BBA PART-I **PAPER : BBA-102**

SEMESTER-I **BUSINESS ECONOMICS-I**

UNIT - 2

LESSON NOS. :

Department of Distance Education

Punjabi University, Patiala

BBA PART-I **PAPER : BBA-102**
SEMESTER-I **BUSINESS ECONOMICS-I**

LESSON NO. 2.1 **AUTHOR : ROZY VAID**

THEORY OF COST

Cost of production is the most important force governing the supply of a product. It should be pointed out here that for each level of output, the firm chooses least cost combination of factors. Various concepts of costs as are used in modern economic theory are explained below and then we turn to study the derivation of short runand long-run cost curves.

THE CONCEPTS OF COSTS

Accounting Costs and Economic Costs

When an enterpreneur undertakes an act of production, he has to pay prices for the factor which he employs for production. He, thus, pays wages to the labourers employed, prices for raw materials, fuel and power used, rent for building and the rate of interest on the money borrowed for doing business. All these are included in cost of production. An accountant will take into account only the payments and charges made by the entrepreneur to the suppliers of various productive factors, which are called accounting costs.

But an economists view of the cost is somewhat different from this. It generally happens that the enterpreneur invests a certain amount of money capital in his productive business. If this money capital had been invested somewhere else, it would have earned a certain amount of interest of dividend : likewise, an Enterpreneur contributes his enterpreneurial and managerial ability to it. Had he not set up his own business, he would have sold his services for some positive return. An accountant would not include these while calculating cost of production but an economist would include these in cost of production. Likewise, the money rewards for other factors owned by the enterpreneur himself and employed by him in his own business are also considered as the constituents of cost of production.The accounting costs or the contractual cash payment which the firm makes to other factor owned for purchasing or hiring the various factors are also known as explicit costs. The money rewards for other factors the Enterpreneur himself owns and employs in the firm are known as implicit cost. The economists take into consideration both the explicit and implicit cost.

Economic cost = Accounting costs + Implicit costs

=Explicit cost + Implicit costs

Opportunity or Alternative Costs

The concept of opportunity cost occupies a very important place in modern

economic analysis. The opportunity cost of any commodity is the next best alternative that is sacrificed. Prof. Benham defines the opportunity cost as, "The opportunity cost of anything is the next best alternative that could be produced instead by the same factors or by an equivalent group of factors, costing the same amount of money."

The concept of opportunity cost bears two important points first, the opportunity cost of anything is only the next best alternative foregone. Thus opportunity cost producing a good is not any other alternative good that could be produced with the same factors, it is only the most valuable other good, which the same factors could produce Second point worth noting is all the factors used in the production of one thing may not be the same as are required for the production of next best alternative good.

Therefore, the opportunity cost of a good should be viewed as the next-best alternative good that could be produced with the 'same value' of the factors which are more or less the same.

Private and Social Costs

There are certain cost which arise due to the function of the firm but do not normally figure in business decisions nor are such costs explicity paid by the firms. Certain such costs are paid by the society. Thus, the total cost generated by the firm's decision may be divided into two categories.

(a) Those paid out or provided by the firms and are known as 'private costs',

(b) Those not paid by the firms including use of resources freely available plus the disutility created in the process of production and are known as 'Social costs'

Private costs are those which are actually incurred or provided for by an individual or a firm on the purchase of goods and services from the market. For a firm, all the actual costs, both explicit and implicit, are private costs. Private costs are internalised in the sense that 'the firm must compensate the resources owned in order to acquire the right to use the resource.' It is only the internalised cost that is incorporated in firm's total cost to production.

Social cost, on the other hand, implies the cost which society bears on account of production of a commodity. Social cost includes both 'private cost' and 'external cost'. External cost includes (a) the cost of 'resources for which the firm is not compelled to pay a price', e.g., atmosphere, rivers, lakes and also for the use of public utility services like roadways, drainage system etc. and (b) the cost in the form of disutility created through air, water and noise pollution's etc. The cost of expenditure incurred to safeguard the individual and public against various kinds of health hazards created by production system and thus, is used in the estimation of social costs. But private and public expenditure serve only as an indicator of trends in 'public disutility', it does not give the exact measure of the public disutility.

Short Run Costs

There are some input or factors which can be readily adjusted with the changes in output level. These factors may be labour, raw material etc. On the other hand, there are some factor such as capital equipment, buildings etc. which can't be so readily varied. It requires a comparatively longer time to make variations in them. The factors such as raw materials, labour etc., which can be readily varied with the change in the level are known as variable factors and the factor such as capital equipments and buildings which cannot be so readily varied are called fixed factors.

Corresponding to this distinction between variable factor and fixed factors, economists distinguish between short run and long run. The short run is a period of time in which output can be increased or decreased by changing only the amount of variable factors such as labour, raw material etc. In the short run, quantities of the fixed factors such as capital equipment, factory building etc. cannot be varied, i.e. the quantities of fixed factors remain unaltered. On the other hand, the long run is defined as the period of time in which the quantities of all factors may be varied, all factors being variable in the long run.

Having explained the difference between the fixed factors and the variable factors and also between the short run and the long run, we are in a position to distinguish between fixed costs and variable costs which when added together make up total cost.

Fixed Costs and Variable Costs

Fixed cost are those costs which are independent of output, that is they do not change with changes in output. These cost are a 'fixed' amount which must be incurred by a firm in the short run whether the output is large or small. Even if the firm closes down for some time in the short run, these costs have to be borne by it. Fixed costs are also known 'as overhead costs' and include charges such as contractual rent, insurance fee, maintenance costs, interest on capital invested, property taxes minimum administrative expenses etc. Thus fixed costs are those which are incurred in hiring the fixed factors of production whose amount cannot be altered in the short run.

Variable costs, on the other hand are those costs which are incurred on the employment of variable factors of productions and their amount can be altered in the short run when output rises or falls. If the firms shuts down for some time in the short run, it will not use variable factors and will not, therefore, incur any variable costs. Variable costs are also called 'prime costs' or 'direct costs.'

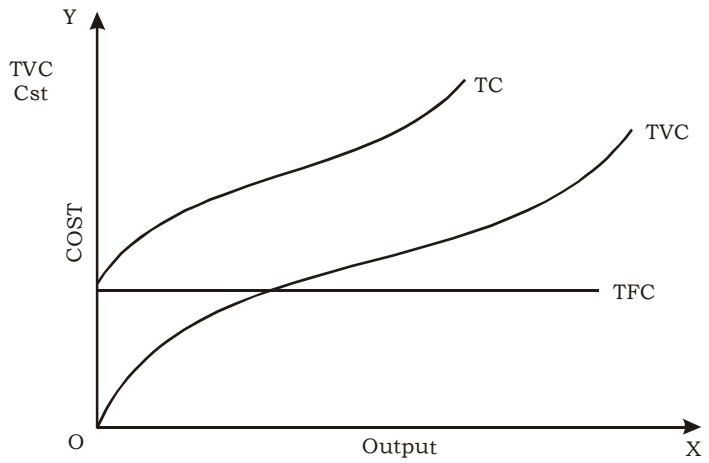
Total cost of business is the sum of its total variable costs and total fixed costs.

TC = TFC+TVC

Where TC = Total costs

TFC = Total fixed costs

TVC = Total variable costs



Since the total fixed cost remains constant whatever the level of output, the total fixed cost curve is parallel to the X-axis. It is seen in the fig. 1.1. that total fixed cost curve starts from a point on the Y-axis meaning thereby that total fixed cost will be incurred even if output is zero. On the other hand, the total variable cost curve (TVC) rises upward showing thereby that as the output is increased, the total variable costs also increases. The total variable cost curve TVC starts from the origin which shows that when output is zero, the variable costs are also nil. It is also noted that TC is a function of the total output.

TC = f(Q)

Total cost curve (TC) has been obtained by adding up vertically total fixed cost and total variable cost curve. Therefore, vertical distance between TVC and TC is constant througout. The same as that of the total cost curve (TC) is exactly the same as that of the total cost (TVC) because the same vertical distance always separates the two cost curves.

THE SHORT-RUN AVERAGE COST CURVES

The concept of average costs is more frequently and usefully used in economic theory.

Average Fixed Cost (AFC)

Average fixed cost is the total fixed cost divided by the number of units of total output produced. Therefore,

$$AFC = \frac{TFC}{TQ}$$

Where TQ is total output produced. It is seen from the figure 1.2 that the average fixed cost continuously falls throughout.

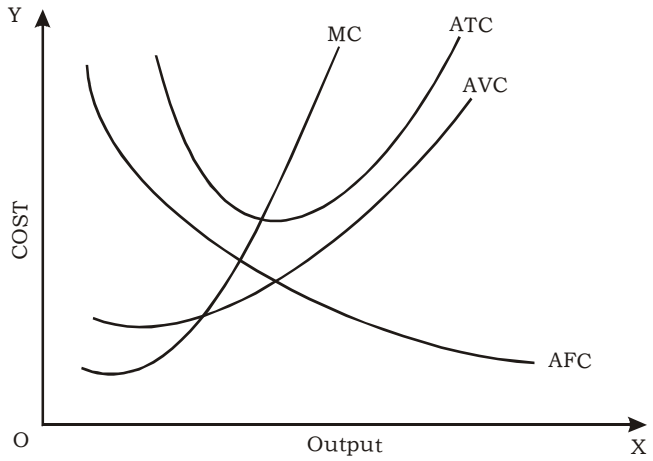


Fig. 1.2

Short-Run Average and Marginal Cost Curves

The average fixed cost curve posseses another property; if we pick up any point on the (AFC) curve and multiply it with the corresponding quantity of output produced, the product will be same because total fixed cost remains constant throughout.

Average Variable Costs (AVC)

Average variable cost is the total variable cost divided by the number of units of output produced. Therefore

$$AVC = \frac{TVC}{TQ}$$

Thus, average variable cost is variable cost per unit of output. The average variable cost will generally fall as the output increases from zero to the normal capacity output due to the occurrence of increasing returns. But beyond the normal capacity output the average variable cost will rise steeply because of the operation of diminishing returns.

Average Total Cost ATC or AC

Average total cost of what is simply known as average cost is the total cost divided by the number of units of output produced.

$$\text{Average cost} = \frac{\text{Total Cost}}{\text{Output}}$$

$$AC = \frac{TC}{TQ}$$

Since the total cost is the sum of total variable cost and total fixed cost, the average total cost is also the sum of average variable cost and average fixed cost.

$$TC = TVC + TFC$$

$$AC = \frac{TVC + TFC}{TQ}$$

$$AC = \frac{TVC}{TQ} + \frac{TFC}{TQ}$$

$$AC = AVC + AFC$$

The shape of average total cost will depend on average fixed cost and the average variable cost. We find in the Fig. 1.2 that in the beginning, both AVC and AFC curves fall, the ATC curve, therefore, falls sharply in the beginning. When AVC begins rising, but AFC curve is falling steeply, the ATC curve continues to fall. But as output increases further, there is a sharp rise in AVC which more than offsets the fall in AFC. Therefore, the ATC curve rises after a point. Therefore, the average cost curve (ACC) like the AVC curve first falls, reaches its minimum value and then rises. Average cost curve is therefore almost of a 'U' shape.

Marginal Cost

The concept of marginal cost occupies an important place in economic theory. Marginal cost is 'addition' to the total cost caused by producing one more unit of output. In other words, marginal cost is the addition to total cost of producing n units instead of n-1 units where n is a given number.

MC = TC - TCn-1

Since marginal cost is a change in total cost as a result of change in output, it can also be written as

$$MC = \frac{\Delta TC}{\Delta TQ}$$

Where TC is a change in Total cost

ΔTQ is a small change in output.

MC is independent of fixed cost. Since fixed costs do not change with output, there are no marginal fixed costs when output increases.

$MC_n = TC_n - TC_n - 1$ because TC = TVC + TFC

$= (TVC_n + TFC) - (TVC + TFC)$

$= (TVC_n + TFC - TVC^{n-1} - TFC$

$= TVC_n - TVC_{n-1}$

Marginal cost is independent of fixed cost and, thus, can be directly attributed to change in variable cost

$$MC = \frac{\Delta TVC}{\Delta TQ}$$

The Relation Between Average and Marginal Cost Curves

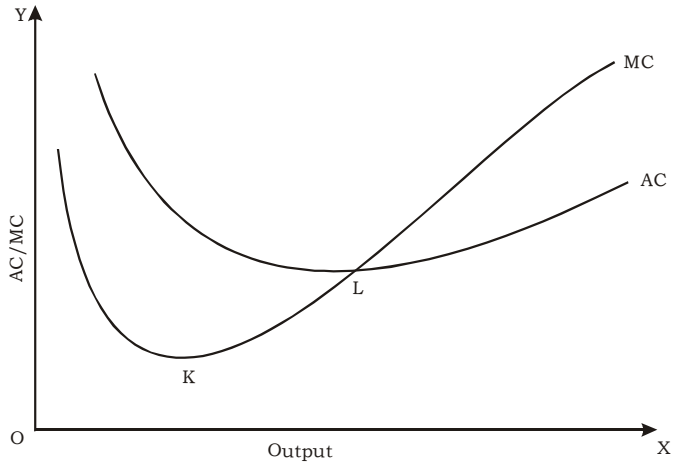
The relationship between the marginal cost and average cost is same as that between any other marginal average quantities. It can be illustrated with the help of following

example.

Units of Output	Fixed Cost (Rs.)	Variable Cost (Rs.)	Total Cost (Rs.)	Average Cost (Rs.)	Marginal Cost (Rs.)
1	42	60	102	102	
2	42	110	152	76	50
3	42	150	192	64	40
4	42	210	252	63	60
5	42	310	352	70.4	100
6	42	540	582	97	230

Table 1.1

The relationship between average and marginal cost can be shown with the help of fig. 1.3 when marginal cost is above average cost, the average cost rises but



Relationship between Marginal Cost and Average Cost Curves

when marginal cost is below the average cost, average cost falls. When marginal cost stands equal to the average cost, the average cost remains constant. The minimum point of marginal cost curve comes prior to the minimum point of average cost curve. It is not necessary that when average cost curve is falling, marginal cost curve will also be falling what can be said definitely is that, when average cost curve is falling, marginal cost curve will be below the average cost curve.

Why is Average Cost (AC) Curve U-shaped?

Basically (AC) average cost curve gets its shape because of the operation of

the law of variable proportions. In the beginning, the proportion of fixed factors is relatively large as these are under-utilised in the beginning. Therefore, AC will fall with increase in the amount of variable factors. When the proportion between fixed and variable factors is most desirable, AC touches its minimum. Later on, proportion of variable factors becomes relatively larger and, therefore, AC swings upward. It can be expressed in another manner too. We know that AC is the addition of AFC and AVC. In the beginning both AFC and AVC fall with increase in output, therefore, AC should decline as more is produced. AC does not necessarily go up as AVC begins to rise because during this period fall in AFC may be greater than rise in AVC only when increase in AVC is more than a decrease in AFC, that AC will move up. Thus, AC has a minimum point at a large output while AVC records a minimum at a lower output. The availability of internal economies and diseconomies also offer an explanation to the U-shape of average cost curve.

Long run Average Cost Curve

In the long run, none of the factors is fixed and all can be varied to expand production and, therefore, the firm has no fixed costs in the long run. A long run cost curve depicts the functional relationship between output and long run cost of production. Long run average cost curve depicts the possible average cost of producing all possible level of output.

In order to understand the derivation of long run average cost curve, we consider the three short run average cost curves as shown in the figure 1.4. These short run average cost curves are also known as plant curves. In the short run, the firm can be operating on any short run average cost curve, given the size of the plant. It is seen that upto OB amount of output, the firm will operate on the short run average cost curve SAC_1 though it could also produce with short run average

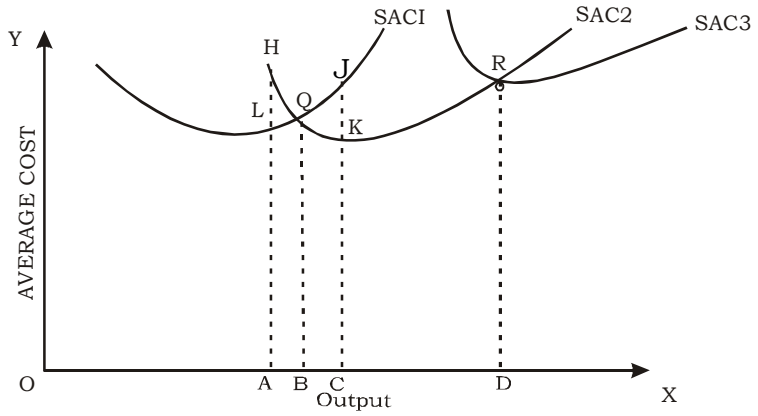


Fig. 1.4

cost curve SAC_2 because upto OB amount of output production on SAC_1 curve entails lower cost than on SAC_2. For instance, if the level of output OA is produced with SAC_1 it will cost AL per unit and if it is produced with SAC_2, it will cost AH per unit. It is clear from the figure that AL is smaller than AH. Similarly, all other output levels upto OB can be produced more economically with the smaller plant SAC_1 than with the larger plant SAC_2. It is thus clear that in the long run the firm will produce an output which is larger than OB (but less than OD), than it will be economical to produce on SAC_1. It will be seen from the figure that the output is larger than OB but less than OD, can be produced at a lower cost per unit on SAC_2 than on SAC_1. Thus, the output OC if produced on SAC_2 costs CK per unit which is lower than. CJ which is the cost incurred when produced on SAC_1.

Therefore, if the firm plans to produce between outputs OB and OD, it will employ the plant corresponding to short-run average cost curve SAC_2. If the firm has to produce an output which exceeds OD, then the cost per unit will be lower on corresponding to the short-run average cost curve SAC_3 than on SAC_2.

It is, thus, clear that in the long run the firm has a choice in the employment of a plant, and it will employ the plant which yields possible minimum unit cost for producing a given output. The long run average cost curve depicts the least possible average cost for producing various levels of output when all factors including the size of the plant have been adjusted.

Suppose now that the number of alternative plants that the firm can have are very large. Then instead of having a wide area for each short period AC,. now the LAC will have one point from each SAC, the point of tangency LAC and the relevant SAC.

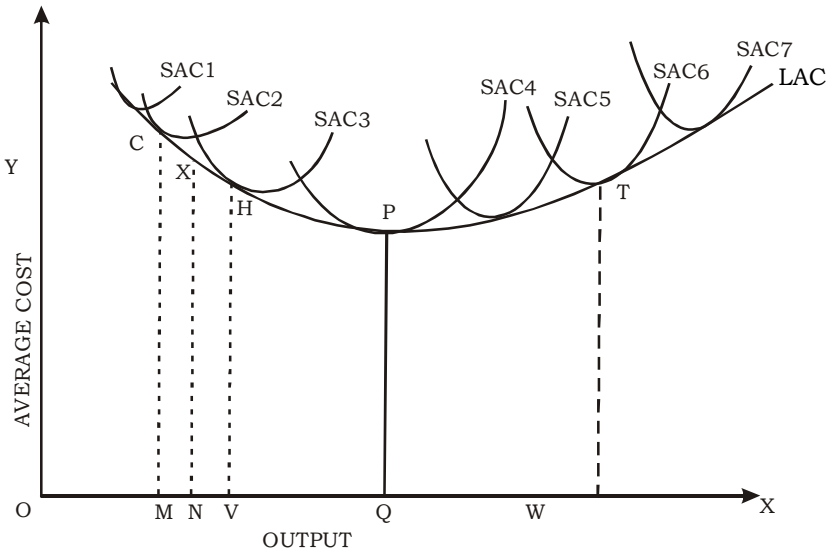


Fig. 1.5 Long Run Average Cost Curves

The LAC then envelops the SACs hence it is known as the 'envelop curve'. As Leftwich writes 'the point of tangency is taken to minimum cost for any given output, the firm should use the scale of plant whose short run average cost curve is tangent to the long-run average cost at that output.

The LAC is tangent to only the lowest SAC at the minimum point of the latter. In case of all those plants which come earlier the point of tangency is prior to the minimum point of SAC, indicating that a bigger plant reduces cost. But in the case of plants coming after the lower SAC, the points of tangency are to the right of the minimum of SACs implying that over utilisation of a smaller plant reduces cost rather than the construction of a bigger plant. Thus LAC is the locus of all those points which represent minima of cost of production for various output levels.

Long-run Average Cost Curve in Constant Cost Case

If the production function is linear and homogneous and also the prices of inputs remain constant, then the long run average cost will remain constant at all levels of output as depicted in fig. 1.6

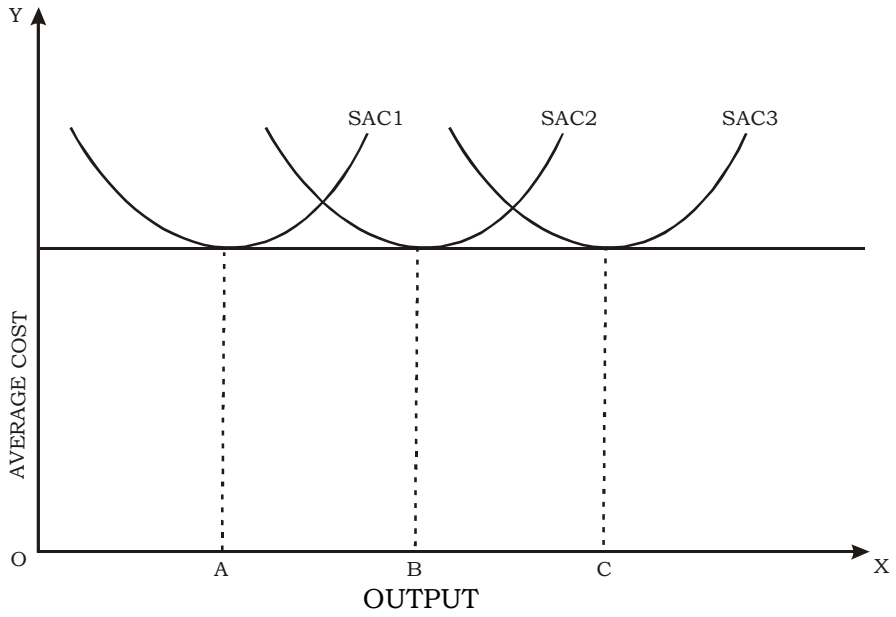


Fig. 1.6

Long Run Avereage Cost Curve

It will be noticed that all the short run average cost curves such as SAC_1, SAC_2 and SAC_3 have the same minimum average cost of production. This means that whatever the size of the plant, the minimum average cost of production is the same. This implies that all factors can be adjusted in the long run in such a way that the proportion between them always remains optimum.

Long-Run Marginal Cost Curves

The long run marginal cost curve can be directly derived from the long run total cost curve, sine the long-run marginal cost at a level of output is given by the slope of the total cost curve at the point corresponding to that level of output.

In the figure 1.7 long run marginal average cost curve which is U-shaped. It is noticeable that long run marginal cost (LMC) curve is flatter than the short-run marginal cost curves.

The relationship between long run marginal cost curve and long run average cost curve is the same as that between short-run average and short-run marginal cost curve. It is also seen that at the level of output at which a particular SAC curve is tangent to the LAC curve the corresponding SMC curve intersects the LMC curve. In other words, at the level of output where the short-run average cost is equal to the long run cost, the corresponding short-run marginal cost is equal to long run marginal cost too.

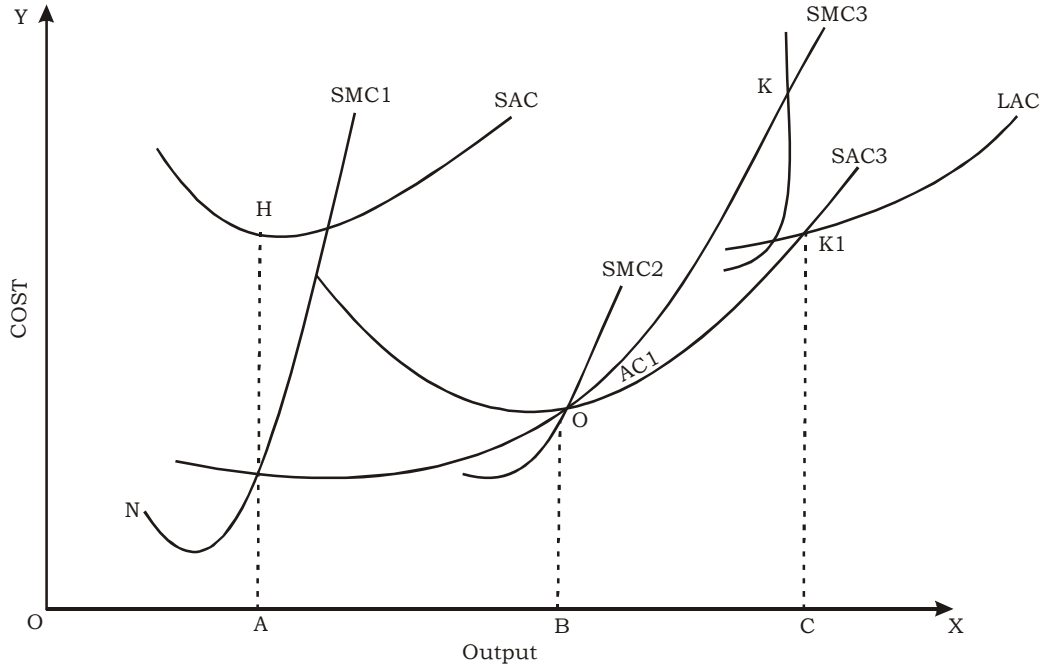


Fig. 1.7 Long Run Marginal Cost Curve

Suggested Readings

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QUESTIONS

1. What is Total Cost, Average Cost and Marginal Cost? Explain the relationship between average cost and marginal cost with the help of a table and diagram?
2. Why is the short-run average cost curve U-shaped? Also discuss the relationship between the short-run average cost curve and short run marginal cost-curve. Does this relationship hold good in the long run?
3. Why is the U-shape of the long-run average cost curve less pronounced than that of the short run average cost curve?

BBA PART-I **PAPER : BBA-102**
SEMESTER-I **BUSINESS ECONOMICS-I**

LESSON NO. 2.2 **AUTHOR : KHUSHWANT SINGH**

CONCEPT OF REVENUE & BREAK EVEN ANALYSIS

i. Meaning
ii. Total Revenue (TR)
iii. Average Revenue (AR)
iv. Marginal Revenue (MR)
v. Relationship between TR, AR and MR
vi. Behaviour of AR and MR under Perfect Competition.
vii. Behaviour of AR and MR under Imperfect Competition.
viii. Relationship between AR and MR
ix. Relationship between AR, MR and Elasticity of Demand
x. Significance of Revenue Curves

I. Meaning :

Every producer, after producing a product is interested to sell his product in the market. The revenue of a firm, together with its cost, determines profit. In this chapter, we study the concept of revenue. The term 'revenue' refers to the receipt obtained by a firm from the sale of certain quantities of a commodity at various prices.

II. Total Revenue :

The sale proceeds which a firm receives after selling its output in the market is known as total revenue.

Total Revenue = Price x quantity sold

In the words of Professor Liebhafisky, "Total revenue may be defined generally as the revenue from sales obtained by a seller. It is equal the number of units of the commodity multiplied by the per unit selling price."

III. Average Revenue :

Average Revenue is the revenue per unit of output sold. It is found by dividing total revenue by the number of units sold. In the words of Prof. Liebhafsky, "Average revenue is define as total revenue divided by the number of units sold. Average revenue is, thus, merely another term meaning price of the product."

$$\text{Average Revenue (AR)} = \frac{\text{Total Revenue}}{\text{No. of units sold}}$$

As a matter of fact, average revenue means price. As consumer's demand curve illustrates the relationship between price and quantity demanded, it also represents the average revenue or the price at which various units of the commodity are sold, since price paid by a buyer constitutes the revenue from the seller's point of view.

IV. Marginal Revenue :

Marginal revenue is addition made to the total revenue by the sale of an additional unit of the commodity. In the words of MC Connel, "Marginal revenue is the addition to total revenue which results from the sale of one more unit of output." Marginal revenue can be expressed as

$$MR = TR_n - TR_{n-1}$$

Here, MR = Marginal Revenue

TR_n = Total Revenue of n Units

TR_{n-1} = Total Revenue of (n –1) Units

To illustrate the concept of marginal revenue, it by sale of 10 units total revenue equals Rs. 1000 and by the sale of 11 units, total revenue increases to Rs. 1100, then marginal revenue is Rs. 100 (being the difference between Rs. 1100 and Rs. 1000).

V. Relationship between TR, AR and MR :

Before we study the relationship between AR and MR under different cases, let us understand these concepts with the help of a table and diagram.

Units Sold (q)	Pricer or AR (TR/q)	TR (Pq)	MR ($TR_n - TR_{n-1}$)
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	– 2
8	3	24	– 4
9	2	18	– 6
10	1	10	– 8

The table shows that as price falls from Rs. 10 to Rs. 1, the output sold increases from 1 to 10. TR increase from 10 to 30, then remains 30 and ultimately falls from 30 to 10. We find that when AR falls, MR falls more than that, i.e., from Rs. 10 to 0 and

then becomes negative. TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

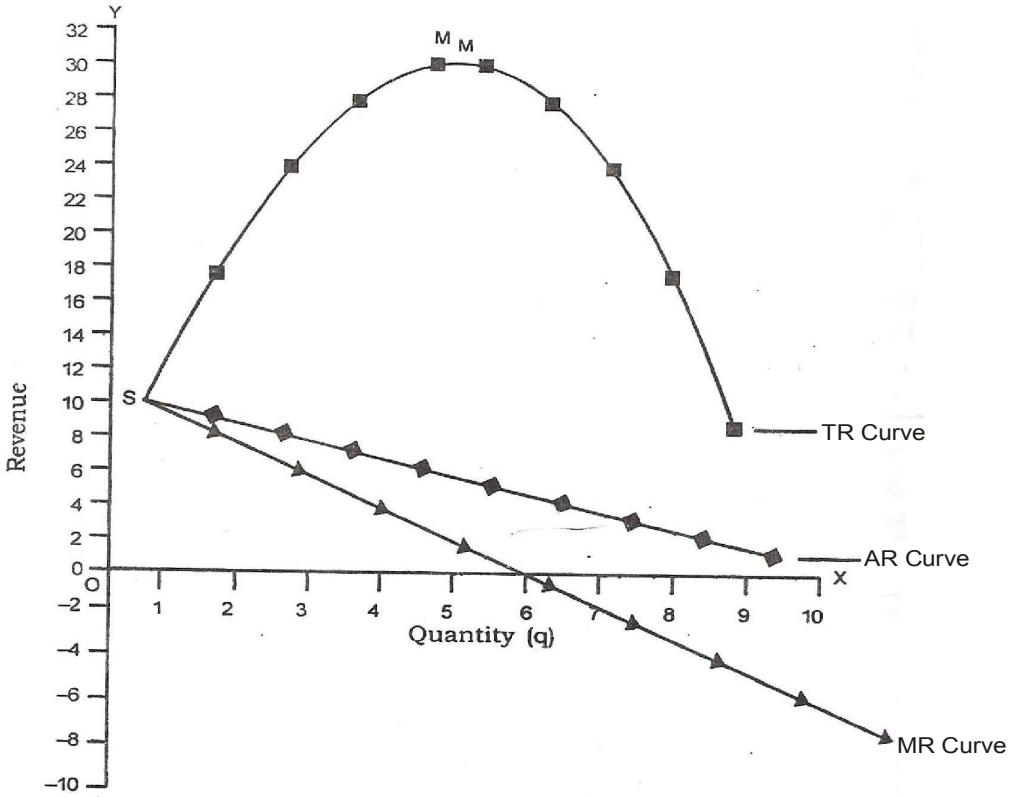


Fig. 1

The Fig. 1 shows that TR curves starts from S. It is known as initial total revenue. The TR rises from S to M. At M, TR is maximum. After that, it falls. Thus, TR rises, reaches maximum and then falls.

In the same figure, AR and MR start from point S. AR falls, MR also falls but MR is much below AR. MR falls, reaches zero and then it becomes negative. AR falls but remains positive throughout. When average revenue functions are linear (straight lines), the rate of fall of marginal revenue is double the rate of fall of average revenue.

VI. Behaviour of AR and MR under Perfect Competition :

If AR is constant, MR will also be constant. In this case AR and MR will be equal. It happens under perfect competition where AR curve and MR curve of the firm will coincide. The curves drawn will be horizontal i.e., parallel to X-axis. Now, we can show with the help of following table and diagram the relationship between TR, AR and MR :

Units Sold	Price (AR)	TR	MR
1	10	10	10
2	10	20	10
3	10	30	10
4	10	40	10
5	10	50	10

As we increase output, price or AR remains the same, i.e. Rs. 10. TR increases but by a constant rate.

MR is also constant i.e., Rs. 10 and it is equal to AR.

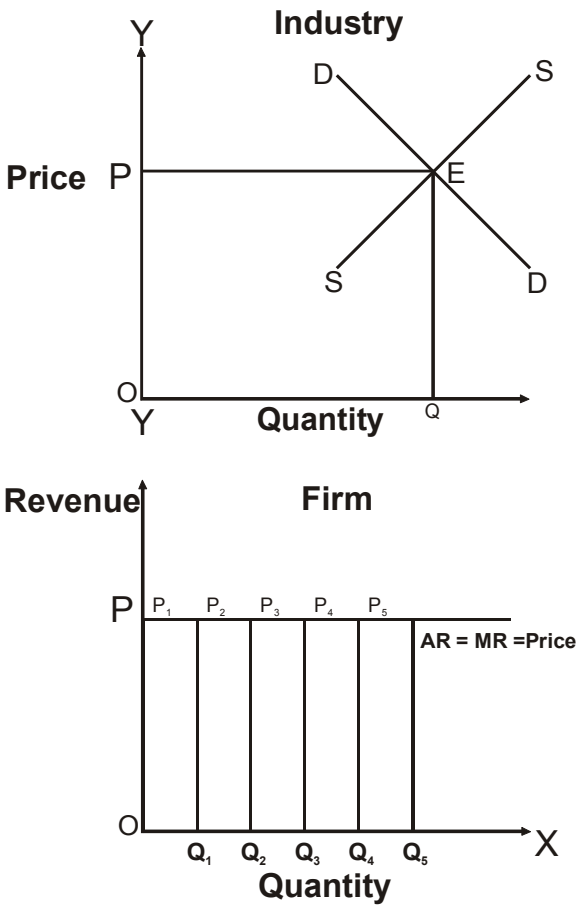


Fig. 2

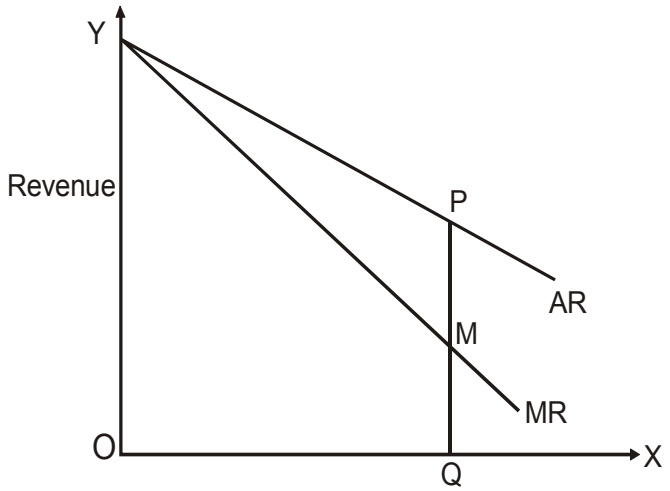
As shown in Fig. 2 at price, OP, the seller can sell any amount of the commodity. In this case the AR curve is the horizontal line. The MR curve coincides with the AR. It is so because additional units are sold at the same price as before. In that case AR = MR. A noteworthy point is that OP price is determined by Demand and Supply of industry and the firm only follow.

VII. Behaviour of AR and MR under Imperfect Competition :

If AR falls, MR also and MR falls faster than the AR. In that case MR is below AR. The downward slopping of AR and MR curves is actually found in case of a firm. It can be shown with the help of a table and diagram.

Units Sold	Price (AR)	TR (pxq)	AR (TR/q)	MR ($TR_n - TR_{n-1}$)
1	10	10	10	10
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2

The above table shows that as AR or price falls from Rs. 10 to Rs. 6, the TR increases from Rs. 10 to Rs. 30 at a diminishing rate. MR in this case falls from Rs. 10 to Rs. 2. MR is the rate at which TR changes. When we compare AR with MR, we find that AR falls at a slow rate whereas MR falls at a faster rate. (see Fig. 3)



Quantity

Fig.3

AT OQ output, AR is PQ where as MR is MQ.
PQ > MQ
AR > MR (Since AR = P)
or P > MR

VIII. Relationship between AR and MR :

(1) If AR Curve is rising upward from Left to Right : Then MR curve will also rise upward. This means that MR will be greater than AR. And the revenue curves drawn will show that MR curve is above AR curve (Fig. 4)

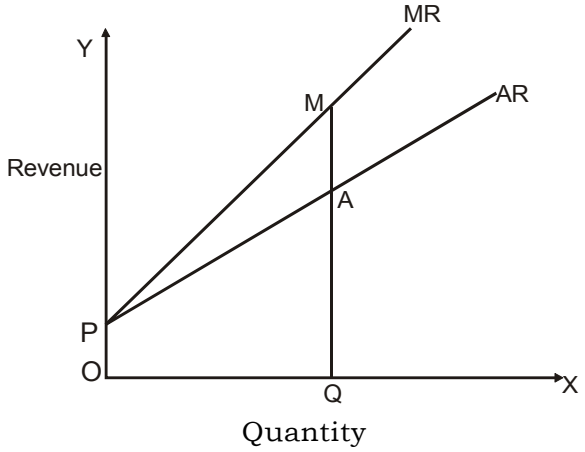


Fig. 4

In the above diagram, we find that AR and MR starts from the same point P. AR rises upwards from left to right. The MR curve also rises upward and MR curve is above AR curve.

It shows MQ > AQ
Or MR > AQ

(2) If AR Curve is a Straight Line Downward Sloping : Then MR curve will pass through middle of any perpendicular drawn to the Y-axis.

(3) If AR Curve is Convex to the Origin : It means, as more and more of commodities are sold, convexity of the AR shows that AR falls but at a slower rate. In case of MR, the curve will be again convex to the origin. The convexity of the curve shows that MR falls but at a slower speed. But when we compare convex AR with convex MR, MR will be falling faster than AR and MR will be below Ar.

(4) If AR Curve is Concave to the Origin : In that case MR is also concave to the origin. AR curve is concave to the origin, when the curve is sloping downward from left to right, means that AR is falling at a higher rate for additional units, the MR curve will also fall at a higher rate for additional units.

(5) If AR Curve or Demand Curve has Unit Elasticity throughout the Length : In that case MR will be zero throughout. If AR curve is rectangular hyperbola, in that case elasticity of demand is equal to one, it means MR = 0 throughout and MR will coincide with X-axis (Fig. 5)

$$M = A\left(\frac{e-1}{e}\right)$$

if $e = 1$, then

$$M = A\left(\frac{1-1}{1}\right)$$

$$= A\left(\frac{0}{1}\right) = 0$$

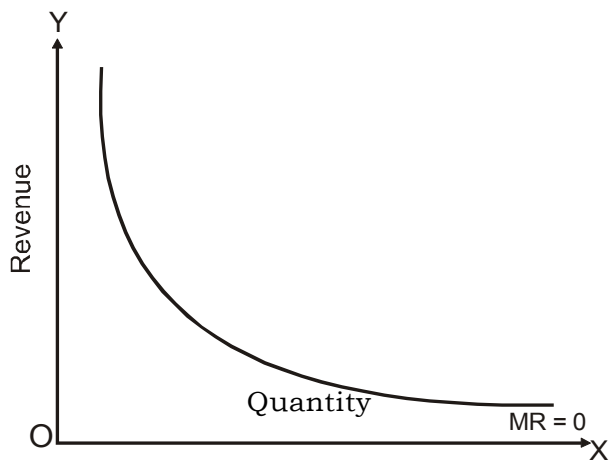


Fig. 5.

IX. Relationship between AR, MR and Elasticity of Demand :

AR, MR and elasticity of demand are related to each other in a special way. The preposition that MR equals price minus the ratio of price to elasticity of demand at that price can be proved with the help of fig. 6 :

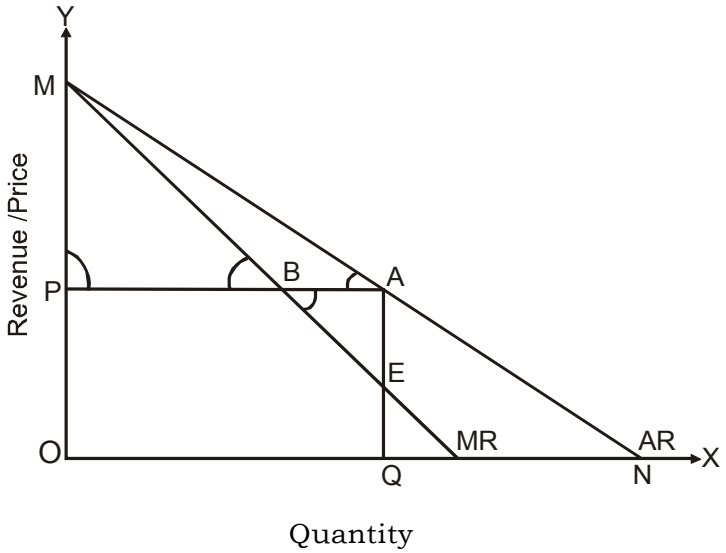


Fig. 6

It has already been explained that AR curve of a firm actually constitutes the demand curve for the firm's product. Therefore, elasticity of demand at any point on a consumer's demand curve amount to the elasticity of demand on the given point on the firm's AR curve. Elasticity of demand at point P on the AR curve in the figure given above equals AN/AM. This measure of point elasticity of demand is helpful in demonstrating the relationship between AR, MR and elasticity of demand at point A on the given demand curve MN.

Elasticity of demand at point A on the given demand curve MN is as follows :

$$\text{E at point A} = \frac{AN}{AM}$$

$$= \frac{AQ}{MP} \text{ (AQN and MPA are similar triangles and hence the ratio of their sides is same).}$$

$$= \frac{AQ}{AE} \text{ (since MP = AE)}$$

In the above figure QA is price or AR, while AE equals AR — MR. Therefore,

$$\text{E at point A} = \frac{AQ}{AE}$$

$$= \frac{AR}{AR - MR}$$

$$= \frac{A}{A - M}$$

Here, A = Average revenue or Price

M = Marginal revenue

E = Elasticity of demand

With the help of this, we can find out the formula for Price and MR.

$$E = \frac{A}{A - M}$$

By Cross-Multiplication, we get

$$EA - EM = A$$

$$EA - A = EM$$

$$A (E - 1) = EM$$

$$A = \frac{EM}{E - 1}$$

$$\text{or} \quad A = M \times \frac{E}{E - 1}$$

$$\therefore \quad A = MR \times \frac{E}{E - 1}$$

Similarly, we can find out the value of MR in terms of AR and elasticity of demand.

$$E = \frac{A}{A - M}$$

By cross-multiplying, we get

$$EA - EM = A$$

$$EM = EA - A$$

Dividing both sides by E, we get

$$M = \frac{A - A}{E}$$

Since AR equals Price

$$M = \frac{P - P}{E}$$

From this relationship, we can maintain that MR equals price minus the ratio of price to elasticity of demand. It is evident from this relationship that MR is always

less than price, with one exception, because it is calculated by substracting some value, represented by P/E from price.

The exception occurs under conditions of perfect competition wherein demand is perfectly elastic because the coefficient of elasticity in infinitely large and the term to be substracted is infinitely small and may be taken as zero.

Through the application of this formula, it can be seen that MR is always positive at any point where elasticity of AR or demand curve is greater than unity and MR is always negative where elasticity of the AR curve or the demand curve is less than unity.

X. Significance of Revenue Curves :

The main points of the significance of AR and MR curves are as under :

(1) Estimation of Profits and Losses : A producer finds out whether he is making supernormal profits, normal profits or sustaining losses. For this purpose, he compares AR with AC :

(i) IF AR > AC, the firm makes the supernormal profits.

(ii) IF AR = AC, the firm earns normal profits.

(iii) IF AR < AC, the firm sustains losses.

(2) Equilibrium : The other point of importance of AR and MR curves is to know how much a producer should produce. The firm will be in equilibrium at that point where MR = MC. This is a general condition for the firm under all market situations.

(3) Capacity Utilisation : It is through revenue curves that we come to know whether a firm is producing to its full capacity or not e.g. under perfect competition, if AR curves are tangent to AC curve at its minimum point, the firm will be producing at its full capacity.

(4) Price Changes : The concepts of AR and MR are also useful to the factor services (such as rent, wages, interest and profits) in determining their prices. In factor pricing, they become inverted U-shaped. The AR and MR curves become ARP and MRP (Average Revenue Productivity and Marginal Revenue Productivity).

BREAK-EVEN ANALYSIS

Break-even analysis reveals the relationship between the volume and cost of production on the one hand and revenue and profits obtained from the sale on the other hand. Break-even analysis involves the study of revenues and cost of a firm in relation to its volume of sales and specifically the determination of that volume at which the firm's cost and revenue will be equal. It magnifies a set of inter-relationship of fixed costs, the level of activity and sales mix to the probability of the concern.

Definition of Break-Even Point

According to Horngren, "The break-even point is that of activity (sales volume) where total revenues and total expenses are equal. It is the point of zero profit."

In words of Matz and Curry, "Break-even analysis indicates at what level cost and revenues are in equilibrium."

The break-even point may be defined as that level of sales where total revenue received from the sale of a product is equal to the total cost of the product. A break-even chart can be defined as an analysis in graphic form the relationship of production and sales of profit. It can be explained with the help of adjoining diagram.

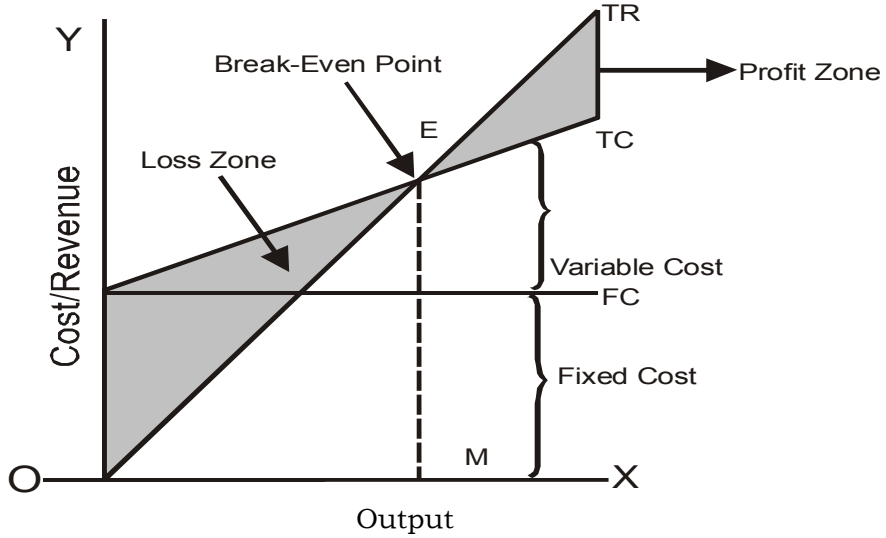


Diagram No. 9

In the diagram 9, fixed cost (FC) curve is parallel to X-axis. TC curve rises upward. Total cost curve and total revenue curve analysis equalises each other at point E which is break-even point. Hence, OM is the break-even output where total cost is equal to total revenue. In the diagram, shaded area before the output OM is loss zone whereas shaded area after point E output OM is profit zone area.

Assumptions of Break-even Analysis

1. All costs are either perfectly variable or absolutely fixed throughout the production process.
2. All revenues are perfectly variable with change in the volume of production.
3. The volume of sale and production are equal. It means whatever is produced is also sold.
4. In case of multi-product firms, the product-mix is stable.

The break-even point can be expressed in terms of units produced or in terms of sales.

Break-even point in terms of physical units

This method is convenient for the single product firm. The break-even volume is the number of units of produce which must be sold to earn enough revenue just to cover all expenses, both-variable and fixed. The break-even points is reached when

sufficient number of units have been sold so that the total contribution margin of the unit sold is equal to the fixed cost. The formula for calculating the break-even point is

$$\text{BEP} = \frac{\text{Fixed Costs}}{\text{Contribute margin per unit}}$$

where, the contribution margin is; Selling price – Variable costs per unit.

Example : Suppose the fixed costs of factory are Rs. 10,000 per year, the variable costs are Rs. 2.00 per unit and the selling price is Rs. 10,000 per year, the variable costs are Rs. 2.00 per unit and the selling price is Rs. 4.00 per unit. The break-even point would be :

$$\text{BEP} = \frac{\text{Rs. } 10{,}000}{(4-2)}$$

In other words, the company would not make any loss or profit at a sales volume of 5,000 units as shown below :

Sales		Rs. 20,000
Cost of goods sold variables cost @ Rs. 2.00	Rs. 10,000	
Fixed costs	Rs. 10,000	Rs. 20,000
Net profits		Nil

Break-even Point in Terms of Sale Value

Multi-product firms are not in a position to measure the break-even point in terms of any common unit or product. They fix it conveniently to determine their break-even point in terms of value.

The formula is :

$$\text{BEP is value} = \frac{\text{Fixed Cost}}{\text{P /V ratio}}$$

$$\text{Here, P/V = ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

Example, Let Sales = Rs. 10, 000
Variable Costs = Rs. 6,000
Fixed Cost = Rs. 3,000

$$\text{Contribution ratio} = \frac{10{,}000 - 6000}{(10{,}000)} = .4$$

BEP value = $\frac{3000}{4}$ = Rs. 7,50

Verification :

Sales value	=		Rs. 7,50
Less variable Cost	=	Rs. 6*7,50 =	Rs. 4,500
Fixed cost	=		Rs. 3,000
Net Profit			Nil

Example : Sales were Rs. 15,000 producing the profit of Rs. 400 in first week of December. In next week, sale goes to Rs. 19,000 and profit to Rs. 1200. Find BEP

Solution : Increase in sale = Rs. 19000
(–) 15000
Rs. 4000

Increase in point 1200 – 400 = 800
Increase in variable cost = 4000 – 800 = Rs. 3200/-
Over sales of Rs. 4000 variable cost = 3200

Hence, VC per Rs. of sale is = $\frac{3200}{4000}$ = .80 paise

Hence, for sale of Rs. 15,000, fixed costs
Will be 20 $\times$ 15000 = Rs. 3000
(–) Profit Rs. 400 = 2600/-
Variable costs = .80 $\times$ 15000 = 12,000

Contribution ratio $= \frac{S-V}{S}$

$= \frac{15000 - 12000}{15000} = 0.2$

Now BEP $= \frac{FC}{0\text{Contribution ratio}}$

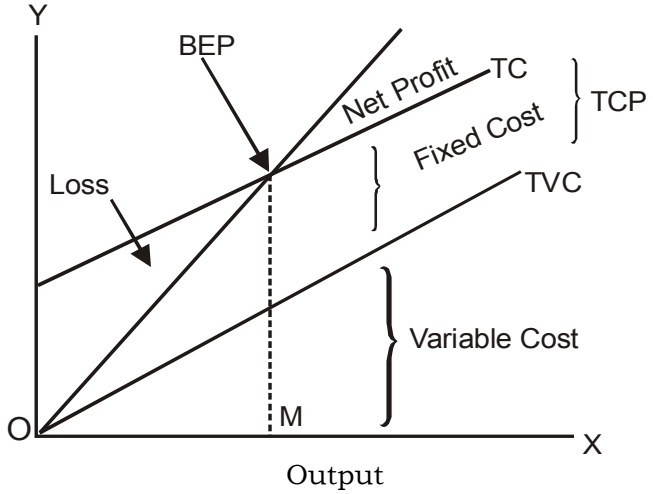
$= \frac{2600}{.2}$ = Rs. 13,000

In break-even analysis, there are certain other concepts, frequently used, also required reference such as :

Contribution

Contribution is the difference between the sale price per unit and the marginal cost per unit. Business manager do not usually think profit in Economic. Sense as the difference between total revenue and total cost. It is the difference between receipts

and variable cost. Suppose a commodity is sold for Rs. 20/- and its variable cost is Rs. 15/- then contribution will be Rs. 5/- (20-15). Thus, contribution first meets fixed cost then think of profit. In the diagram on next page, Total Variable Cost (TVC) + total Net Profit (TNP) + Total Fixed Cost (TFC).



Therefore, if TNP = 0, then TCM = TFC which occurs at BEP.

From the above equation, it becomes clear

TR = TCM + TVC

= (TNP + TFC) + TVC

Total C

Contribution profit (TCP) = TR – TVC

Margin of Safety

It is the difference between the current actual sales and Break Even point output. The formula for margin of safety is

Margin of safety = Total Sales – BEP Sale

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P / V ratio}}$$

If the margin of safety is more, it is an indicator of the growth of a business. In case margin is narrow, the following steps may be taken to improve unsatisfactory position of the firm :

1. Increase the level of production
2. Increasing the selling price
3. Reduce the fixed or variable or both cost
4. Substitute the existing products by more profitable products.

Profit Volume Ratio

It is , generally, known as P/V ratio. It is a relationship or percentage or contribution in terms of sales or turnover. It can be calculated as follows :

$$\text{P/V ratio} = \frac{\text{Contribution} \times 100}{\text{Sales}}$$

P/V ratio is very helpful in pricing policy, Product analysis and Break-Even point etc.

Limitations of Break-Even Analysis

The above discussion provides us a fair idea of the limitation of break-even analysis. The main limitations can be summarized under the following points :

1. Break-even analysis is based on static character which presume constant cost and revenue relationship, but practically constant relationship is not possible.
2. Often we find that input prices undergo a change over time. Such adjustments are generally, avoided in break-even analysis.
3. It is assumed in break-even analysis that the relative share of different products in total output remain same. But in practical situation, it is very difficult to presume this sort of relationship.
4. Break-even analysis implies a horizontal demand curve which is feasible only under perfect competition and not in other market conditions.
5. Factor like plant, size, technology and methodology of production have to be kept constant in order to draw an effective break-even chart, but it is not found in actual life.
6. Break-even analysis is based on accounting data and it suffers from many limitations like ambition of imputed costs, non-scientifically determined depreciation.
7. The break-even analysis ignores the selling cost and only concentrate over production cost.
8. The break-even analysis is not an effective tool for long range use.
9. The area included in the break-even analysis should be limited because it is difficult to apply to too many departments or too many plants.
10. The valuation and allocation of costs in company are usually arbitrary. So it reduces the utility of this analysis.

In view of the above limitations, sometimes doubts are raised about the utility of break-even analysis. The break-even analysis inspite of these limitations is widely used as a method of profit forecasting.

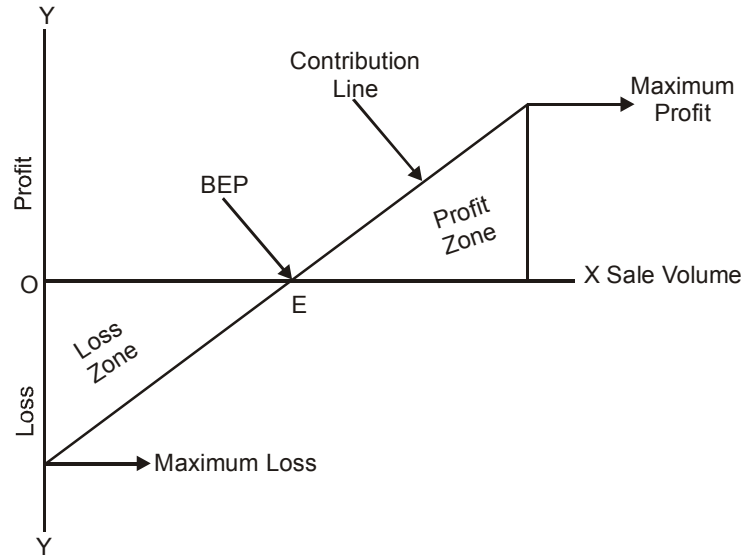
Importance/Significance of Break-Even Analysis

As a tool of planning, break-even analysis plays an immense role. To management, utility of break-even analysis lies in the fact that it presents a micro-scopic picture

of the profit structure of a business economic, strength and weakness, but also sharpens the focus of certain leverages which can be operated upon to enhance its profitability. The break-even analysis brings an ever changing contribution to the modern business. The main importance of break-even analysis to managerial decision making can be given in the following paragraphs :

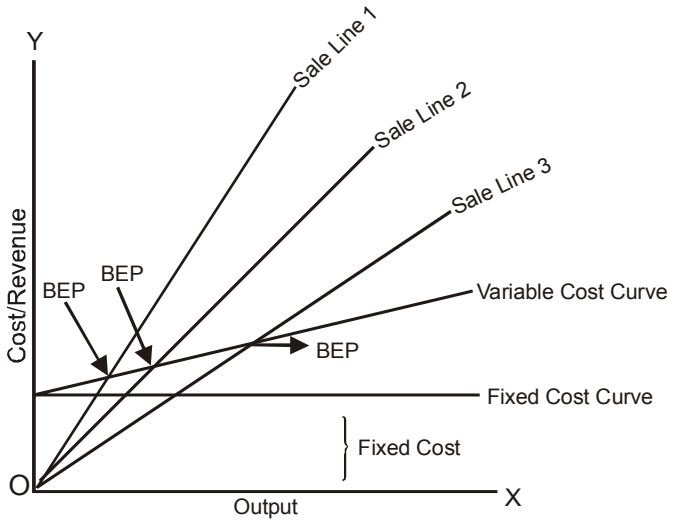
Profit Volume Analysis

It is used to analysis profit volume relationship. The profit volume graph given below shows the relationship of a firm's profits to its volume. In the following diagram, X-axis shows the sale volume and Y-axis profit/loss. At point E, contribution line intersects X-axis determining break-even point. The maximum loss which occurs and zero sales volume is equal to the fixed cost. The maximum profit point is shown on the vertical axis or Y-axis. So the line joining maximum loss point and maximum profit point is known as contribution line.



Forecasting Profit Position of Different Price Levels

The break-even chart can be modified to show the price executive, but his profit position would be at different price levels under the given cost conditions. It can be shown with the help of a diagram given below. In the following diagram as sales line shift downward due to increase in price. It does not mean that profit decreases rather profit will increase. So it is not necessary to take every conceivable price into consideration.



1. Break-even analysis helps in determining optimum level of output which is profitable for the firm.
2. It helps in deciding which product is to be produced and which not to be produced.
3. It is helpful in determining the target capacity for a firm.
4. With the help of break-even analysis, the firm can determine minimum cost for a given level of output.
5. The break-even analysis is helpful in decision making regarding droping or adding a product.
6. It evaluates the percentage financial yield from the project.
7. The break-even analysis can be used in finding the selling price which would prove beneficial to the firms.
8. It is also helpful for the firm to decide from where to start paying dividend to the share holders.

The above study is useful in different fields and its usefulness varies from industry to industry. It is most helpful to the industries which are suffering from frequent changes in input prices, technological changes and constant shifts in product mix. Hence, break-even analysis should be viewed as a guide to decision making and not a substitute for judgement, logical thinking or common sense. Thus, Break-Even Analysis is in principle concerned with the Cost Volume Profit Analysis.

QUESTIONS FOR PRACTICE

1. Explain Break-Even Point. Give its advantages and limitations.
2. Explain the nature and importance of Cost Volume Profit Analysis.
3. How Break-Even Analysis helps in forecasting profit position of different price levels ?

4. Define :
   (a) Margin of Safety
   (b) Break-Even-Point
   (c) Contribution

SUGGESTED READINGS

1.	Economic Analysis	—	Ram Avtar Arora
2.	Business Economic Analysis	—	Vaid, Mehta & Aggarwal
3.	Economic Analysis	—	T.L. Kaushal
4.	Micro Economics	—	T.R. Jain

BBA PART-I **PAPER : BBA-102**
SEMESTER-I **BUSINESS ECONOMICS-I**

LESSON NO. 2.3 **AUTHOR : DR. UPINDERJIT KAUR**

PRICE DETERMINATION UNDER PERFECT COMPETITION

Meaning of Perfect Competition

By the word competition we mean the action of endeavouring to gain what another individual or firm endeavours to gain at the same time. For example, when two or more individual want to buy the same commodity they are said to compete among themselves. Similarly, when there are two or more sellers of a commodity they will compete with each other in order to sell a large quantity of their commodity. This is the ordinary meaning of competition. Thus, competition would become perfect or pure when all the competing buyers and sellers buy and sell the commodity at the same price and are unable to change that price by their individual actions. This would be possible when the following conditions are satisfied.

(i) Large number of buyers and sellers,
(ii) Homogeneous or identical product.
(iii) Perfect knowledge about price prevailing in the market.
(iv) Freedom of entry and exit from the industry for firms and for factors of production.
(v) Non existence of transport costs.

Thus, purely competitive industry comprises a large number of independent firms producing a standardized product. Pure competition assumes that firms and resources are mobile between different industries. No single firm can influence output to that price. It can sell any amount of output at that prevailing price. Price, therefore, equals marginal revenue. According to Leftwitch, "Perfect competition is a market in which there are many firms selling identical products with no firm large enough relative to the entire market to be able to influence market price".

We now discuss main features of perfectly competitive market, one by one in detail.

(i) Large Number of Buyers and Sellers : For the competition to be perfect, the number of buyers and sellers must be very large. If the number is small, the buyers and sellers would be able to change price by their individual action. This fact we can illustrate with the help of an example :

Suppose the number of sellers of breads in the market is only ten and each one of them supplies one thousand breads every day. The total supply of all of them taken

together is ten thousand breads. Suppose the demand in the market is also for ten thousand units of breads. By this balance between demand and supply of breads a single price would be determined. Now if any one of the sellers of breads decides to double his supply, he can change the price in the market. The additional supply, when the demand for bread is the same can be sold only at a lower price. Hence an individual seller is able to change the price by his individual action.

But this would not be possible when the number of sellers is very large. If number of sellers in the market is one thousand and each of them is selling only ten breads daily then total supply of breads is again ten thousand breads. Now if one of the sellers decides to double his supply then the total supply in the market becomes ten thousand ten breads. An increase by ten breads is only an insignificant part of the total supply and so this action of the seller will not make any effect on the price. Hence the importance of the large number of sellers in perfect competition. The case of consumers can also be explained similarly.

(ii) Homogeneous Product: Second condition for competition to be perfect is that the product brought and sold is homogeneous or identical. By identical product, we mean that all the units of that product are similar in every respect so that the consumers find no reason to prefer one to the other product. For example, if the breads produced and sold in the market are of the same quality or size and bear the same label on them would be sold at the same price. But if there is some difference in quality or size under which they are sold, a single price would not be possible. There will be as many prices as qualities and brands of breads of bread.

(iii) Perfect Knowledge : Perfect knowledge about the price prevailing in various parts of the market on the part of buyers and sellers is another condition of perfect competition. This, in simple words, means that both buyers and sellers have complete knowledge about the price at which the various goods are sold in the market. Absence of this knowledge would mean that some buyers would be buying at higher price, while others would be able to have the commodity at the lower price. So there may be more than one price for the same product in the market. For example, if sellers in one part of the market sell breads at Rs. four per bread and in another part sell at Rs. five, the buyers would continue to pay different prices unless they have knowledge about the difference in price. The benefit of the knowledge to the buyers would be that they buy in the cheapest market and to the seller would be that they sell in the dearest market. The effect of this would be that ultimately one uniform price would be established in the market.

(iv) Free Entry and Exit for Firms : Fourth and equally important condition of perfect competition is the absence of restriction for the individual producer or firms to move to various fields of production in search of higher profits

and for the factors of production like labour and capital for higher rewards in the form of wages and interest payments. The importance of this condition lies in the fact that abnormal profits disappear in the long run with the free entry of new products into the field of production. Conversely, if the number of firms has exceeded the desired number, then firms last to enter the industry would have to undergo losses. For these firms also there is no restriction to move out to the field where they would be saved from these losses.

The condition is also significant for bringing a balance between the total demand and total supply of a commodity. In order to achieve this balance the free mobility of factors of production like labour and capital also becomes essential between various occupations or fields of production. For example, if the total supply is less than the total demand then the existing firms would expand the scale of their production for which they would also require more of these factors. Thus the existence of perfect mobility of factors is essential for perfect competition.

(v) Non-existence of transport costs : A perfectly competitive market also assumes the non-existence of transport costs. If the cost of transport is there, price must rise in different sectors of the market. A single uniform price for the same product cannot exist in the market if transport cosra are to be incurred.

Having discussed the meaning of perfect competition and the conditions under lying it, we now proceed to discuss the process of determination of prices under such conditions. In other words, we are to discuss now how an individual firm and the industry as a whole attain their equilibrium positions.

Nature of demand curve for its product : We have noted above that an individual seller cannot change the price of the"commodity by his individual action. He has to sell his product at a given price in the market. This, in other words, means that the demand for the product of an individual seller of firm is perfectly elastic. So he would continue to sell his product at the given price. This may be explained with the help of a diagram also.

In diagram no. 1 we represent the demand for output on X-axis and revenue (Price) on Y-axis. At the same price (OP) any amount of commodity can be sold. When the price per unit remains the same, the average revenue also remains the same. Our knowledge of the average and marginal revenue tells us that, when average revenue is constant, the marginal revenue (revenue or price received by the sale of the unit sold last of all) is also constant and both are equal. So that same curve represents both the AR and MR.

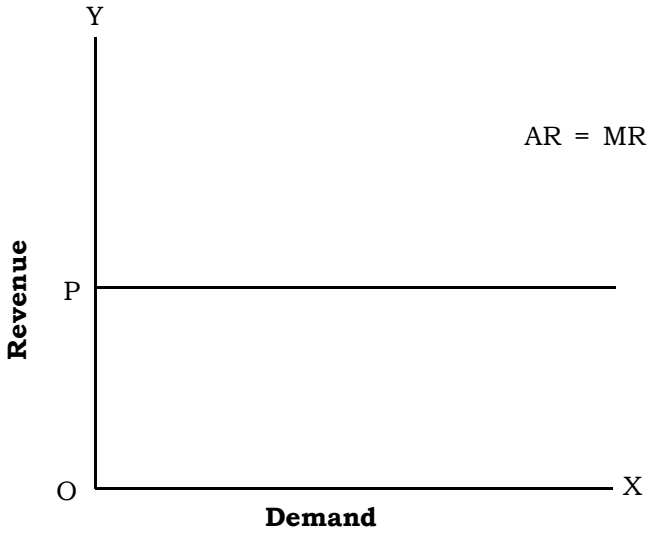


Fig. No. 1

Size of its output : If the firm cannot change the price of the commodity it must try to minimise costs in order to maximise profits. The cost can be minimised by an appropriate combination of various factors of production like land, labour aid capital including raw materials etc. These factors can be broadly classified under tvo categories, fixed and variable factors. For example, land and capital are fixed factor, while labour, raw material etc. variable factors. Accordingly, we have the fixed costs and the variable costs. By adding these costs we got the total costs of production.

Now the question before us is which cost should be minimised in order to be sure that the firm has attained the optimum scale of output. Certainly it is the average total cost (also known as average cost of production) which, at its minimum point would indicate the ideal scale of output of firms. The actual scale of output of the firm would be determined by the marginal cost of production which means the cost of production of the additional unit of output. It is also defined as the addition made to the total cost when one more unit of output is produced.

In diagram no. 2, we have taken four cost curves; average fixed cost, average variable cost, average total cost and the marginal cost. The behaviour of marginal cost curve shows that it cuts the AVC and ATC at their lowest points and the minimum point on AVC is below the minimum point on ATC. These four cost curves are called short period cost curves because, over the long period, we take only two cost curves i.e. ATC and MC.

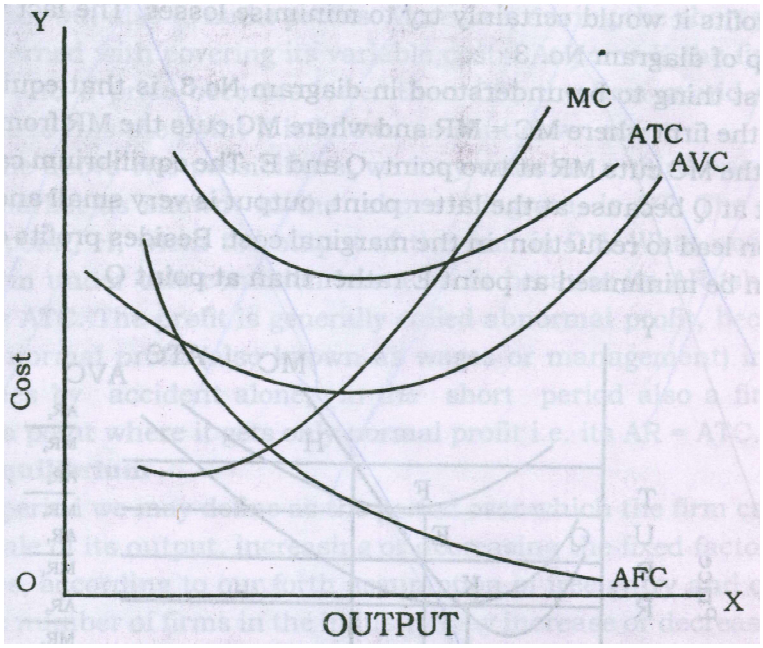


Fig. No. 2

The Equilibrium of the Firm : After analysis of the nature of demand and the nature and, behaviour of costs we are in a position to find out the equilibrium of the firm. By the term equilibrium we mean a state of rest or absence of change. The equilibrium may be short lived or stable for quite some time depending on the time element. Time element means the period at the disposal of a firm. This time period may be short or long and accordingly, we have short period equilibrium and long period equilibrium. We may now turn to the discussion of the conditions of equilibrium and the determination of equilibrium output of a firm in the short and their in the long periods.

Two conditions are necessary for determination of equilibrium : the marginal cost of production must be equal to the marginal revenue and secondly, from point of view of ideal scale of production and maximum profits, marginal cost must cut the marginal revenue curve from below.

Short-run Equilibrium

In short period a firm in equilibrium may face any of the following three situations:

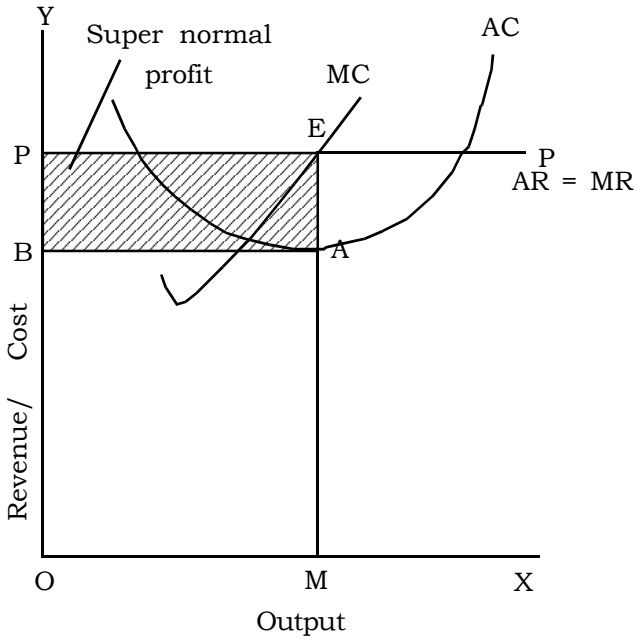
(1) It may earn super-normal profit because in the short period new firms cannot enter in the industry.

(2) It may earn normal profits.

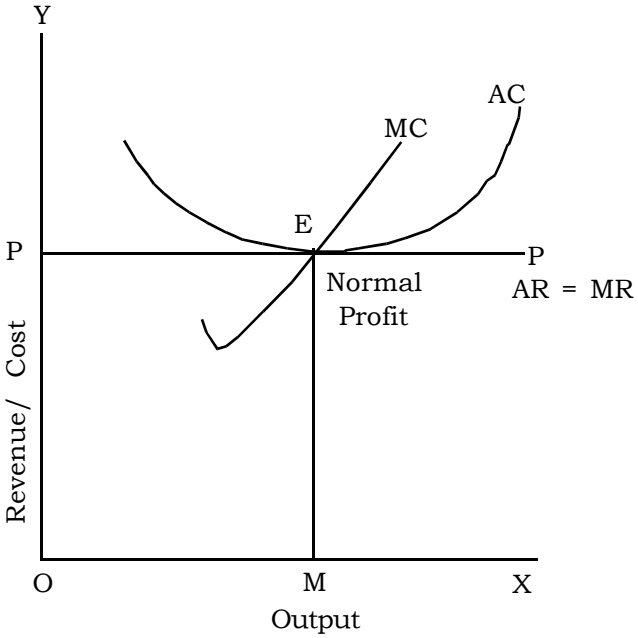
(3) It may even suffer minimum losses, because in the short run firm may not stop production even when prices of the product falls. In case, it stops production temporarily, it will have to bear the loss of fixed cost.

All the three situations faced by the firm in equilibrium in short run are explained diagrammatically.

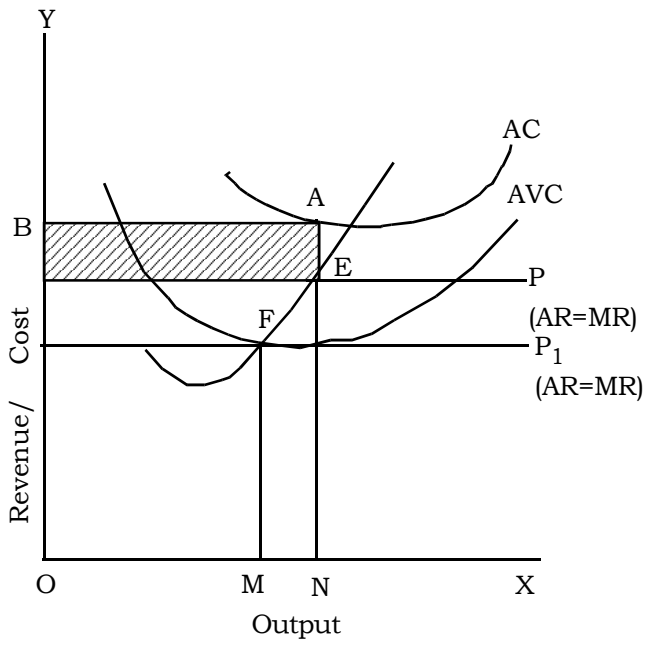
1. **Super-Normal Profit :** A firm in equilibrium earns super normal profit, when average revenue determined by the industry is more than its average cost. In the figure output of the firm is shown an OX axis and cost/revenue on OY axis MC is marginal cost and AC is average cost curve. PP is average revenue and marginal curve (AR = MR). Supposing OP is the price determined by the industry firm's equilibrium will be at point E where MC is equal to MR and MC curve cut MR curve from below equilibrium output is OM. At this output AR = EM and AC = AM. Since AR> AC so firm is earning EA super normal profit (SNP), so EABP the shaded area in SNP.



2. **Normal Profit :** A firm in equilibrium earns normal profit when its AC is equal to AR. It is shown in figure 4. At OP Price determined by industry, firm's equilibrium is at point E and OM is the equilibrium output. At point E, MC and MR are equal and MC curve cuts MR curve from below. Firms earn normal profit at OM output because at this output its MC=MR=AR=AC. In other words, AC and price per unit are equal.



3. Minimum Loss : A firm in equilibrium may incur minimum loss when the average cost of equilibrium output is more than price (AR) determined by industry, by an amount equal to fixed cost i.e. when price (AR) is equal to average variable cost (AR=AVC). Even if the firm discontinues its production, it will have to bear the loss of fixed cost. Loss of the fixed cost is the minimum loss of the firm. As long as AR is more than or equal to AVC the firm will continue with its production. If AR is less than AVC the firm will prefer to shutdown the unit.



Long Period Equilibrium

The long period we may define as the period over which the firm can expand and contract the scale of its output, increasing or decreasing the fixed factors as the need may be. Besides, according to our forth assumption of free entry and exit during the long period, the number of firms in the industry may increase or decrease in order that a balance between the total demand and the total supply is achieved.

Besides the two conditions of short period equilibrium examined above, a third condition is also required to be fulfilled for the long period equilibrium also known as "Full Equilibrium". This condition is that the price AR is not only equal to MR and MC but is also equal to the ATC.

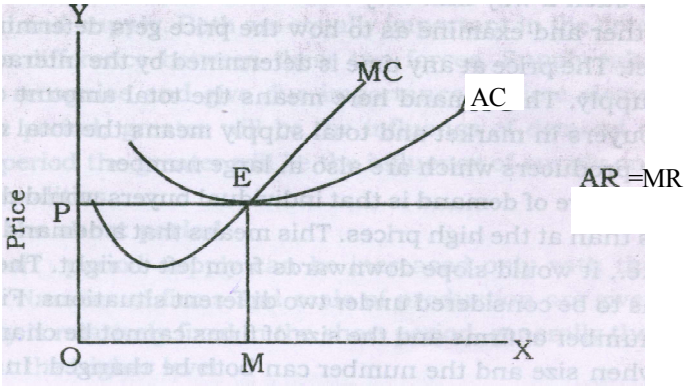


Fig. No. 4

In diagram no. 4, we find that all the above conditions of equilibrium are met at the point E. So E is the point of stable and full equilibrium. The equilibrium output is OM and equilibrium price OP or what is the samething, EM. There are no abnormal profits. The firm earns only normal profits which are included in the ATC. Thus over the long period the price charged by the firm is equal to both the MC (=MR) and the AC i.e.

Price - MR = MC = AC = AR

Secondly, the firm attains the optimum scale of its output as it produces OM output at the minimum ATC shown by EM in the diagram. At this point, by coincidence, the industry (all these firms taken together) also attains equilibrium because the total demand for product is fully met by the total supply of product made available by all firms taken together. This is called "Full Equilibrium", because the supply of the product in the market exactly balances the demand for it.

Imagine for a moment that the supply is either less or more than the demand. "Full Equilibrium" would be achieved in this case. If the supply is less than the demand, some of the firms would get abnormal profits which would make them expand the size or scale of their output or attract new firms to enter that industry. This tendency would continue till supply becomes equal to the demand for the commodity. Conversely, if the supply exceeds the demand the marginal firms will undergo losses and they will leave that industry and go to some other field or industry. This tendency would also continue till the balance between demand and supply is achieved.

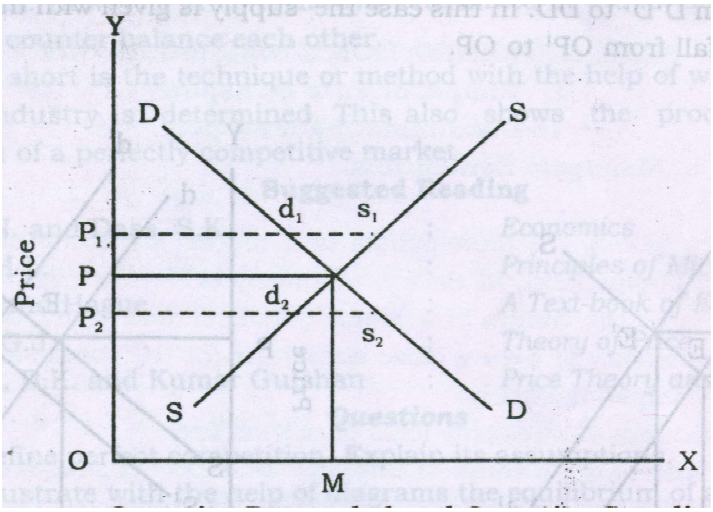
4. Case of Industry

So far, it has been explained that the price of the commodity is constant in the market and the individual firms adjust their output by combining the fixed and variable factors in such a way that they attain a minimum cost combination. Now we may go a step further and examine as to how the price gets determined in a perfectly competitive market. The price at any time is determined by the interaction of the forces of demand and supply. The demand here means the total amount demanded by the large number of buyers in market and total supply means the total quantity supplied by all the firms or producers which are also in large number.

The general nature of demand is that individual buyers would demand more only at the lower prices than at the high prices. This means that a demand curve could have a negative slope i.e., it would slope downwards from left to right. The supply curve on the other hand has to be considered under two different situations. Firstly, in the short period wen the number of firms and the size of firms cannot be changed, secondly, in the long period, when size and the number can both be changed. In the short period, the supply curve would slope upwards to the right but in the

long period it could be sloping upwards to the right or could be a horizontal straight line depending upon the operation of laws of returns.

Thus, in a perfectly competitive market, price would be determind at a point where quantity demanded and quantity supplied are equal to each other. This is known as equilibrium price. Demand and supply are the two contracting forces which move in opposite directions, price settles at a point where these two forces are equal.



Quantity Demanded and Quantity Supplied
Fig. No. 5

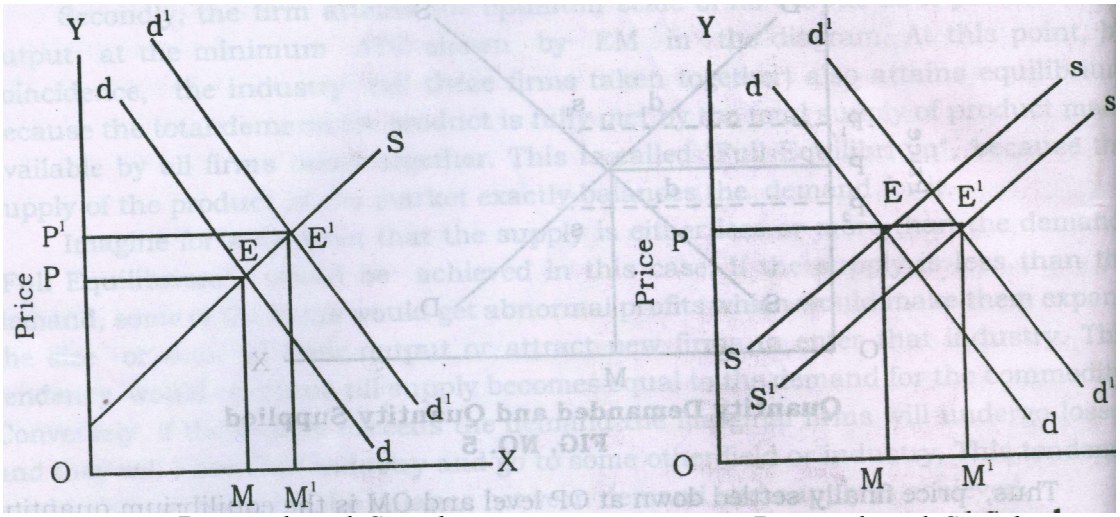
Thus, price finally settled down at OP level and OM is the equilibrium quantity. At price OP_1 supply exceeds demand so price is pushed downwards. On the other hand, at OP_2 price, demand exceeds supply, so price is pushed upwards. Ultimately, equilibrium is established at the point where demand and supply are equal to each other. Whenever there is deviation from this level it will be restored by the automatic forces of demand and supply. Both are equally important in the determination of price. But there is one difference between these two forces. Supply takes time to change. Thus we are to recognise and give due importance to time element. Generally, the shorter the time period, greater will be the influence of demand on pricing and the longer the time period the greater will be the influence of supply on the determination of prices of commodities.

Equilibrium in the short period

In the short period supply can be increased only with the increased use of variable factors. Number of firms and scale of production are given during the short period.

As supply is relatively fixed in the short period, generally the short period price would be fixed at the higher level.

Besides every increase in demand would lead to a rise in the price because the supply cannot be adequately increased. The DD and SS curve in the diagram 6 (next page) represent demand and supply curves of the industry. As supply is somewhat inelastic, the price is fixed at a high level, i.e, at E. Now a rise in a demand leads to rise in price from OP to OP^1 because a similar rise in supply is not neither the number of firms in the industry can be increased nor the size of firms in the industry can undergo a major change. The change would happen when the demand falls from D^1D^1 to DD. In this case the supply is given with the fall in demand the price would fall from OP^1 to OP.



Demand and Supply **Demand and Supply**

Fig. No. 6 **Fig. No. 7**

Long Period Equilibrium

Over the long period, the supply becomes elastic meaning there by that the output can be increased by the existing firms or supplemented by the new firms entering the industry. With the supply becoming elastic and the demand not showing much change over the long period, the price might be fixed at a lower level. This can also be shown with diagram no. 7.

DD and SS are original demand and supply curves intersecting at point E_1 Equilibrium price is OP and equilibrium output OM. Now with the increase in demand by D^1D^1 the supply can also be increased from SS to S^1S^1. The price may remain at

the same level if increase in supply is equal to increase in demand. If increase in supply is more than the increase in demand the price may fall below OP also. The laws of returns will affect the position of the new supply curve.

The long run supply curve slopes upward to the right in increasing cost industry, is horizontal straight line in constant cost industry and slopes downward to the right in decreasing cost industry. Long run normal price is determined by the equilibrium between a demand curve and long run supply curve Le. when supply is fully adjusted to a given demand. Long run price is equal to the minimum long run average cost. Then all the firms within the industry earn only normal profits and industry is also in equilibrium. Whether long run price rises or remains constant or falls depends upon whether the industry is experiencing law of increasing cost, constant cost and decreasing cost. However, price is always determined at the level where demand and supply forces counter balance each other.

This, in short is the technique or method with the help of which equilibrium of competitive industry is determined. This also shows the process of the price determination of a perfectly competitive market.

Suggested Reading

1. Sen, S.N. and Dass, S.K. : *Economics*
2. Ahuja, H.L. : *Principles of Micro-economics*
3. Stonier and Hague : *A Text-book of Economic Theory*
4. Stigler, G. J. : *Theory of Price*
5. Sharma, B.K. and Kumar Gulshan : *Price Theory and Distribution*

Questions

1. Define perfect competition. Explain its assumptions.
2. Illustrate with the help of diagrams the equilibrium of a firm in short run and long run under conditions of perfect competition.
3. Describe the effect of a change in demand on the price of product in short run and long run.

BBA PART-I **PAPER : BBA-102**
SEMESTER-I **BUSINESS ECONOMICS-I**

LESSON NO. 2.4 **AUTHOR : DR. UPINDERJIT KAUR**

PRICE DETERMINATION UNDER MONOPOLY

MEANING

According to Dooley, "A monopolists is a market with one seller". Monopoly means absence of competition. In theory, monopoly is said to exist when the supply of a commodity is in the hands of a single producer and there is no other firm producing the commodity or even a close substitute for the commodity. This is what is called pure or simple monopoly.

FEATURES OF MONOPOLY MARKET

The main featuers of monopoly form of market are :

(i) **One Seller and Large Numbe of Buyers** : Monopoly is said to exist when there is only one seller of a product in a market. A monopolist may be the only person, a few partners or in the form of a joint stock company. In simple monopoly, the number of buyers is assumed to be large. No single buyer can influence the price by his individul actions.

(ii) **No Close Substitutes** : The second condition of monopoly is that there should not be any close substitute of the product sold by the monopolis. If it is not so, a monopolist can't charge a price according to his own desire. So, he can't be a price maker.

(iii) **Restriction on the Entry of New Firms** : In a monopoly type of market, there is a strict barrier on the entry of new firms. A monopolist faces no competition.

(iv) **Selling Costs** : In monopoly, selling costs are incurred in the beginning. These are done to give information to the buyers about the product. Under perfect competition an individual producer or firm cannot change the price in the market because of the presence of a large number of producers and keen competition among all of them. Again, this monopoly is a one firm industry and it does have the power to influence the price in the market by increasing or decreasing the supply. We will now examine the price and output policy that a monopolist would generally adopt.

MONOPOLY EQUILIBRIUM

Like any other producer a monopolist also aims at maximization of his profits. In

order to achieve this objective he would so adjust the scales of his production that not only produces a required output at the minimum possible cost, but he also sells that output at the minimum possible price. To understand the price and output policy of a monopolist we must analyse the forces underlying the demand for and supply of the commodity produced by tbe monopolist.

(a) Nature of Demand

The demand curve for the product of a seller under perfect competition is perfectly elastic and so it is a horizontal straight line. But, under monopoly the demand curve would slope downwards from left to right, implying that more of a commodity is sold at lower price than at a higher price. In other words, a monopolist can charge a higher price only be selling a smaller output. The demand curve has a negative slope or slopes downwards to the right, the marginal revenue curve also slopes downwards and lies below the average revenue curve. If we assume for the sake of simplicity that AR curve is a straight line then the corresponding MR curve would also be straight line and the latter would lie halfway between AR and Y axis. This we may show with the help of a diagram.

In the diagram no. 1 we take AR as a straight line. Its behaviour shows that more output can be sold only when the price is reduced. The MR curve also has a similar shape and behaviour but it would always lie halfway between the AR and Y axis. This we may prove with the help of an example.

Draw a perpendicular from point P or Y axis meeting it at point R. Now bisect the line PR. The point Q lies in middle of P and R. The marginal revenue curve would pass through this point.

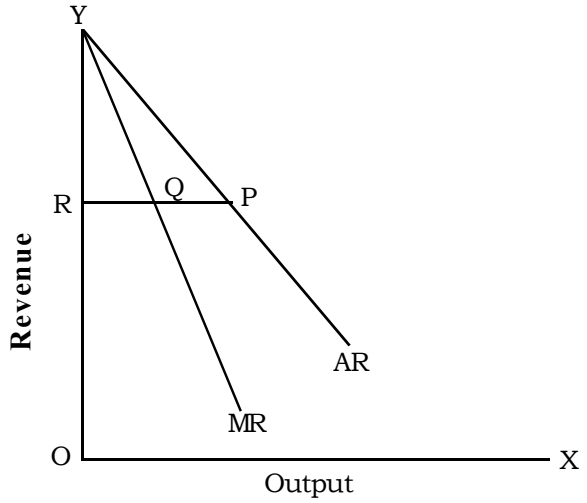


Fig. No. 1

Another point to be noted here is that the demand or AR curve may be more or less elastic. If it is more elastic then its slople shall be less steep but, if it is less elastic it shall have a more steep slope. When the demand is elastic then the monopolist would generally find it difficult to charge a high price. Conversely, when demand for his product is some what inelastic he can charge a high price by restricting his output. In other words, the power of a monopolist or what is the same thing as degree of monopoly depends on the elasticity of demand. The lower the elasticity of demand, the greater the degree of monopoly profits.

(b) Nature of Costs

The cost curves of a monopoly firm are similar to those of a competition firm. This is so because the same principles are involved in the case of cost of a firm producing under monopoly and competition conditions. There is no difference however, between the two. We generally do not take the average variable cost of monopoly firm. Instead we take the ATC and MC into consideration. This is so because the monopolist being the only producer can fix the price of his product at a level higher than even the ATC. In this sense the time element would not have much effect on the price and output policy of the monopolist.

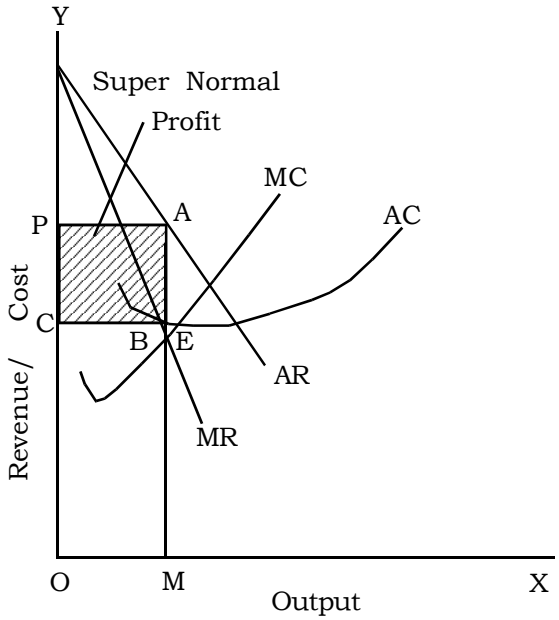
3. THE EQUILIBRIUM

Under monopoly also the main condition of equilibrium is the equality between the MR and the MC at which point the profits of the monopolist are maximised.

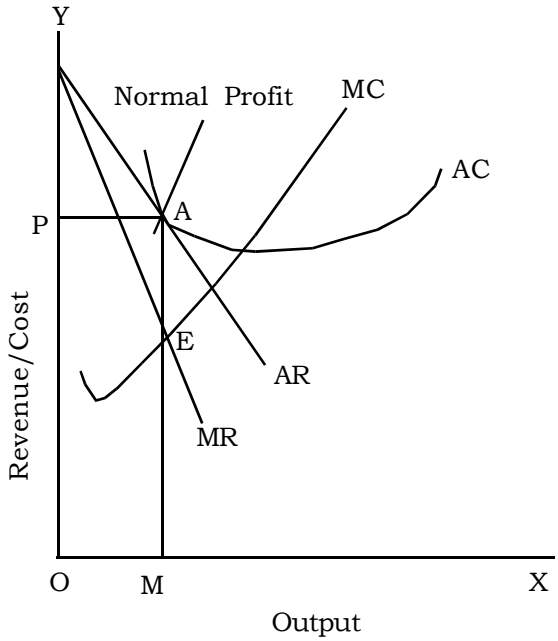
(a) Price determination under short period :

A monopolist in equilibrium may face any of the given three situation in the short period.

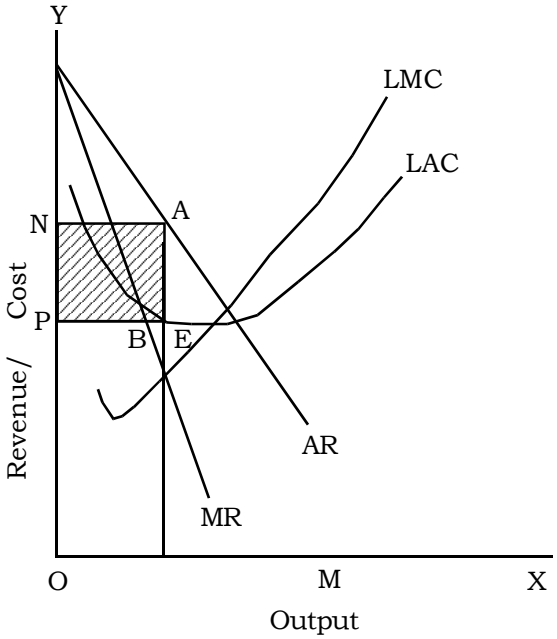
1. Super Normal Profit : If the price (AR) fixed by the monopolist in equilibrium is more than his average cut then he will get super normal profits. The monopolist will produce upto the extent where MC=MR. If the price of equilibrium output is more than AC then monopolist will earn super-normal profit. The monopolist will produce OM units of output and sell it at AM price which is more (AC) BM by AB per unit. (AM – BM = AB).



2. Normal Profit : If in the short period equilibrium (MC=MR) the monopolist price (AR) is equal to its AC i.e. AR=AC then he will earn normal profit. Equilibrium of the monopoly firm in the short run is shown in figure. At point A AC curve touches AR, Monopoly firm earns normal profit in equilibrium situation as at equilibrium output at AC=MR.



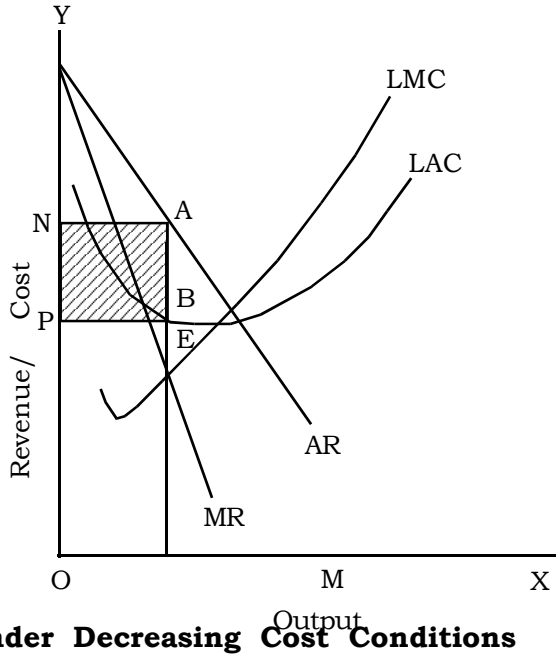
3. Minimum Loss : In the short run the monopolist may incur loss also. If in the short run price falls due to depression or fall in demand, the monopolist may continue his production so long as the low price covers his average variable cost (AVC). Accordingly, a monopolist in equilibrium in the short period may bear minimum loss equivalent to fixed costs. The monopolist will have to bear this loss even if he chooses to discontinue production in short period. Thus Minimum loss = AR – AVC.



(b) Determination of Long-Run Equilibrium :

In the long-run, the monopolist will be in equilibrium at a point where his long-run marginal cost is equal to marginal revenue (LMC=MR). In the long-run a monopolist earns super-normal profit. Monopoly firm in the long run is not contented with normal

profit alone, as the firms under perfect competition do, rather it in a position to earn super-normal profit. Super normal profit refers to a situation where AR>AC. At point E, MR = ?MC, hence OM is the equilibrium output and ON (=AM) is the equilibrium price. Monopolist earns AM – BM = AB super normal profit per unit. ABPN shaded area is super normal profit.



Equilibrium under Decreasing Cost Conditions

In the diagram no. 4 the AR, MR, MC curves are all taken as straight lines for the sake of simplicity. The equilibrium point is E where the MC = MR. The equilibrium output is OM. The equilibrium price is OP. Profit per unit of output it TS. Total monopoly profit is PTRS.

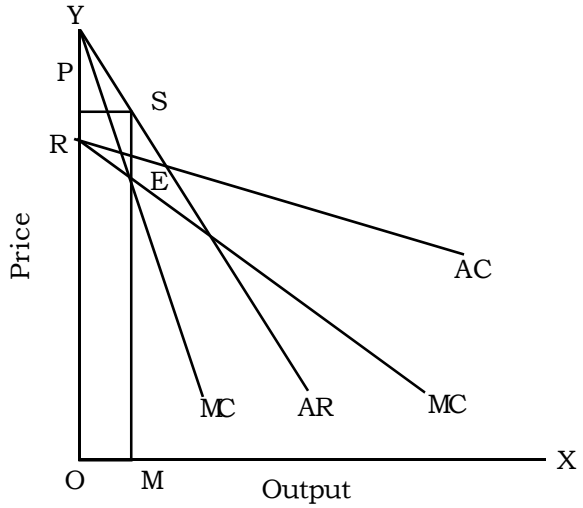


Fig. No. 4

Constant Cost Conditions

Under the constant cost conditions both the average and marginal cost are equal and thus the same horizontal line represents both of them, as show in diagram No. 5 given below. With the AR and MR curves also given, we can find out the equilibrium position.

In this case also equilibrium is established at the point R where MR = MC. The equilibrium output is OM and equilibrium price PM. Per unit profits is PR while the total profit is PRST.

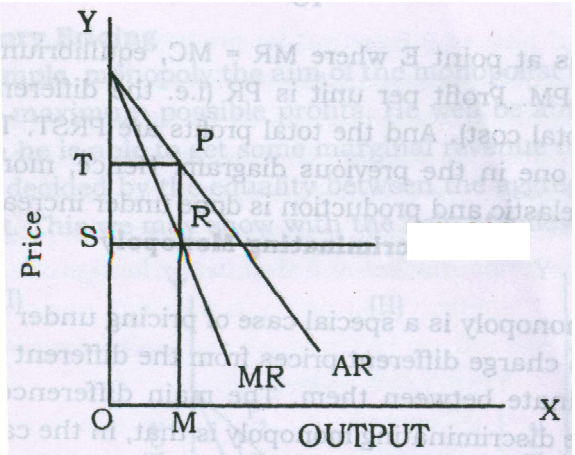


Fig. No. 5

Increasing Cost Conditions

Under this condition the average and marginal costs rise, we already when the average cost rises, the marginal cost rises faster than the average cost and thus it is more than the ATC. In the diagram No. 6 we find that when the average cost curve is rising the marginal cost curve increases at a faster rate and it is above the average cost. The equilibrium is established at point E. The equilibrium output is OM and equilibrium price PM. In this case the profits are more than those in the previous two cases, as clearly indicated by rectangle PRST. The per unit profit is also more than the same under decreasing and constant cost conditions. So the monopolist would prefer this situation as his profit is more in this case. He would benefit more if the demand for this product is inelastic because in this case his profit would be still higher. This may be shown with the help of diagram No. 7.

INCREASING COSTS CONDITIONS

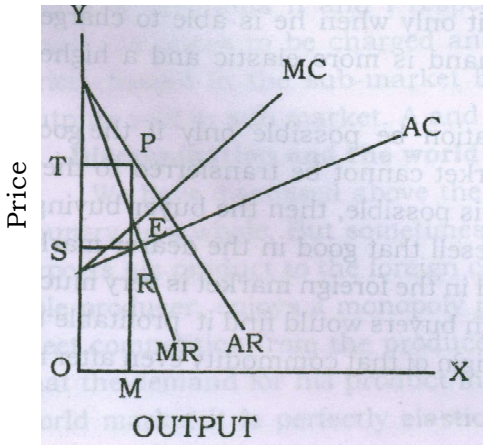
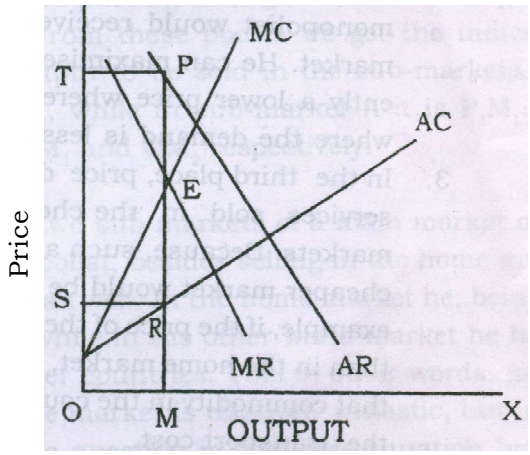


Fig. No. 6

INCREASING COSTS CONDITIONS



(Less Elastic Demand)

Fig. No. 7

The equilibrium is at point E where MR = MC, equilibrium output is OM and equilibrium price is PM. Profit per unit is PR (i.e. the difference between average revenue and average total cost). And the total profits are PRST. This rectangle is certainly bigger than the one in the previous diagram. Hence, more profits are earned when the demand is inelastic and production is done under increasing cost conditions.

4. DISCRIMINATING MONOPOLY

(A) Meaning :

Discriminating monopoly is a special case of pricing under Monopoly. Whenever the monopolist tries to charge different prices from the different buyers or customers he is said to discriminate between them. The main difference between simple or pure monopoly and the discriminating monopoly is that, in the case of former uniform price is charged by the monopolist from all the customers while under the latter, he charges different price from them. Now the question arises as to how he is able to practice price discrimination. For the price discrimination to succeed, certain conditions must be fulfilled :

1. The first condition for discrimination is that the market should be divisible into sub-markets. As the buyers generally try to buy at the lowest prices, the monopolist can charge different price only if he succeeds in dividing the market into two or more sub-markets for example, doctor may charge more from a rich patient than from a poor patient for the same type of medicine. Similarly, an electricity company may charge different rates for the electricity

used for lighting and for cooking purpose. In this way the monopolist has many markets as the number of prices he is able to charge.

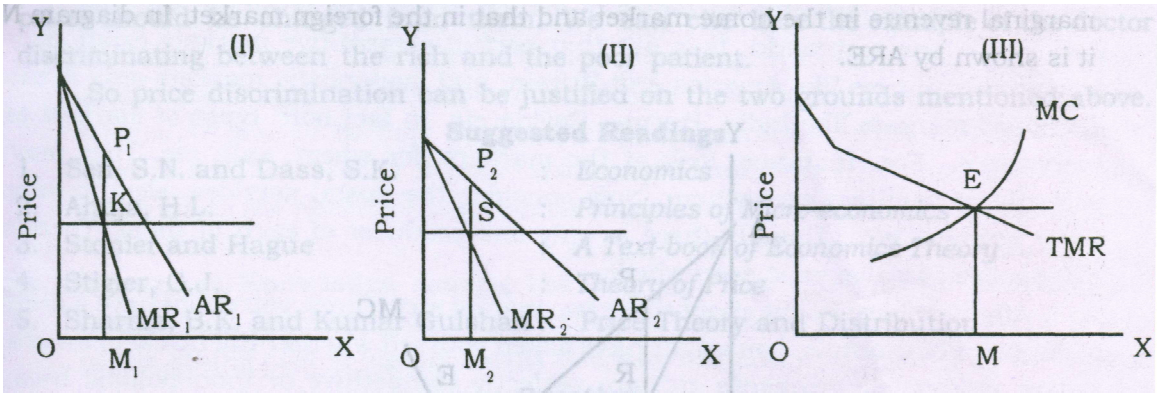
2. Second condition of price discrimination is that the elasticity of demand in the different markets is considerably different. Discrimination would not at all be profitable if the elasticity of demand is the same, because the monopolist would receive the same marginal revenue or price in each market. He can maximise his profit only when he is able to charge differently a lower price where the demand is more elastic and a higher price where the demand is less elastic.

3. In the third place, price discrimination be possible only if the goods and services sold in the cheaper market cannot be transferred to the dearer markets. Because, such a transfer is possible, then the buyer buying in the cheaper market would be able to resell that good in the dearer market. For example, if the price of the good sold in the foreign market is very much lower than in the home market, the foreign buyers would find it profitable to resell that commodity in the country of origin of that commodity even after meeting the transport cost.

(B) Discriminatory Pricing

As under simple monopoly the aim of the monopolist under price discrimination is also to get the maximum possible profits. He well be able to receive the maximum profits only when he is able to get some marginal revenue from each market. His total output would be decided by the equality between the aggregate marginal revenue and the marginal cost. This we may show with the help of following diagrams.

(I) Sub-market (II) Sub-market (III)



Output Output Output

Fig. No. 8

In diagram No. 8 we find that the demand in the sub-market A is less elastic, while it is more elastic in the sub-market B. In order to find out equilibrium for the monopoly firm we combine the MRI and MR2 and get TMR. The MC and TMR are equal at point E, so this shows the equilibrium of the firm. The equilibrium output is OM for purpose of the profit maximisation the monopolist would equal the marginal revenue in both the sub-markets. In order to find that, we drew a straight line from equilibrium point E, parallel to the X-axis and passing through M2 and M1 at point S and K in diagrams II and I respectively. From these points we get the indication about the prices to be charged and the output to be sold in the sub-markets. The price charged in the sub-market B is P_2M_2, while in sub-market A it is P_1M_1. The outputs sold in sub market. A and B are OM_1 and OM_2 respectively.

(C) Discrimination and the world market

We have discussed above the case of two sub-markets of a main market of the country as a whole. But sometimes a monopolist, besides selling in the home market exports his product to the foreign countries as well. In the home market he, being the sole producer, enjoys a monopoly position while in the other world market he has to meet competition from the producers of other countries. This in other words, means that the demand for his product in the home market is relatively inelastic, but in the world market it is perfectly elastic. Now the question is with this situation how he attains equilibrium and how much output he produces and sells in the two markets.

As perfect competition prevails in the market, so the AR_F and MR_F are equal and represented by a horizontal straight line. In the home market, on the other hand, AR_H and MR_H slope downwards as shown in diagram No. 9.

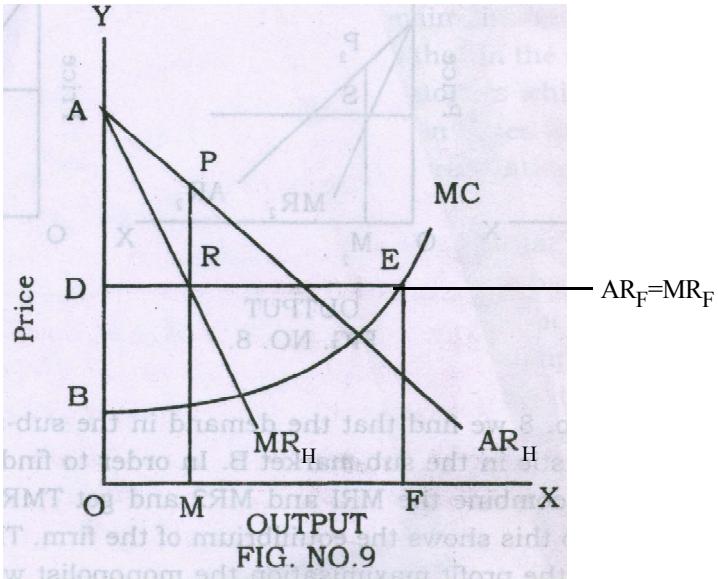


FIG. NO.9

The equilibrium for the discrimination monopoly firm is attained at point E where marginal cost is equal to aggregate marginal revenue, aggregate marginal revenue is obtained by adding the marginal revenue in the home market and that in the foreign market. In diagram No. 9 it is shown by ARE.

In order to maximise profits the monopolist equates the marginal revenue in the home and world markets shown by EF and RM. The price charged in home market is PM and output sold is OM. The price charged in the world market is EF, and the output sold is MF. The monopoly profit is equal to area AREB.

It is generally felt that price discrimination is bad because a monopolist in his greed for profit tries to fleece the people, both rich and poor alike, by changing discriminatory prices. So price discrimination of all types in all the case is not desirable. But it may be desirable in certain cases.

The price discrimination can be justified on the ground of larger producing and larger employment resources. For example, when there is no descrimination the output produced by the monopolist would be small and so the cost of production and price would be high. Under price discrimination the output of the commodity may increase because the commodity may have to be supplied to more than one market. Sometimes, output becomes possible only with price discrimination. There is also a possibility that due to increase in production, costs may go down and consequently the product may be sold at a cheaper price both at home and abroad. Besides this, larger production would mean greater employment of labour, capital and other resources.

Secondly, we justify price discrimination on grounds of equity or equality. As the rich have high incomes and high purchasing power, they can and should pay higher prices. But as the poor people have low income and low purchasing power, lower prices should be charged from them. We can cite here the example of the doctor discriminating between the rich and the poor patient.

So price discrimination can be justified on the two grounds mentioned above.

5. SUGGESTED READINGS

1. Sen, S.N. and Dass, S.K. : *Economics*
2. Ahuja, H.L. : *Principles of Micro-economics*
3. Stonier and Hague : *A Text-book of Economics Theory*
4. Stigler, G.J. : *Theory of Price*
5. Sharma, B.K. and Kumar Gulshan : Price Theory and Distribution

6. SELF CHECK QUESTIONS

1. Define Monopoly and give the nature of demand and cost curves of a firm under monopoly.
2. Show equilibrium of a firm under the conditions of price discriminating monopoly.
3. What principles would the monopolist keep in mind while adopting price and output policy so that he maximise his profits.

Type Setting :
Department of Distance Education, Punjabi University, Patiala