



Name: _____

Date: __/__/__

Simple Monopoly in the Commodity Market

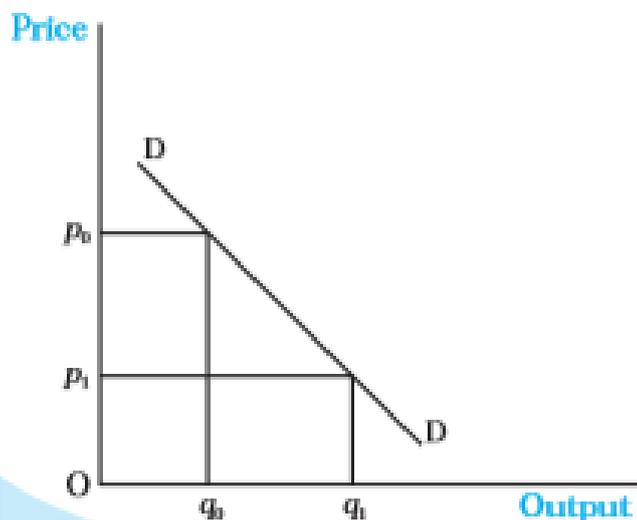
A market structure in which there is a single seller is called monopoly. The conditions hidden in this single line definition, however, need to be explicitly stated. A monopoly market structure requires that there is a single producer of a commodity; no other commodity works as a substitute for this commodity.

Market Demand Curve is the Average Revenue Curve

The market demand curve shows the quantities that consumers are willing to purchase at different prices. If the market price is at the higher level p_0 , consumers are willing to purchase the lesser quantity q_0 . On the other hand, if the market price is at the lower level p_1 , consumers are willing to buy a higher quantity q_1 . That is, price in the market affects the quantity demanded by the consumers. This is also expressed by saying that the quantity purchased by the consumers is a decreasing function of the price.

Since the monopoly firm is aware of the shape of the curve DD, if it wishes to sell the commodity at the price p_0 , it can do so by producing and selling quantity q_0 , since at the price p_0 , consumers are willing to purchase the quantity q_0 . This idea is concretized in the slogan: 'Monopoly firm is a price maker'

In a perfectly competitive market structure should be clear. In that case, the firm could bring into the market as much quantity of the commodity as it wished and could sell it at the same price. Since this does not happen for a monopoly firm, the amount of money received by the firm through the sale of the commodity must be examined again. As an example, let the demand function be given by the equation $q = 20 - 2p$, where q is the quantity sold and p is the price in rupees. The equation can be written in terms of p as $p = 10 - 0.5q$. Substituting different values of q from 0 to 13 gives us the following table

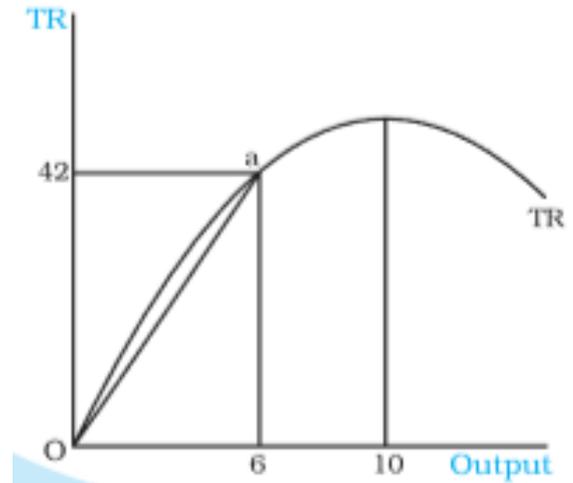


q	P	TR	AR	MR
0	10	0	-	-
1	9.5	9.5	9.5	9.5
2	9	18	9	8.5
3	8.5	25.5	8.5	7.5
4	8	32	8	6.5
5	7.5	37.5	7.5	5.5
6	7	42	7	4.5
7	6.5	45.5	6.5	3.5
8	6	48	6	2.5
9	5.5	49.5	5.5	1.5
10	5	50	5	0.5
11	4.5	49.5	4.5	-0.5
12	4	48	4	-1.5
13	3.5	45.5	3.5	-2.5

The TR column represents the product of the p and q columns. It can be noticed that as the quantity increases, TR increases to Rs 50 when output becomes 10 units, and after this level of output, total revenue decreases.

The revenue received by the firm per unit of commodity sold is called the Average Revenue (AR). Mathematically, $AR = TR/q$. The value of AR can be found from the TR curve for any level of quantity sold through a simple construction given in the diagram. When quantity is of 6 units, draw a vertical line passing through the value 6 on the horizontal axis.

This line will cut the TR curve at the point marked 'a' at a height equal to 42. Draw a straight line joining the origin O and point 'a'. The slope of this ray from the origin to a point on the TR provides the value of AR. The slope of this ray is equal to 7. Therefore, AR has the value 7



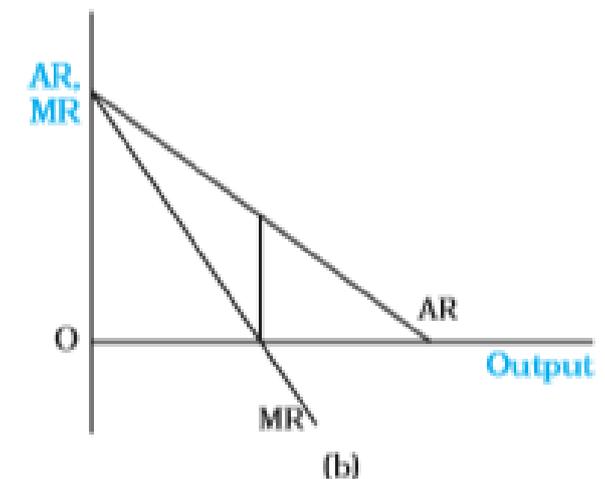
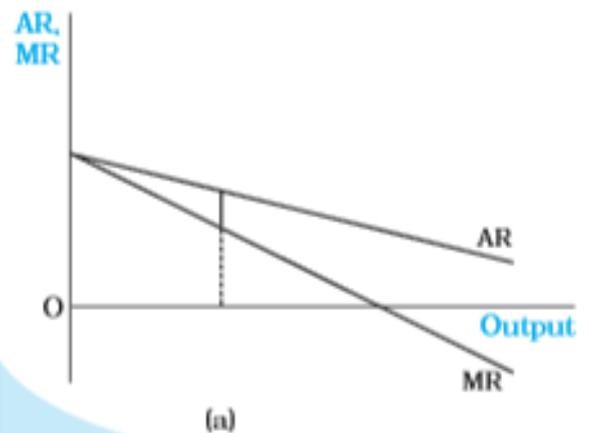
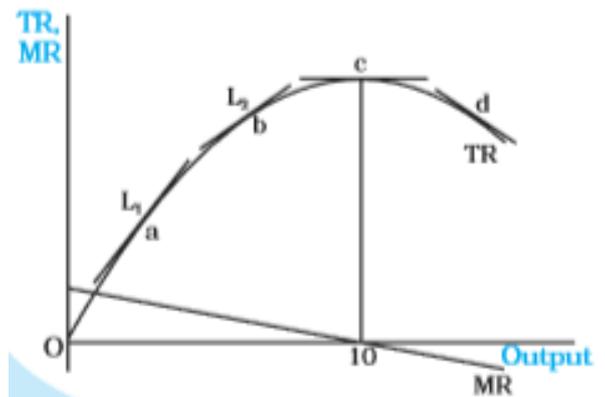
Total, Average and Marginal Revenues

The change in TR due to the sale of an additional unit is termed Marginal Revenue (MR). In the table, this is depicted in the last column. The values in every row of the MR column after the first equal the TR value in that row minus the TR value in the previous row.

After the quantity reaches 10 units, MR has negative values. In the diagram, MR is depicted by the dotted line. The values of the MR curve are given by the slope of the TR curve. The slope of any smooth curve is defined as the slope of the tangent to the curve at that point.

At point 'a' on the TR curve, the value of MR is given by the slope of the line L_1 , and at point 'b' by the line L_2 . Both lines have positive slope, but the line L_2 is flatter than line L_1 , ie its slope is lesser. The value of MR for the same level of quantity is also lesser. When 10 units of the commodity are sold, the tangent to the TR is horizontal, ie its slope is zero.

The value of the MR for the same quantity is zero. At point 'd' on the TR curve, where the tangent is negatively sloped, the MR takes a negative value. We can now conclude that when total revenue is rising, marginal revenue is positive, and when total revenue shows a fall, marginal revenue is negative



Marginal Revenue and Price Elasticity of Demand

The MR values also have a relation with the price elasticity of demand. The detailed relation is not derived here. It is sufficient to notice only one aspect— price elasticity of demand is more than 1 when the MR has a positive value and becomes less than the unity when MR has a negative value.

As the quantity of the commodity increases, MR value becomes smaller and the value of the price elasticity of demand also becomes smaller. The table below shows that when quantity is less than 10 units, MR is positive and the demand curve is elastic and when quantity is of more than 10 units, the demand curve is inelastic. At the quantity level of 10 units, the demand curve is unitary elastic.

q	P	MR	Elasticity
0	10	-	-
1	9.5	9.5	19
2	9	8.5	9
3	8.5	7.5	5.67
4	8	6.5	4
5	7.5	5.5	3
6	7	4.5	2.33
7	6.5	3.5	1.86
8	6	2.5	1.5
9	5.5	1.5	1.22
10	5	0.5	1
11	4.5	-0.5	0.82
12	4	-1.5	0.67
13	3.5	-2.5	0.54

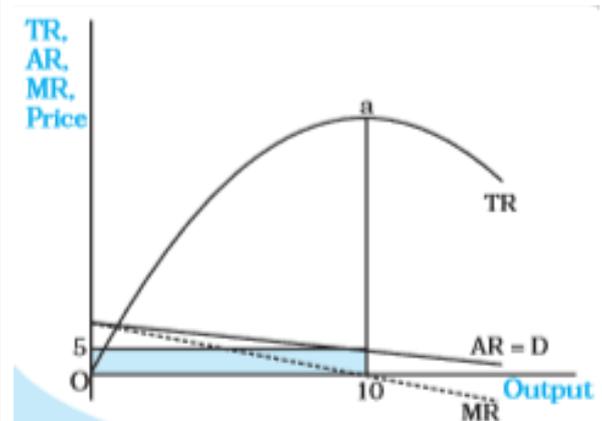
Short Run Equilibrium of the Monopoly Firm

The Simple Case of Zero Cost

Suppose there exists a village situated sufficiently far away from other villages. In this village, there is exactly one well from which water is available. All residents are completely dependent for their water requirements on this well. The well is owned by one person who can prevent others from drawing water from it except through purchase of water. The person who purchases the water must draw the water out of the well. The well owner is thus a monopolist firm which bears zero cost in producing the good.

The profit received by the firm equals the revenue received by the firm minus the cost incurred, that is, $\text{Profit} = \text{TR} - \text{TC}$. Since in this case TC is zero, profit is maximum when TR is maximum. This, as we have seen earlier, occurs when output is of 10 units. This is also the level when MR equals zero. The amount of profit is given by the length of the vertical line segment from 'a' to the horizontal axis.

The price at which this output will be sold is the price that the consumers are willing to pay. This is given by the market demand curve D. At output level of 10 units, the price is Rs 5. Since the market demand curve is the AR curve for the monopolist firm, Rs 5 is the average revenue received by the firm. The total revenue is given by the product of AR and the quantity sold, ie $\text{Rs } 5 \times 10 \text{ units} = \text{Rs } 50$. This is depicted by the area of the shaded rectangle.



Using Average and Marginal Curves

It may be seen that at quantity level below q_0 , the level of MR is higher than the level of MC. An additional unit of output would create additional profits since $\text{Change in profit} = \text{Change in TR} - \text{Change in TC}$.

If the firm was producing a level of output which is greater than q_0 , MC is greater than MR. This means that the lowering of total cost by reducing one unit of output is greater than the loss in total revenue due to this reduction. It is therefore advisable for the firm to reduce output. Once output level reaches q_0 , the values of MC and MR become equal and the firm stops reducing its output.

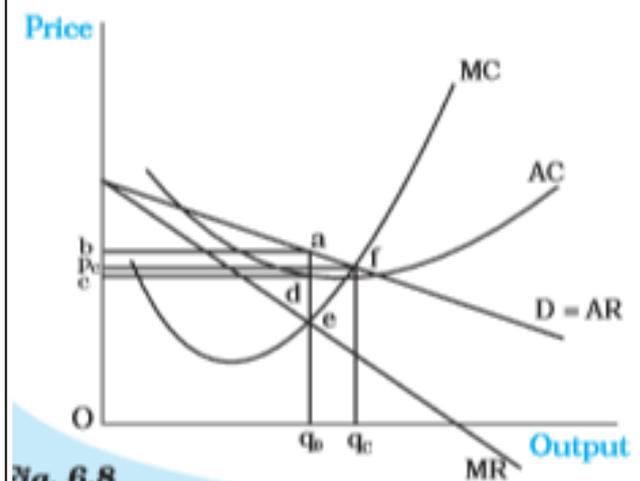
Since the firm inevitably reaches the output level q_0 , this level is called the equilibrium level of output. Since this equilibrium level of output corresponds to the point where the MR equals MC, this equality is called the equilibrium condition for the output produced by a monopoly firm.

At this equilibrium level of output q_0 , the average cost is given by the point 'd' where the vertical line from q_0 cuts the AC curve. The average cost is thus given by the height dq_0 . Since total cost equals the product of AC and the quantity produced being q_0 , the same is given by the area of the rectangle Oq_0dc .

The price is given by the point 'a' where the vertical line through q_0 meets the market demand curve D. This provides price given by the height aq_0 . Since the price received by the firm is the revenue per unit of output, it is the Average Revenue for the firm.

The total revenue being the product of AR and the level of output q_0 , can be shown as the area of the rectangle Oq_0ab . It can be seen from the diagram that the area of the rectangle Oq_0ab is larger than the area of the rectangle Oq_0dc , i.e., TR is greater than TC. The difference is the area of the rectangle $cdab$.

Thus, $\text{Profit} = \text{TR} - \text{TC}$ which can be represented by this area $cdab$.



Comparison with Perfect Competition Again

Suppose that the firm, whose equilibrium we were considering above, believed that it was a perfectly competitive firm. Then, given its level of output at q_0 , price of the commodity at $a_{q_0} = O_b$, it would expect the price to remain fixed at O_b , and therefore, every additional unit of output could be sold at that price. Since the cost of producing an additional unit, given by the MC, stands at e_{q_0} which is less than a_{q_0} , the firm would expect a gain in profit by increasing the output. This would continue if the price remained higher than the MC.

At the point 'f' in the diagram, where the MC curve cuts the demand curve, price received by the firm becomes equal to the MC. Hence, it would no longer be considered beneficial by this perfectly competitive firm to increase output. It is for this reason that Price = Marginal Cost that is considered the equilibrium condition for the perfectly competitive firm.

The diagram shows that at this level of output, the quantity produced q_c is greater than q_0 . Also, the price paid by the consumers is lower at p_c . From this we conclude that the perfectly competitive market provides a production and sale of a larger quantity of the commodity compared to a monopoly firm. Further the price of the commodity under perfect competition is lower compared to monopoly. The profit earned by the perfectly competitive firm is also smaller.

In the Long Run

If firms were facing losses, some firms would close and the reduction in output would raise prices and increase the earnings of the remaining firms. The same is not the case with monopoly firms. Since other firms are prevented from entering the market, the profits earned by monopoly firms do not go away in long run.

Some Critical Views

The results presented above portray an extremely negative picture of the impact of monopoly in a commodity market: the monopoly firms solely benefit themselves, at the cost of consumers. The monopoly firm receives a higher profit and a positive profit even in the long run. On the other hand, consumers get a lesser quantity of the output and have to pay more for each unit consumed.

However, varying views have been expressed by economists concerning the question of monopoly. First, it can be argued that monopoly of the kind described above cannot exist in the real world. This is because all commodities are, in a sense, substitutes for each other. This in turn is because all the firms producing commodities, in the final analysis, compete to obtain the income in the hands of consumers. Another argument is that even a firm in a pure monopoly situation is never without competition. This is because the economy is never stationary.

New commodities using new technologies are always coming up, which are close substitutes for the commodity produced by the monopoly firm. Hence, the monopoly firm always has competition eventually. Even in the short run, the threat of competition is always present, and the monopoly firm is unable to behave in the manner we have described above.

Other Non-Perfectly Competitive Markets

Monopolistic Competition

We consider a market structure where the number of firms is large, there is free entry and exit of firms, but the goods produced by them are not homogeneous. Such a market structure is called monopolistic competition. This kind of a structure is more commonly visible. The demand curve faced by the firm is not horizontal (perfectly elastic) as is the case with perfect competition. The demand curve faced by the firm is not the market demand curve, as in the case with monopoly.

In the case of monopolistic competition, the firm expects small increases in demand if it lowers the price. Hence, the marginal revenue is slightly less than the average revenue. The firm increases its output whenever the marginal revenue is greater than the marginal cost. But since the marginal revenue is lower than the price, the marginal revenue becomes equal to the marginal cost at a lower level of output compared to perfect competition.

How do Firms behave in Oligopoly?

If the market of a commodity consists of more than one seller but the number of sellers is few, the market structure is termed oligopoly. The special case of oligopoly where there are exactly two sellers is termed duopoly. In analyzing this market structure, we assume that the product sold by the two firms is homogeneous and there is no substitute for the product, produced by any other firm.

Given that there are a few firms, the output decisions of any one firm would necessarily affect the market price and therefore the amount sold by the other firms as also their total revenues. It is, therefore, only to be expected that other firms would react to protect their profits. This reaction would be through taking fresh decisions about the quantity and price of their own output. There are various ways in which this can be theorized. We briefly explain two of them.

Firstly, duopoly firms may collude together and decide not to compete with each other and maximize total profits of the two firms together. In such a case the two firms would behave like a single monopoly firm that has two different factories producing the commodity.

Secondly, take the case of a duopoly where each of the two firms decides how much quantity to produce by maximizing its own profit if the other firm would not change the quantity that it is supplying.

Thirdly, some economists argue that oligopoly market structure makes the market price of the commodity rigid, i.e. the market price does not move freely in response to changes in demand. The reason for this lies in the way in which oligopoly firms react to a change in price initiated by any firm.

If one firm feels that a price increase would generate higher profits, and therefore increases the price at which it sells its output, other firms do not follow. The price increase would therefore lead to a huge fall in the quantity sold by the firm leading to a fall in its revenue and profit. It is therefore not rational for any firm to increase the price.