an economic profit.

**Figure 6-3**

**Monopolist in short-run equilibrium**

Profit is maximised if MR = SMC, which determines output $Q_1$ and price $P_1$. Economic profit is $P_1CBD$.




## Not always economic profit for monopolist

Some people believe that because a monopolist is the only supplier of a product he or she will, without exception, make a profit. However, this is not always so – having a monopoly does not guarantee profit. The profitability of a mono-

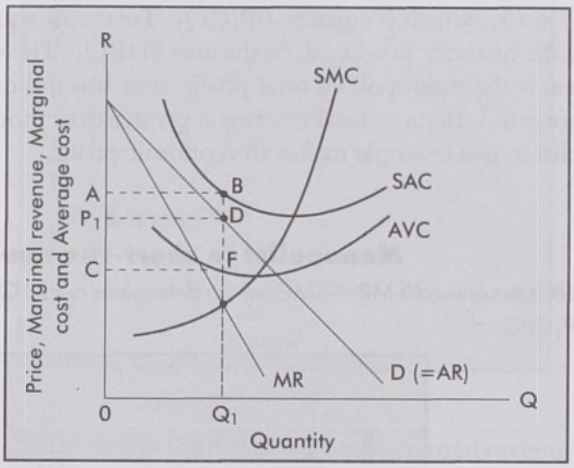
poly depends on the demand for the product as well as the cost of production. Figure 6-4 represents the demand and cost curves of a monopolist who makes short-term losses. Equilibrium is again obtained where MR = SMC, but here it is a loss-minimising situation (as opposed to a profit-maximising situation). In equilibrium, the monopolist will produce quantity $Q_1$ and sell it at price $P_1$. Price $P_1$ is lower than the short-run average cost, as indicated by BD. The monopolist therefore makes a loss represented by the rectangle $ABDP_1$.

**Loss**

**Figure 6-4**

**Short-run loss for the monopolist**

The SAC curve lies above the demand curve, hence price $P_1$ is lower than the SAC. The loss is $ABDP_1$.




We saw in Chapter 4 that total cost is equal to constant cost plus variable cost. At output $Q_1$ in Figure 6-4, the monopolist's total cost ($0Q_1 \times Q_1B$) is equal to $0Q_1BA$, while his variable cost ($0Q_1 \times Q_1F$) is equal to $0Q_1FC$ – hence constant cost is CFBA. At the same time, the monopolist's total revenue ($0Q_1 \times Q_1D$) at output $Q_1$ is equal to $0Q_1DP_1$. The monopolist can therefore pay all his variable costs plus a portion ($CFDP_1$) of the constant (ie fixed) cost. (The portion that is not paid, is the loss $ABDP_1$.) In the short term, constant costs must be paid and, by staying in production, a portion of these costs can be paid out of the firm's revenue. Obviously, a situation in which a monopolist makes a loss cannot continue indefinitely.

## Not always the highest price for the monopolist

Another misconception is that a monopolist can increase his price arbitrarily and will always ask for the highest price he can obtain. However, this is not true, for

a price increase can also mean a loss in total revenue (and total profit) for a monopolist.

If a monopolist with his price-quantity combination finds himself on the inelastic part of the demand curve, then a price increase will always mean a rise in total revenue (see Fig 6-1 and Fig 2-4 in Chapter 2). However, a monopolist will not want to be on the inelastic part of the demand curve because he cannot maximise total profit there. To maximise total profit, he will produce where marginal revenue is equal to marginal cost (MR = SMC) and use this point of intersection (see point A in Fig 6-3) to determine his price on the demand curve – this price will always fall on the elastic part of the demand curve (see point C in Fig 6-3), where a price increase will reduce total revenue.

How do we know with certainty that the equilibrium price at which the monopolist maximises total profit will fall on the elastic part of the demand curve? Cost is always positive (no cost curve lies below the horizontal axis) and SMC is therefore also positive, which means that if SMC = MR, the point of intersection will also be at a positive value of MR – that is, above the horizontal axis. If this is so, the price that is determined by means of this point of intersection will always fall on the top half of the demand curve (see point C in Fig 6-3). In this half of the demand curve, demand elasticity is greater than 1 and we know that a price increase will lead to a decline in revenue.

If the monopolist was in the equilibrium position (or to the left of it), and total revenue declines, total profit will also decline. Hence it is a misconception that a monopolist will randomly increase his price and always ask for the highest possible price. A monopolist will be satisfied with selling his product at the equilibrium price, where maximum total profit is made.

## The monopolist's supply

We saw in Chapter 5 that for each price there is a unique quantity that will be offered by a perfectly competitive firm which is determined by the short-run marginal cost curve. Thus a unique price-quantity relationship exists. The supply curve of the perfectly competitive firm is therefore that portion of the SMC curve above the minimum point of the average variable cost curve. However, this is not so for a monopolist. This is illustrated with the aid of Figures 6-5(a) and 6-5(b).

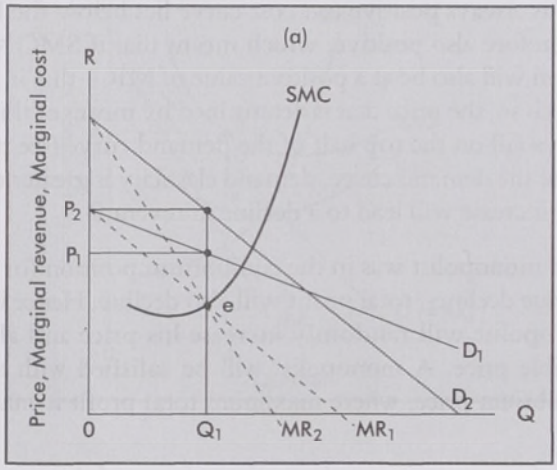
Figure 6-5(a) shows the SMC curve of a monopolist. Two possible demand curves, $D_1$ and $D_2$, are indicated. The marginal revenue curves, $MR_1$ and $MR_2$, that correspond to the demand curves intersect the SMC curve at the same output level $Q_1$ (the equilibrium condition SMC = MR therefore applies to both demand curves). In the diagram we can see that if demand is $D_1$, the monopolist determines the price for his product at $P_1$; if demand is $D_2$, the price will be

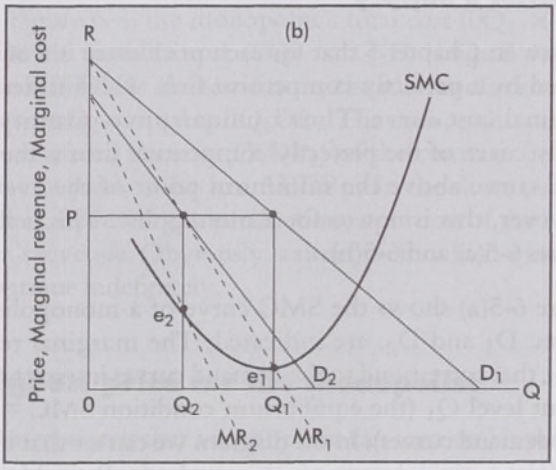
$P_2$. For a given output level $Q_1$, determined according to the equilibrium condition SMC = MR, there are two prices for this monopolist. In Figure 6-5(b) the other possibility is indicated in the same way, namely that at a given price two quantities, $Q_1$ and $Q_2$ are offered. Once again, two demand curves, $D_1$ and $D_2$, with their matching marginal revenue curves, $MR_1$ and $MR_2$, are indicated. According to the points of intersection, $e_1$ and $e_2$, of the SMC curve with the MR curves, a price P is determined, but two quantities, $Q_1$ and $Q_2$, are offered at this price.

**Figures 6-5(a) and (b)**

**No supply curve for the monopolist**

There is no unique price-quantity relationship. In 6-5(a) there are two prices for a given output level; in 6-5(b) there are two output levels for a given price. Supply curves cannot therefore be derived.



**No supply curve**

These two examples illustrate that one cannot determine a unique price-quantity relationship for the monopolist and therefore one cannot derive a supply curve as one can for the perfectly competitive firm. This is not to say that the monopolist is not in a position to determine a price for his product, but that we cannot say with certainty what his supply curve will look like – the monopolist will allow himself to be led by the elasticity of the demand curve, and then, with due consideration of his marginal cost, determine the price.

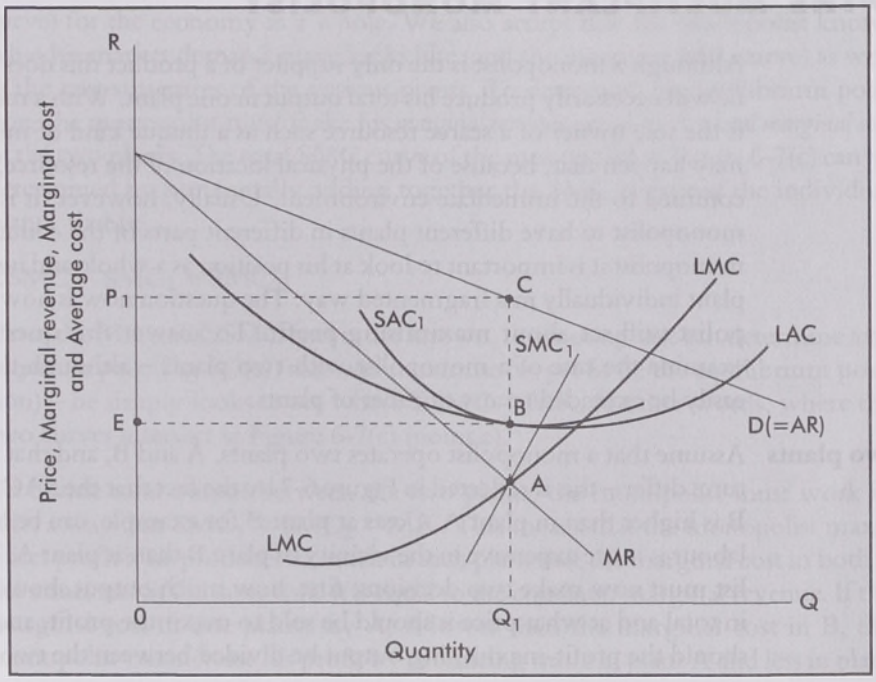
## Long-run equilibrium

As with the perfectly competitive firm, there is no fixed cost for a monopolist in the long run. A monopolist can therefore extend his plant in the long run and construct the particular plant size that maximises long-run profit. If the monopolist makes losses in the short run, he will endeavour to build a plant of such a size that it will make a profit. If no plant size can make a normal or economic profit, the monopolist will close his enterprise. If the monopolist makes an economic profit in the short run, it will change the plant size in the long run, in order to make more economic profit (if it is not already a maximum).

**Figure 6–6**

**The monopolist in long-run equilibrium**

Profit is maximised if MR = LMC, which determines $Q_1$ and price $P_1$. Economic profit is $P_1$CBE, and the monopolist can also make it in the long run.



Long-run profit is maximised by making marginal revenue equal to long-run marginal costs, that is, MR = LMC. This is illustrated in Figure 6-6, where the MR curve and the LMC curve intersect at A, which determines the long-run profit-maximising quantity $Q_1$ at a price $P_1$. The plant size that maximises profit in the long run is represented by the short-run average cost curve $SAC_1$, which has a point of tangency at B with the long-run average cost curve LAC and can therefore produce the output level $Q_1$ at a lower average cost than any other plant size. Also, if the plant size $SAC_1$ which maximises profit in the long run is operated at the profit-maximising output level $Q_1$, profit is simultaneously maximised in the short run. This is indicated by the fact that in Figure 6-6 both the LMC curve and the $SMC_1$ curve intersect the MR curve at point A.

The demand curve and the cost curves that appear in Figure 6-6 show that this particular monopolist's selling price $P_1$ is higher than the LAC at output level $Q_1$ (compare C with B). The monopolist therefore makes economic profit equal to the area $P_1$EBC. Unless the demand curve shifts as the result of changes in taste, rising incomes, or the development of close substitutes for the monopolist's product, he will be able to make economic profit for an unlimited period in the long run. This favourable position is possible only because constraints prevent other firms from entering the market.

## THE MULTIPLANT MONOPOLIST

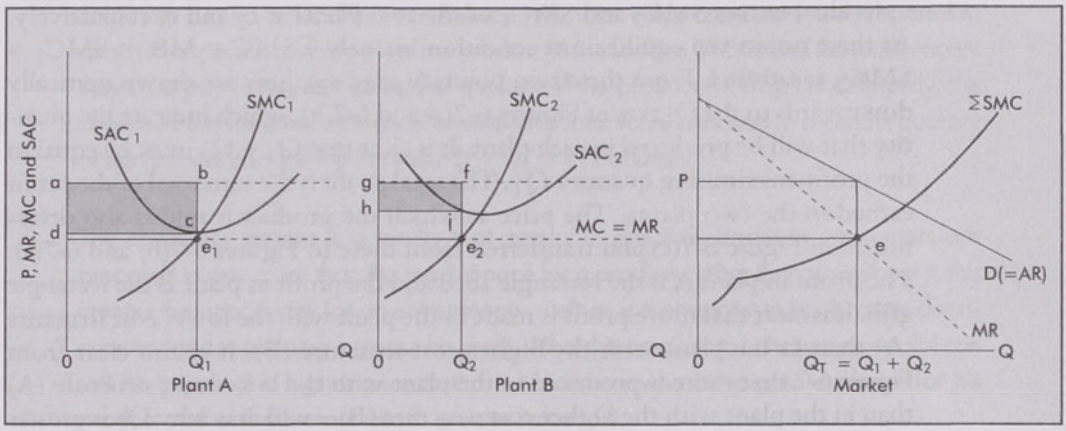
Although a monopolist is the only supplier of a product this does not mean that he will necessarily produce his total output in one plant. With a monopolist who is the sole owner of a scarce resource such as a unique kind of mineral water, it may happen that, because of the physical location of the resource, production is confined to the immediate environment. Usually, however, it is possible for a monopolist to have different plants in different parts of the country. For such a monopolist it is important to look at his position as a whole and not to view each plant individually in a fragmented way. The question now is how such a monopolist will set about maximising profit. To answer this question, we shall examine the case of a monopolist with two plants – although the analysis can easily be extended to any number of plants.

**Two plants** Assume that a monopolist operates two plants, A and B, and that the cost structures differ – this is reflected in Figure 6-7 by the fact that the SAC curve in plant B is higher than in plant A. Costs at plant B for example, can be higher because labour is more expensive in the vicinity of plant B than at plant A. The monopolist must now make two decisions: first, how much output should be produced in total and at what price it should be sold to maximise profit, and second, how should the profit-maximising output be divided between the two plants.

**Figure 6–7**

**Multiplant monopolist**

Total output and price are determined by equating ΣSMC with MR. To maximise profit, total output is divided between the two plants in such a way that $SMC_1 = SMC_2 = MR$. The plant with the lower costs produces more than the plant with the higher costs.




We assume that the monopolist does not face separate demand curves for each plant – that is, the monopolist has only one demand curve (the market demand curve) for the economy as a whole. We also accept that the monopolist knows what his market demand curve looks like (and the matching MR curve) as well as the cost structures of the various plants. To determine his equilibrium position, the monopolist must make his *marginal revenue* equal to the *total marginal cost* of the two plants. The total SMC curve of the monopolist in Figure 6–7(c) can be determined by horizontally adding together the SMC curves of the individual plants, that is:

$$\Sigma SMC = SMC_1 + SMC_2$$

Once the MR and ΣSMC curves are known, the monopolist can determine *total output and price* (Fig 6–7(c)) that will maximise his profit (ie the equilibrium position) – he simply looks to see where ΣSMC = MR, in other words, where the two curves intersect in Figure 6–7(c) (point e).

**Dividing output**

To divide total output between the two plants, the monopolist must work in such a way that $SMC_1 = SMC_2 = MR$. This means that the monopolist maximises profit if he produces so much in each plant that the marginal cost in both is the same, and at the same time it is equal to the common marginal revenue. If the marginal cost in one plant, say A, is lower than the marginal cost in B, the monopolist can increase his profit by producing more in plant A and less in plant

B – until the stage is reached that $SMC_1 = SMC_2 = MR$, then profit cannot be further increased.

Graphically, the equilibrium position of the monopolist with two plants can be explained as follows. As mentioned previously, the total profit-maximising output and price are determined by the point of intersection of the $\Sigma SMC$ and MR curves, that is at point e in Figure 6-7(c). This point of intersection is carried over to Figures 6-7(b) and 6-7(a) by means of a horizontal line to intersect the individual curves $SMC_2$ and $SMC_1$ of the two plants at $e_2$ and $e_1$ respectively. At these points the equilibrium condition, namely $\Sigma SMC = MR = SMC_1 = SMC_2$, is satisfied. From these two points ($e_1$ and $e_2$), lines are drawn vertically downwards to the Q-axes of Figures 6-7(a) and 6-7(b), which indicate the quantity that will be produced in each plant. It is clear that $Q_1 + Q_2$ must be equal to the profit-maximising quantity $Q_T$. The total profit is the sum total of the profit earned in the two plants. The price at which the product is sold is also determined in Figure 6-7(c) and transferred from there to Figures 6-7(b) and 6-7(a). The profit in plant A is the rectangle abcd and the profit in plant B the rectangle gfjh. It is clear that more profit is made in the plant with the lower cost structure (A) than in the plant with the higher cost structure (B). It is also clear from Figure 6-7 that more is produced in the plant with the lower cost structure (A) than in the plant with the higher cost structure (B) – which is why $Q_1$ is greater than $Q_2$.

**Box 6-2**

## CONSUMER SURPLUS

When a consumer, Sarah Smith, goes into a shop to buy bread, the price that she pays is per definition the market price. However, the market price is not necessarily a precise indication of the value that Sarah attaches to the bread. What can be said with certainty is that if Sarah buys the bread, the value that she attaches to it cannot be less than the price of the bread – because if that had been so she would not have bought it. What can also happen (and this is often so) is that the value that Sarah attaches to the bread is a great deal higher than the price of the bread.

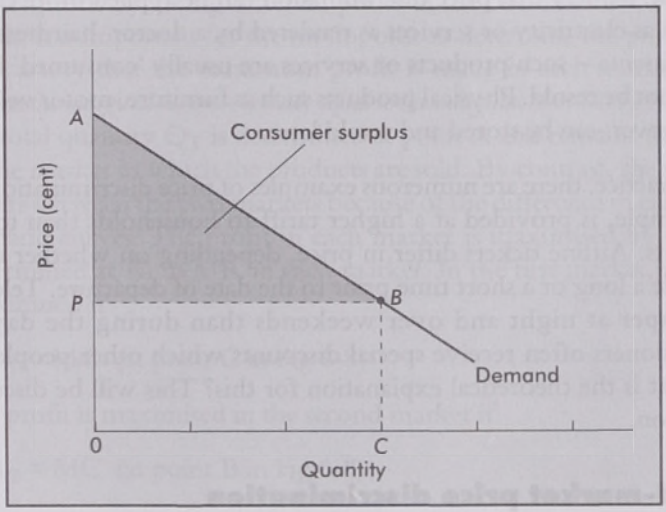
An experiment would show by how much the value that Sarah attaches to the bread could exceed the price. Suppose that Sarah normally buys ten loaves of bread a month and the bread is obtainable at only one shop in the town (thus she cannot buy it anywhere else). If the price of the bread is not regulated by the government, the owner and Sarah would be able to negotiate the price she would be prepared to pay for the ten loaves of bread rather than do without them. The maximum that she would be prepared to pay will be the rand value of the utility (or satisfaction) that Sarah gets out of having ten

loaves of bread rather than doing without them. The difference between what Sarah would be prepared to pay for the ten loaves of bread and the price that she does pay for them is known as the *consumer surplus*.

Graphically, the consumer surplus is represented by the area between the demand curve and the price line (ie the horizontal line drawn on the level of the market price). This is indicated by the shaded area in the figure below. It is clear in the figure that the consumer surplus is the difference between the total value consumers are prepared to attach to a specific quantity (C) of the product (ie the surface 0ABC) and the total amount they must pay to buy that particular quantity of the product (0PBC). Put differently, the consumer surplus is the difference between the total value attached to a certain quantity of the product and the market value (P x Q) of that quantity.

The consumer surplus is a reality that occurs in practice. Because consumers are prepared to pay more than the market price for a product, rather than do without it, this creates the opportunity for an entrepreneur such as a monopolist to apply price discrimination and in so doing increase his profit. What this amounts to is that a monopolist can sell his goods at a higher price to those consumers who have greater desire for his product and who therefore attach greater value to it.

**Consumer surplus**



# PRICE DISCRIMINATION

## Background to price discrimination

A monopolist is in a unique position in that he or she is the only supplier of a product. Frame 6-2 showed that the existence of the consumer surplus makes it possible for the monopolist to apply price discrimination. Price discrimination occurs when a firm asks a higher price from some consumers than others for the same product and the price difference cannot be attributed to cost differences in supplying the product. By applying price discrimination, an entrepreneur can increase his total revenue and thus also increase his profit.

Price discrimination is applied most easily by the monopolist, because he can control the supply of his product, although non-monopolists also often use this price policy. Different clients are asked different prices on the basis of factors such as the quantity that is purchased, or how well the seller knows the buyer. In this section the focus will be on the monopolist who sells an identical product (all units produced at the same cost) at different prices, depending on the consumers' preferences, their income, location and possible substitutes that are available. These factors give rise to demand curves with different elasticities.

**Conditions**

Two conditions have to be met before a monopolist can apply price discrimination. First, it must be possible to divide the market into submarkets, with different price elasticities. Second, it should not be possible to resell from a low-price market to a high-price market. The question of resale gives rise to another point, namely that price discrimination can be applied more easily to a product such as electricity or services as rendered by a doctor, hairdresser, bus company or cinema – such products or services are usually 'consumed' by the buyer and cannot be resold. Physical products such as furniture, motor vehicles and clothes, however, can be stored and resold later.

In practice, there are numerous examples of price discrimination. Electricity, for example, is provided at a higher tariff to households than to large industrial plants. Airline tickets differ in price, depending on whether the reservation is made a long or a short time prior to the date of departure. Telephone tariffs are cheaper at night and over weekends than during the day. Students and pensioners often receive special discounts which other people do not receive. What is the theoretical explanation for this? This will be discussed in the next section.

## Segmented-market price discrimination

We mentioned earlier that a monopolist (or any other firm) applies price discrimination to increase his total revenue, and hence also his profit. By selling the quantity which is determined by the equilibrium condition MC = MR at

different prices in different markets, the monopolist can obtain a higher total revenue and therefore also higher profit than if he were to ask a uniform price. The case that we are studying is that of a monopolist who sells his product at two different prices in two markets.

**Two markets**

We assume that the monopolist has two markets that are totally separate from each other and that the elasticity of the demand curves also differs. In Figure 6-8 the demand curve $D_2$ is more elastic than $D_1$ at any given price. The total demand curve $\Sigma D$ is obtained by the horizontal summation of $D_1$ and $D_2$. The total margin revenue curve $\Sigma MR$ is likewise the horizontal summation of the marginal revenue curves $MR_1$ and $MR_2$. We also accept that the monopolist has only one plant and the marginal revenue curve is therefore represented by MC.

A monopolist who wishes to apply price discrimination and to maximise his profit must first decide the total output that he must produce and, second, how much needs to be sold in each market and at what price.

The profit-maximising total output is determined by the point of intersection of the MC curve and the monopolist's total marginal revenue curve $\Sigma MR$. In Figure 6-8 the two curves intersect at A and the total output determined by this point of intersection is $Q_T$. If the monopolist wishes to ask a uniform price, it will be $P_T$ (also determined by the point of intersection A and read off by means of point F on the vertical axis) and his total revenue will be $0Q_TFP_T$.

**Maximising profit**

The monopolist's profit will be the difference between his revenue and the production cost of the quantity $Q_T$. However, the monopolist can make a higher profit by asking different prices in the two markets. To maximise total profit, it is important for the monopolist to determine the price and quantity in such a way that the maximum profit is made in each market – hence *in each market the marginal revenue is made equal to the marginal cost*. Marginal cost to produce the total quantity $Q_T$ is determined at point A and remains the same regardless of the market in which the products are sold. By contrast, the marginal revenue differs between the two markets because of the difference in elasticity of the two demand curves. The profit in each market is maximised by equating MC (as determined at A) to MR in each market. In the first market, profit is therefore maximised if

$MR_1 = MC$ (at point C in Fig 6-8)

and profit is maximised in the second market if

$MR_2 = MC$ (at point B in Fig 6-8)

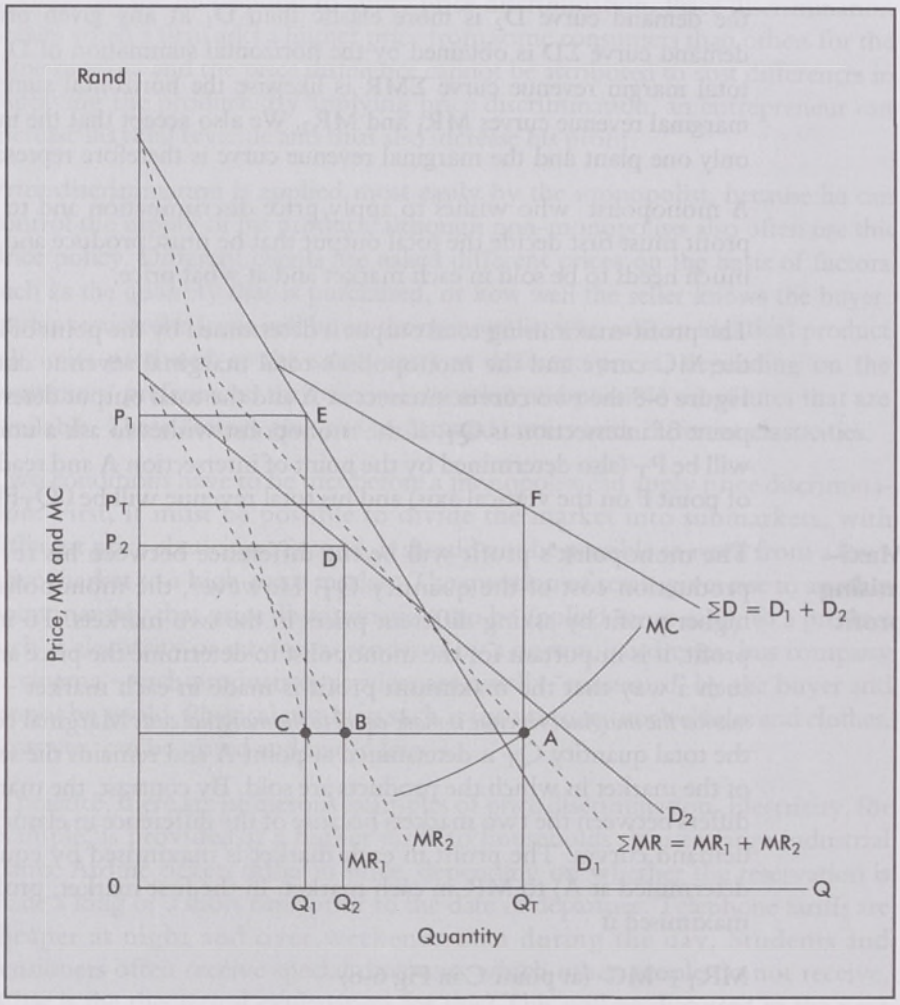
It is therefore clear that total profit is maximised if the marginal revenues are set equal to the common MC, that is

$MR_1 = MR_2 = MC$

**Figure 6–8**

**Price discrimination: segmented markets**

Profit is maximised by making maximum profit in each market. The profit-maximising total output is determined by MC = ΣMR. P and Q in each market are determined by making MR = MC, that is, $MR_1 = MC$ and $MR_2 = MC$. Higher profit is earned with price discrimination than with a uniform price.




If marginal revenue MR is higher in the first market than in the second, the monopolist will sell more in the first market and less in the second until the above precondition is met. Determination of the various prices and quantities can be explained graphically as follows: from the equilibrium point A, a line is drawn *parallel* to the horizontal axis to cut the marginal revenue curve $MR_1$ at C and the marginal revenue curve $MR_2$ at B. This line runs at the same level as the

MC at A – hence $MC = MR_1 = MR_2$ applies. From points C and B lines are drawn downwards as far as the quantity axis, and upwards until they reach the respective demand curves $D_1$ and $D_2$. These vertical lines determine the output and price in each market. In the first market the monopolist will therefore sell quantity $Q_1$ at price $P_1$ and in the second market, quantity $Q_2$ at price $P_2$. In the market with the higher price elasticity ($D_2$) the price is therefore lower than in the market with the lower price elasticity ($D_1$). It stands to reason that the sum of the quantities sold in the respective markets is equal to the total sales, therefore $0Q_1 + 0Q_2 = 0Q_T$.

One can deduce from Figure 6-8 that the total revenue earned from price discrimination is greater than the revenue that would be earned with a uniform price. With price discrimination the monopolist's total revenue is

$$(P_1 \times Q_1) + (P_2 \times Q_2) = 0P_1EQ_1 + 0P_2DQ_2$$

This total revenue should be compared with the amount the monopolist would earn without price discrimination with a uniform price $P_T$, namely $P_T \times Q_T = 0P_TFQ_T$. By comparing the areas one can determine that the total revenue obtained with price discrimination is larger than the total revenue obtained with a uniform price. Since the cost to produce $Q_T$ is the same, regardless of the price at which it is sold, the profit that is earned with price discrimination is larger than that earned with a uniform price.

## Segmented-market price discrimination in practice

**Examples**

We mentioned earlier that examples of segmented-market price discrimination are frequently found in practice. In the light of the theoretical discussion above, we can briefly look at these examples again. Electricity is one such example. If electricity becomes very expensive, if need be, an industrial enterprise may generate its own power – such an enterprise's price elasticity (or sensitivity to price changes) for electricity is therefore fairly high. It is more difficult for households to generate their own electricity than it is for an industrial enterprise – hence households' price elasticity is less than that of industrial enterprises. In practice it is common for industrial enterprises' electricity tariffs to be lower than those of households. Similarly, a traveller who has an urgent reason to fly from Johannesburg to Cape Town will be prepared to pay more for the airline ticket than someone who has months to plan the trip and can consider other alternatives – the price elasticity of the traveller who is in a hurry is therefore relatively low. Airlines use this phenomenon to their advantage and travellers who are in a hurry have to pay higher prices.

Another example is telephone tariffs. Business calls usually have to be made during the day, which makes the price elasticity of telephone calls during working time fairly low – this allows Telkom to ask higher tariffs for such calls.

Similarly, students and pensioners, who are usually regarded as groups with a greater sensitivity to price changes (thus greater price elasticity), often obtain discounts which other groups are denied.

In each of these examples, the group with the higher price elasticity will be represented by a demand curve such as $D_2$ in Figure 6–8, while the group with lower price elasticity will be represented by $D_1$. Again it can be seen that in the market with the higher price elasticity ($D_2$), the price is lower than in the market with the lower price elasticity ($D_1$).

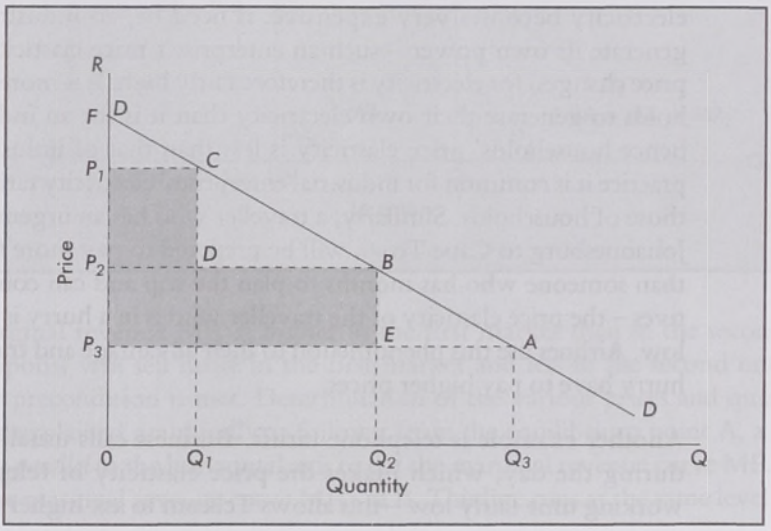
## Multipart price discrimination

The preceding section showed that a monopolist can increase his profit if his customers can be divided into different submarkets with different price elasticities. If segmented-market price discrimination is applied, the price differs from one market to the next, but all the customers in a given submarket pay the same price. Another form of price discrimination is known as multipart price discrimination. In practice it means that a customer pays a high price for the first unit, a lower price for the next unit, and so forth. An example of multipart price discrimination is often found in supermarkets – for example, a container with fruit juice will sell for R1,89, but a package with two containers is sold for only R3,40. In such a case, the first container in the package cost R1,89 while the second cost only R1,51.

**Figure 6–9**

**Price discrimination: multipart**

By selling different quantities at different prices, total revenue increases and therefore so does profit.



Multipart price discrimination is illustrated in Figure 6-9. A consumer's demand curve is represented by DD. The monopolist offers the initial quantity from 0 to $Q_1$ at a price of $P_1$ to the consumer. Between $Q_1$ and $Q_2$ the consumer can purchase the product at a price of $P_2$. Finally, the consumer can buy the quantity between $Q_2$ and $Q_3$ at a price of $P_3$.

What is the motivation behind the monopolist applying multipart price discrimination? Suppose that the monopolist does not apply price discrimination and asks only the single price $P_3$ and that this price is determined by the point of intersection of the MR and MC curves. The total revenue ($P \times Q$) of the monopolist will therefore be $0P_3AQ_3$. These total takings should be compared with what the monopolist receives if he does apply price discrimination, namely $0P_1CQ_1 + Q_1DBQ_2 + Q_2EAQ_3$. It is clear that by applying multipart price discrimination the monopolist can increase his total revenue by an amount equal to the shaded area in Figure 6-9 – what is more, without production costs rising in the process. Because the monopolist's total revenue has increased as a result of price discrimination, his profit will also increase.

The monopolist who applies price discrimination succeeds in increasing his total revenue by receiving part of the consumer surplus in addition. In the most extreme case, where the monopolist can negotiate with each consumer and can sell each unit of his product at the corresponding price (as indicated by DD in Figure 6-9), he will receive the entire consumer surplus $P_3AF$.

**Box 6-3**

## PREDATORY PRICING

The use of predatory prices by a firm to obtain or maintain a monopoly is a common practice.

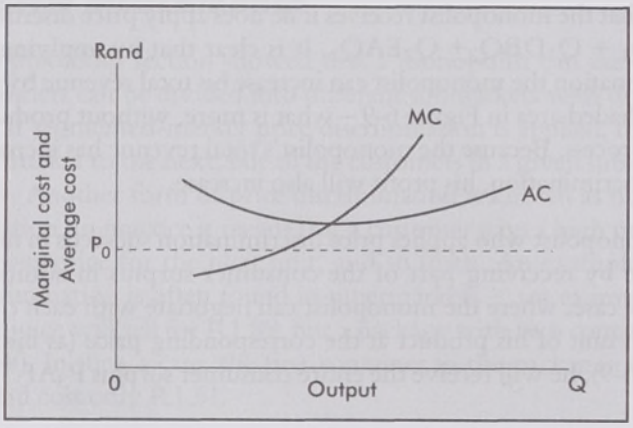
Definitions of predatory prices sometimes differ, but in general one can say that a firm uses predatory pricing when it keeps the price of its product very low in an effort to force a competitor out of the business, or to make it extremely difficult for a potential opponent to enter it. For example, suppose that a monopolist is being threatened by a competitor. The monopolist's average and marginal cost curves appear below. (To avoid long-windedness, we shall continue to refer to the firm as a monopolist, although it will no longer be one once the opponent enters the industry.)

The monopolist can set a price such as $P_0$, which lies below the AC curve. If this curve is also below the opposition's average cost, the opposition will make losses. The question arises whether the monopolist acts rationally, since in the process he also makes losses. This will depend on whether (and how quickly) the competitor can be forced out of the

business. Since the monopolist is supposed to have a greater output, he will lose more money than the competitor. However, the monopolist will probably have greater financial reserves and be in a position to temporarily bear such losses.

Of course, other competitors may appear on the scene later. However, if the monopolist ruthlessly disposes of the first competitor, the idea will probably take root that it is not worth trying to compete with the monopolist. This will frighten off potential competitors.

**Predatory pricing**




## LONG-RUN EQUILIBRIUM: COMPARISON OF A MONOPOLY AND PERFECT COMPETITION

A comparison of the long-run equilibrium situation of a pure monopolist with a firm under perfect competition reveals interesting differences between the two market forms.

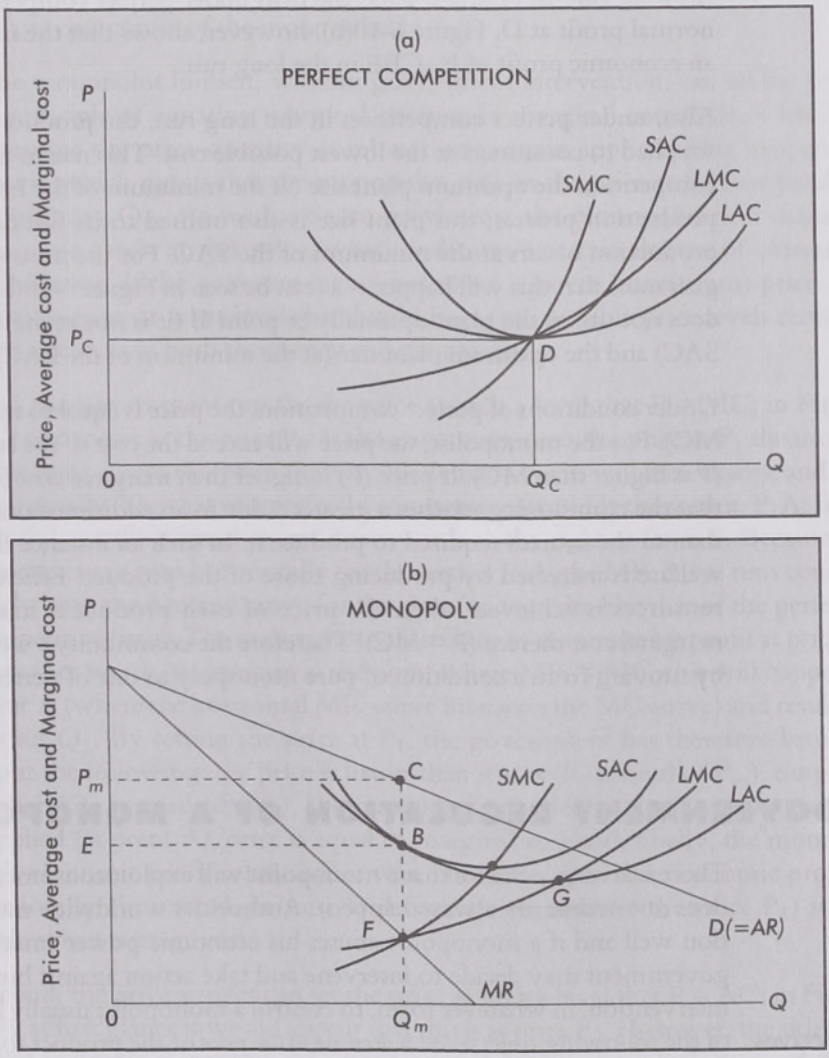
Figure 6-10(a) shows the long-run equilibrium situation of the firm under perfect competition and Figure 6-10(b) that of a monopolist. We know that a firm under perfect competition is one of a large number of firms and that it is insignificantly small compared with the industry as a whole. A monopolist, by contrast, is the only producer in the market and can therefore be regarded as the whole industry. To compare the two market forms, we have to make three assumptions. First, we assume that we can add together all the data of all the firms in a perfectly competitive market, that is, to allow them to 'merge' for the sake of the analysis, but we assume that their cost curves do not change and the joint cost curves are represented by Figure 6-10(a). Second, after this

merging, the cost structure of the new 'enterprise' is the same as that of the monopoly illustrated in Figure 6–10(b). Third, the firms retain all the characteristics of perfect competition and do not act like a monopoly. With these assumptions, we can compare the long-run equilibrium situation of the two market forms.

**Figure 6–10**

**Long-run equilibrium: comparison of monopolist and perfectly competitive firm**

Monopolist: produces less, asks higher price, earns economic profit, does not build optimum plant size, does not utilise plant optimally, P higher than MC.



Figures 6-10(a) and 6-10(b) are drawn according to the same scale and can therefore be compared directly. When the 'firm' (the newly formed one) under perfect competition is in long-run equilibrium, it will produce quantity $Q_c$ and sell it at the price $P_c$. The monopolist will produce quantity $Q_m$ and sell it at $P_m$. A comparison of the two situations shows that the monopolist will produce less ($Q_m < Q_c$) and ask a higher price ($P_m > P_c$) than the perfect competitor. This is because under perfect competition in the long-run equilibrium situation production occurs at the minimum point on the LAC curve, while this is not so with the monopolist.

Under perfect competition, only normal profit will be made in the long run – the monopolist, by contrast, can earn economic profit both in the short run and the long run. In Figure 6-10(a) the firm under perfect competition only makes normal profit at D. Figure 6-10(b), however, shows that the monopolist makes an economic profit of $P_m$CBE in the long run.

Also, under perfect competition in the long run, the product is produced and supplied to consumers at the lowest possible cost. This means that under perfect competition the optimum plant size (at the minimum of the LAC) is used in the production process; this plant size is also utilised to its full capacity – that is, production occurs at the minimum of the SAC. For the monopolist there is no guarantee that this will happen – as can be seen in Figure 6-10(b) the monopolist does not utilise the plant optimally at point B (it is not at the minimum of the SAC) and the optimum plant size (at the minimum of the LAC) is also not used.

Under conditions of perfect competition, the price is equal to marginal cost (P = MC). For the monopolist, the price will exceed the cost of the last unit produced (P is higher than MC). If price (P) is higher than marginal cost (MC), this means that the community attaches a greater value to an additional unit of the product than to the sources required to produce it. In such an instance the community's welfare is increased by producing more of the product. Efficient allocation of resources is achieved when the price of each product is made equal to the marginal cost thereof (P = MC). Therefore the community's welfare is increased by moving from a condition of pure monopoly to one of perfect competition.

## GOVERNMENT REGULATION OF A MONOPOLIST

There is always a chance that a monopolist will exploit consumers (although this does not necessarily always happen). Authorities worldwide monitor the situation well and if a monopolist abuses his economic power (market power), the government may decide to intervene and take action against him. Government intervention, in whatever form, to control a monopolist usually has one or more

**Objectives** of the following objectives: a *decrease in the price* of the product for the consumer;

an *increase in the quantity* the monopolist produces, so that more people can enjoy the particular product; and a *decrease* in the monopolist's *economic profit*.

Governments can adopt various methods of intervention. In the following section we look at *price control* where the maximum price that a monopolist may ask for his product is prescribed by the government.

## Price control

Figure 6-11 illustrates the long-run cost structure and market conditions relating to a specific monopolist. The diagram therefore shows the demand curve (ie the AR curve) and the accompanying MR curve as well as the marginal cost and average cost curves of the monopolist.

If the monopolist himself, without government intervention, can set the price, the principle of equating marginal revenue to marginal cost (MR = MC) to determine the price-quantity combination is again applied. This happens at point e, which means that the monopolist will set the price at $P_m$ and produce the quantity $Q_m$. As we have seen previously, the monopolist will make an economic profit at this price, which indicates a certain degree of consumer exploitation. If the government wishes to set a lower (maximum) price, the question arises at what level this should be – two possible price levels received close attention in both the theory and the practice.

**Which price?**

First, the government can fix the price at such a level that P = MC; in Figure 6-11 this occurs at the price $P_1$. If the government sets the price at $P_1$ the monopolist must accept this price as given; his demand curve will then change and run horizontally (like that of a perfectly competitive firm) for the section $P_1A$; from A it follows the normal course downwards to the right as far as F. Because the demand curve runs horizontally for the section $P_1A$, the MR curve runs concurrently with the demand curve for this part (once again, like that of the perfectly competitive firm). The monopolist will still try to maximise his profit at price $P_1$ – in other words, to produce at the point where MR = MC; this will happen at point A (where the horizontal MR curve intersects the MC curve) and results in output $Q_1$. By setting the price at $P_1$, the government has therefore brought about the following: the price is lower than it was ($P_1$ instead of $P_m$), output is higher ($Q_1$ instead of $Q_m$), the quantity demanded is equal to the quantity supplied (at point A), price is equal to marginal cost and, finally, the monopolist's economic profit is less than it was. However, note that economic profit is not totally eliminated, because at A average revenue (ie the price $P_1$) is still higher than average cost.

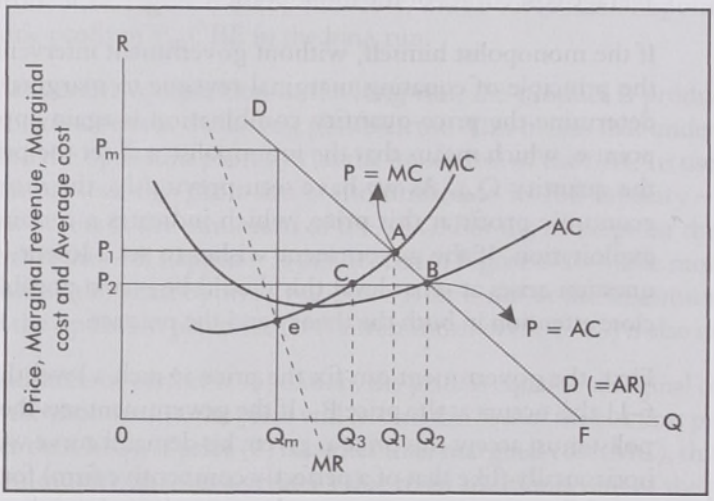
Second, the government can set the price at such a level that P = AC; in Figure 6-11 at first glance it would appear that this is at price $P_2$. However, the situation is not as simple as it seems. At a fixed price $P_2$, the monopolist's demand curve

changes to $P_2B$ (thereafter it runs downwards to the right) and the MR curve again runs concurrently along the section $P_2B$. Therefore, at price $P_2$ the monopolist would prefer to produce at point C (where MR = MC), which will result in a smaller output than $Q_1$. Thus the situation is that the monopolist maximises profit by offering $P_2C$ (ie $Q_3$), while the quantity demanded at $P_2$ is actually $P_2B$. Hence there is a surplus demand equal to CB and the market is therefore not in equilibrium.

**Figure 6–11**

**Price control of the monopolist**

With price $P_1$, the government's goals (lower P, greater Q, less profit) can be realised. At $P_2$ there is excess demand and additional measures are necessary.




If the government does nothing, this surplus demand will give rise to black market prices. Some consumers are prepared to pay higher prices. (Think, for example, what happens when all the tickets for a rugby or soccer test are sold out – black market prices arise.) The primary goal of the government in reducing prices is therefore being thwarted.

In a situation such as this, the government could introduce additional measures. First, it could *ration* production to consumers. However, this is a clumsy system with high administrative costs. Alternatively, the government could *force* the monopolist to produce the output $P_2B$ (ie $Q_2$). If they succeed in doing this, they will also succeed in making price equal to average cost. The monopolist will then make only normal profit.

Of course there is always the possibility that the government can set a price even lower than $P_2$. However, there is a danger here, namely that the price may be lower than the average cost (AC). As indicated earlier in the chapter, such a situa-

tion cannot continue in the long run, because the monopolist will suffer losses and cease production – as the only producer of his product, this could create serious problems in the economy if the product is no longer available. In such an event, the government would have to *subsidise* the monopolist to remain in production.

It is important to note that the application of these theoretical principles is no easy task in practice. The government is faced with the difficult task of collecting information on the monopolist's cost structure and market demand. The implementation of theoretical guidelines therefore cannot guarantee the optimal allocation of economic resources.

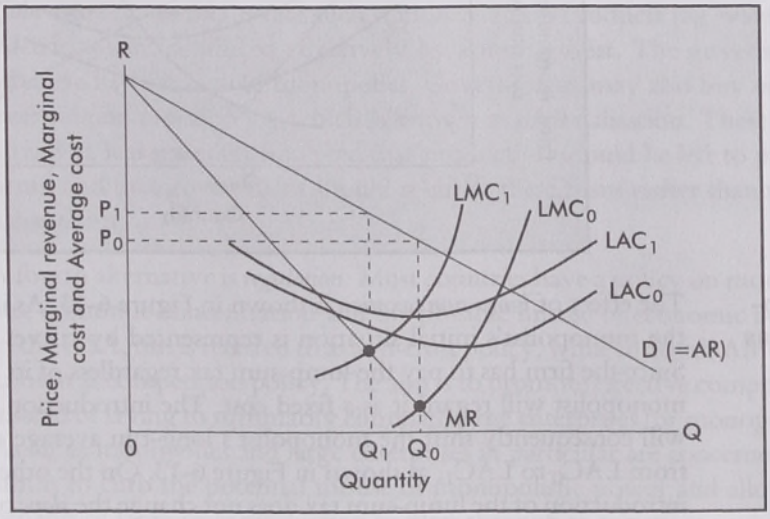
## Taxation as control measure

A government can also use tax methods to reduce a monopolist's profit. However, this method is also not without problems because the monopolist can shift a portion of the tax on to consumers. It may easily happen that the economic profit of the monopolist declines, but the price of the product rises and the quantity offered diminishes – this is in contrast to the goals of government intervention mentioned earlier. The discussion below illustrates the government's dilemma in such a situation.

**Figure 6–12**

**The effect of per-unit tax on the monopolist**

Economic profit declines, but Q decreases and P rises. Welfare diminishes.



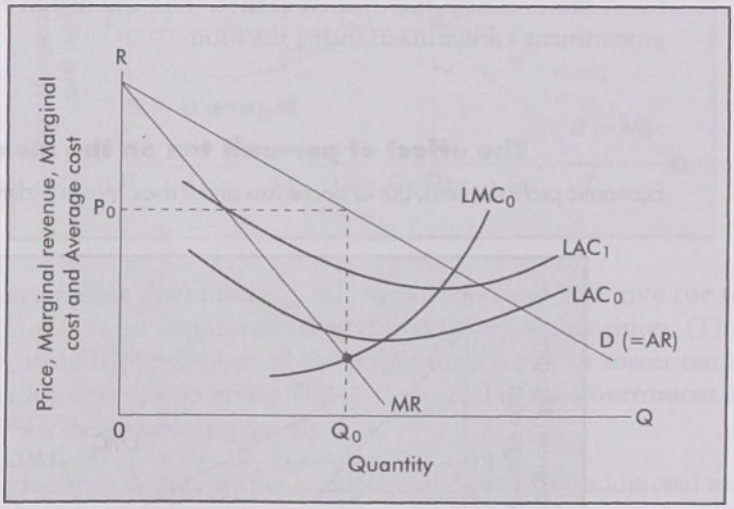
**Per-unit tax**

The effect of *per-unit taxation,* whereby the monopolist must pay a tax for each unit he sells, is indicated in Figure 6-12. $LAC_0$ and $LMC_0$ represent the monopolist's long-term average cost and long-term marginal cost curve respectively before the introduction of the tax. The equilibrium situation, in which the monopolist maximises profit, will be determined according to the customary rule (MR = MC) and the monopolist will therefore produce quantity $Q_0$ and sell it at price $P_0$. Because the per-unit taxation causes an increase in the monopolist's total taxation as production (and sales) increase, the firm will regard it as a variable cost item. The implication here is that the LMC and LAC curves both move upwards as the per-unit taxation is introduced; this is shown in Figure 6-12 by the shift of $LAC_0$ and $LMC_0$ to $LAC_1$ and $LMC_1$. Because of the shift of $LMC_0$ to $LMC_1$, the monopolist produces quantity $Q_1$ and sells it at price $P_1$. In Figure 6-12 we can see that the economic profit of the monopolist has decreased, but it is accompanied by a *decrease in output* and an *increase in price*. Since the per-unit taxation method reduces the welfare of consumers instead of increasing it, it is not very popular among economists.

**Figure 6-13**

**The effect of lump-sum taxation on the monopolist**

Economic profit decreases, P and Q remain the same.




**Lump-sum tax**

The effect of *lump-sum taxation* is shown in Figure 6-13. As in the previous case, the monopolist's initial situation is represented by curves $LAC_0$ and $LMC_0$. Since the firm has to pay the lump-sum tax regardless of its revenue or size, the monopolist will regard it as a fixed cost. The introduction of a lump-sum tax will consequently shift the monopolist's long-run average cost curve upwards from $LAC_0$ to $LAC_1$, as shown in Figure 6-13. On the other hand, because the introduction of the lump-sum tax does not change the *slope* of the long-run total

cost curve, the long-run marginal cost curve will remain unchanged at $LMC_0$. Since $LMC_0$ does not shift, the point of equilibrium remains where it was and the lump-sum tax therefore does not result in a reduction in the monopolist's output ($Q_0$) or increase in his price ($P_0$). The upward shift of the long-run average cost curve to $LAC_1$ will reduce the monopolist's economic profit, but will not influence his price or output.

**Profit tax** A third taxation method, namely a *profit tax*, gives the same results as the lump-sum tax.

It is understandable that the lump-sum and profit tax methods are preferred to the per-unit tax method because the first two reduce the monopolist's economic profit, but the price and quantity produced remain the same, while the per-unit tax reduces the monopolist's economic profit but leads to a reduction in the quantity produced and an increase in price. Nonetheless neither of these tax methods favours the consumer directly with price reductions and/or increased output. If the government is in a position to obtain sufficient information on the monopolist's cost and demand conditions, price control would be a preferable method to recover some of the welfare losses imputable to monopolies. However, as mentioned earlier, this is no easy task.

## Other methods of control over a monopoly

Besides the fixing of maximum prices or the imposition of taxes, governments can apply other methods to control monopolies.

- *Government ownership* is one such option. Certain products (eg water and electricity) are produced effectively by a monopolist. The government often owns such natural monopolies. Governments may also buy or take over private monopolies, which is known as nationalisation. These days, however, it is generally accepted that production should be left to private firms, and that government should regulate these firms rather than nationalise them.
- A fourth alternative is *regulation*. Most countries have a policy on monopolies, economic concentration and the possible misuse of economic power. In the USA, this is referred to as anti-trust policy, while in South Africa it is known as competition policy. The aim is to promote effective competition instead of trying to summarily eliminate large enterprises (or monopolies). As far as monopolies and large enterprises in particular are concerned, the aim is to curb the potential misuse of monopolistic power and allow the benefits of large-scale production to filter through to society as a whole.

- Creating opportunities for increased competition is a fifth possibility. The exposure of firms to *import competition* in particular is an effective way of preventing monopolies and the misuse of economic power.

**Box 6–4**

The following extract from a report in *Business Day* in October 1997 shows that governments keep a watchful eye over the possible misuse of monopolistic powers.

**MICROSOFT IN $1M-A-DAY ANTI-MONOPOLY SUIT**

WASHINGTON – The US Justice Department asked the Federal Court yesterday to fine the world's leading software company, Microsoft, $1m for each day that it violated anti-monopoly laws in marketing its Internet browser.

The petition, filed by the department's anti-trust division, said Microsoft violated a 1995 court order by requiring personal computer manufacturers to distribute its Internet Explorer browser if they wanted to include its Window 95 software.

The 1995 order prohibited Microsoft from forcing manufacturers to license any other Microsoft product as a condition for licensing Windows 95.

'Microsoft is unlawfully taking advantage of its Windows monopoly to protect and extend that monopoly and undermine consumer choice', attorney-general Janet Reno said. More than 85% of personal computers manufactured today contain Windows 95.

Assistant attorney-general Joel Klein said: 'Our main concern is that . . . Microsoft is using an unlawful advantage to beat back an important competitive challenge to its Windows monopoly.' The government also asked the court to require Microsoft to notify Windows 95 users that they were not required to use Internet Explorer and to give them instructions on how to remove the browser's visual icon. Sapa-AFP-AP.

## MONOPOLY IN PRACTICE

At the beginning of this chapter we stated that pure monopolies are seldom encountered in practice. Yet they do occur. The Central Selling Organisation (CSO) of De Beers Consolidated Mines Ltd, with its head office in South Africa, has been described as one of the most successful monopolies in the world. De Beers, which was founded by Cecil John Rhodes in 1880, controlled more than 99 per cent of the world's diamond production until approximately 1900. At present the company produces only about 15 per cent of the world's diamonds, but through its Central Selling Organisation it still controls more than 80 per cent of the world's sales of brilliant diamonds. This organisation

markets De Beers's own diamonds as well as those of other important diamond producers such as the Democratic Republic of Congo, the Soviet Union, Botswana, Namibia and Australia.

There is no doubt that De Beers control the price of diamonds. Buyers are offered small holders with assorted diamonds on a 'take it or leave it' basis at a price fixed by De Beers. Those who decide not to buy have to wait for the next opportunity. If the demand for diamonds declines, which is what happened in the early eighties, De Beers buy in diamonds to support the price.

Besides limiting supply, De Beers also go to great pains to shift the demand curve for diamonds to the right. An important part of the marketing campaign involves linking diamonds to romance. (The company motto, 'A diamond is forever', has been going strong for more than fifty years.) This approach also helps to keep diamonds, once they are sold, out of the market. A product to which people attach so much sentimental value will not easily be sold during difficult economic times. De Beers' policy has made considerable profits for the company, but consumers have had to pay higher prices than they would have if the market had been competitive.

## IMPORTANT CONCEPTS

- Monopoly
- Natural monopoly
- Artificial monopoly
- Marginal revenue (MR)
- Average revenue (AR)
- Short-run equilibrium (profit maximisation)
- Monopolists' 'supply'
- Long-run equilibrium (profit maximisation)
- Multiplant monopolist
- Consumer surplus
- Price discrimination
- Segmented-market price discrimination
- Multi-unit price discrimination
- Government regulation (goals)
- Price control
- Taxation as a control measure
- Per-unit taxation
- Lump-sum taxation
- Profit taxation

## QUESTIONS

(1) Explain the concept 'monopolist' as well as the meaning of the terms 'natural monopoly' and 'artificial monopoly'. (5)

(2) (a) Explain why a monopolist's marginal revenue is always less than the price. (10)

(b) Explain why average revenue is always equal to price for a nonprice-discriminating monopolist. (4)

(3) Illustrate a situation of short-run (or long-run) equilibrium, in which the monopolist makes only normal profit. Explain the derivation of the equilibrium situation in detail. (12)

(4) Explain why a monopolist does not have a fixed supply curve. Use a diagram to illustrate your explanation. (8)

(5) You are the financial manager of a firm that has a monopoly on a particular product. The firm has two production plants. Explain in writing to your directors the theoretical principles one would use to maximise profit and to determine the output to be produced in each plant. Use a diagram to illustrate your explanation. (12)

(6) Compare the long-run equilibrium position of a monopolist with that of a perfectly competitive firm. Use diagrams to illustrate your discussion. (12)

(7) Explain the problems experienced when price regulation is used to ensure that a monopolist makes only normal profit in the long run. Use a diagram to illustrate your discussion. (Assume that the monopolist will in fact make economic profit without price regulation.) (15)

(8) Explain why a monopolist who applies price discrimination will sell his product at a higher price to those consumers who have a greater desire for the product. Use a diagram to illustrate your explanation. (15)

(9) Explain how a monopolist will apply multi-unit price discrimination. Use a diagram to illustrate your explanation. (15)

(10) (a) Explain in your own words with the aid of a diagram why governments seldom make use of a per-unit tax to curb monopolists. (10)

(b) Explain in your own words with the aid of a diagram how the government can use the lump-sum taxation method to reduce a monopolist's profit. (10)