Department of Distance Education

Punjabi University, Patiala

Class : M.A. I (Economics) **Semester : 2**
Paper : I (Micro Economic Analysis) **Unit : I**
Medium : English

Lesson No.

1.1 : Price-Output Decisions under Monopolistic Competition

1.2 : Price-Output Decisions under Non-Collusive Oligopoly

1.3 : Pricing and Output under Oligopoly

1.4 : The Marginalist Controversy

1.5 : Average-Cost Pricing Theory

1.6 : Baumal's Sales Revenue Maximization Model and Bain's Theory of Limit Pricing

1.7 : Managerial Theories

Department website : www.pbidde.org

M.A. (ECONOMICS) PART - I **PAPER–I**

SEMESTER - II **(MICRO ECONOMIC ANALYSIS)**

LESSON NO. 1.1 **AUTHOR : PROF. UPINDERJIT KAUR**

PRICE-OUTPUT DECISIONS UNDER MONOPOLISTIC COMPETITION

1.1 Introduction

So for we have been concerned with the product pricing under perfect competition and monopoly. But these are extreme cases which are seldom found in practice. In fact, there are market situations which fall in between these two extremes. It was Edward H. Chamberlin of Harvard University who in his Theory of Monopolistic competition and Joan Rebinson of Cambridge University in her 'Economics of Imperfect competition' brought out a synthesis of perfect competition and pure monopoly independently of each other.

1.2 Objectives

The objectives of this chapter is to explain price and output decision under monopolistic competition. By going through this chapter, you will get to know about:-

- meaning of monopolistic competition
- analytical problems of monopolistic competition
- euilibrium through price output variation
- equilibrium with entry and exit
- equlibirum through product variation
- equlibrium through variable selling costs.

1.3 Meaning of Monopolistic Competition

In order to understand how price-output decisions are taken and how equilibrium is determined under monopolistic competition, we must first try to understand the meaning of the term, “Monopolistic competition”.

A very simple way of defining the term, monopolistic competition is to state that it is a market form in which there is a large number of freely competing firms producing products which are, in some way or the other, differentiated from one another, and selling these products to a large number of freely competing buyers.

A careful scrutiny of the above definition of monopolistic competition will

bring out the following defining characteristics of the market form which bears the label of "monopolistic competition":

(i) Large Number of Firms : In this market form, the number of firms is very large such that each one of them is producing an insignificant part of the total supply of 'products' belonging to the 'group'. Moreover, there is free competition among these firms. This means that there is no explicit or implicit, that is, no open or hidden, agreement among them not to compete.

(ii) Large Number of Buyers : This market form is also characterised by a large number of buyers such that each one of them is buying only an insignificant part of the total supply of 'products' belonging to the 'group'. And, as in the case of the firms selling their 'products', there is free competition among the buyers also.

As regard the above two features, monopolistic competition resembles pure competition as well as perfect competition. The special feature which makes monopolistic competition different from pure competition as well as perfect competition and also from monopoly is the following one.

(iii) Differentiated Products : In the market form known as monopolistic competition, each firm produces and sells a product which is differentiated in some respect or the other, from the similar products produced and sold by its rivals. This differentiation is brought about through various means such as giving a particular brand name or design or colour or fragrance or packaging, etc. For example, a large number of firms may be producing and selling toilet soap but each firm gives a particular brand name to its own individual product such as 'Lux', 'Santoor', 'Dove', and so on. All these individual brands belong to the same 'group' of toilet soaps but each one is, at the same time, distinguished from the others in the same group.

Now, how does this particular product's characteristics make monopolistic competition different from pure competition, perfect competition and monopoly ? Well, under the last mentioned three market forms— that is, under pure competition, perfect competition and monopoly— the product is homogeneous. This means that all the individual units of the product or commodity are identical to the buyers: the buyers believe that there is no difference at all between the units of the commodity regardless of whether they are produced and sold by any one firm or the other. In the language of economics, we can say that under these conditions the product of any one firm is a perfect substitute product of the produced and sold by any other firm in the industry. But, under monopolistic competition, the product is differentiated and not homogeneous or standardised. This means that the product produced and sold by the different firms belonging to a 'group' are not identical, though they are similar to one another. In the language of economics, they are not perfect substitutes of one another, thought they are very close substitutes of one another. Lux, Santoor, Dove etc. are very close substitutes of one another but they are not perfect substitutes. Similarly, take the case of different brands of tooth pastes selling in our country such as Colgate, Dant Kanti, Pepsodent etc. They too are close substitutes of one another but they are not perfect substitutes.

What is the importance of the distinction between close substitutes and perfect substitutes. When the products of the different firms are perfect substitutes of one another, as they are when the product or the commodity is homogeneous or standardised as is the case under pure and perfect competition, a firm which lowers its price even slightly in relation to the price charged by the rival firms will attract all the customers of the rival firms, and if this firm raises price even slightly compared to the price charged by its rivals, then it will lose all its customers to the rival firm and will not be able to sell even a single unit. In other words, when the products of the rival firms are perfect substitutes, the demand curve facing an individual firm or its sales curve (which are one and the same thing) is a horizontal line showing infinite or perfect elasticity of demand as shown in the following figure :

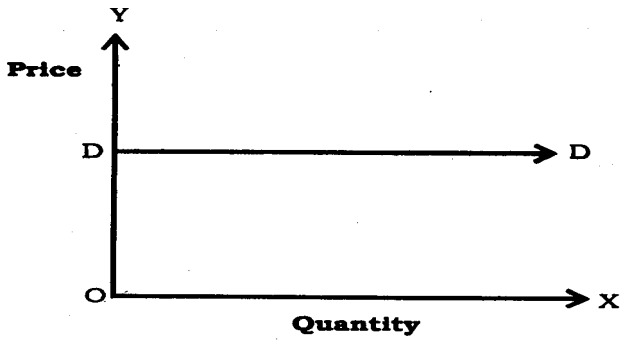


Fig. 1 M.A. I (Econ.), Paper I, Lesson No. 1

In the above figure, DD' is the perfectly elastic demand curve facing an individual firm. It should be kept in mind that this type of demand curve is valid only in case of an individual firm under pure or perfect competition. It will not be valid under monopoly, because although the product of a monopolist is homogeneous, yet he has, by definition, no rival producing even a close substitute, not to speak of a perfect substitute.

Where there is a large number of freely competing firms producing and selling products which are close, though not perfect, substitutes of one another as is the case under monopolistic competition, a lowering of the price charged by any one firm will not take away all the customers of the rival firms, because some customers of the rival firms may be too much attached to their particular brands of the product to be attracted towards the brand of the firm lowering its price. For the same reason, an individual firm under these conditions will not lose all its customers to its rivals, if it alone raises its price. This implies that under these conditions (that is, under monopolistic competition), the demand curve facing an individual firm is less than perfectly elastic. In other words, this demand curve or sales curve facing the individual curve will be sloping downwards towards the right (that is, it will have a negative slope) unlike the

horizontal demand or sales curve under pure or perfect competition. The model of such a negatively sloping demand curve is given below in Fig. 2.

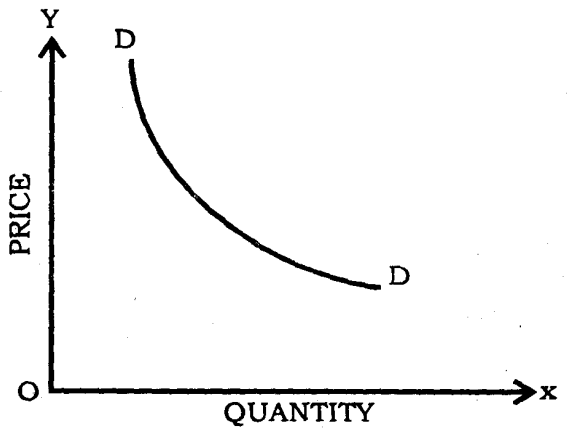


Fig. 2 M.A. I (Econ.), Paper I, Lesson No. 1

The implication of what we explained above is that under monopolistic competition the individual firm enjoys some degree of monopoly power over its price and output inspite of the free competition from the large number of rivals. Thus, monopolistic competition is a market form in which elements of monopoly co-exist with elements of free competition, and it is on account of this that this particular form of market is described as "monopolistic" competition. Thus we find that the distinction between perfect substitutes and close substitutes in relation to which we distinguish between pure and perfect competition, on the one hand, and monopolistic competition, on the other, is of great analytical importance. It is of great help to us in analysing the price-output decisions of firms under the different market conditions.

Before we proceed further it will not be out of place to mention that until the publication of two momentous books, more or less at the same time in 1932, one The Economics of Imperfect Competition by Ms. Joan Robinson and the other The Theory of Monopolistic Competition by E.H. Chamberlin, the only recognised market forms in the science of economics were perfect competition and, monopoly. Even monopoly found a peripheral place in the Theory of value, while nearly the whole space was occupied by the analysis of perfect competition. It was only after the publication of the above said two books that with some time gap the analysis of price-output determination under monopolistic competition and imperfect competition entered the text books on micro economics. Although there are some differences of detail between the theory of imperfect competition as developed by John Robinson and the theory of monopolistic competition as expounded by Chamberlin

(Chamberlin for one, has been vehemently claiming that his brand of the theory is different from that of Joan Robinson), yet the essential results emerging from the two theories are more or less the same : They may not be perfect substitutes of each other but they are very close substitutes of each other, nevertheless.

1.4. Monopolistic Competition : Some Analytical Problems

The analysis of price-output determination under monopolistic competition is complicated compared to its analysis under perfect competition or monopoly. This is due to some problems which arise on account of the nature of monopolistic competition.

One of these problems is related to the determining of the nature of the sales curve of a firm under monopolistic competition. Since in this market form individual firms produce differentiated products. Each one of them is in a position to exercise some monopoly power over the price and output of its own brand of product so that we can say, as we have explained above, that the sales curve of an individual firm in this market form is less than perfectly elastic which makes it different from perfect or pure competition. We can also say, for sure, that the sales curve of an individual firm under monopolistic competition is likely to be relatively more elastic which makes it different from perfect or pure competition. We can also say, for sure, that the sales curve of an individual firm under monopolistic competition is likely to be relatively more elastic than that of a monopolist, for unlike under monopoly large number of clear substitutes are available under monopolistic competition. Under monopoly there is one and only one firm producing a commodity that has no close substitute. Therefore, the determining of the sales curve of a monopolist is a simple affair. The sales curve of the industry is also the sales curve of the firm and it remains uncomplicated for there are no rivals to complicate the matter. Under perfect competition too it is a simple affair, for the sales curves of all individual firms are horizontal at the level of the ruling market price which means that all of them have identical sales curve. But under monopolistic competition the sales curve of the individual firms belonging to a “group” are inter-related due to their products being close substitutes of one another. You cannot determine the position of the sales curve of any one firm unless you know the position of the sales curves of all the other firms. Any change anywhere is most likely to affect the sales curves of all others. This complicates the matter. It is difficult under the circumstances to specify how the sales curve of each firm in the “group” will stand in relation to the sales curves of the other firms.

Similar type of difficulties arises on the side of supply and costs also. It is not necessary that all firms will be using identical inputs as well as one and the same technology. Rather the greater probability under monopolistic

competition is that the firms would be using some inputs at least which are different. This complicates the problem of fixing the position of the cost curves of an individual firm in relation to the cost curves of the other firms.

Still another type of analytical problem arises on account of the fact that, unlike under perfect competition and monopoly, equilibrium under monopolistic competition need not come about only through changes in price and output. There are at least two other channels also open under monopolistic competition. The alternative routes are changes in the type or quality of product produced by a firm which is described as product variation. The other alternative is undertaking selling costs and changing them in order that a firm may have an edge over its rivals. This highlights a very important feature of monopolistic competition, namely, that competition in this market form is not confined to price competition or competition under monopolistic competition also takes the form of "improving" one's product in relation to the similar products of others or it may take the firm or advertising and otherwise providing one's sales (which involves selling costs apart from the production costs) at the expense of the rival firms. Such form of competition is known as "non-price competition", the existence of which under monopolistic competition complicates the analysis of equilibrium under monopolistic competition. Moreover, when the firms are competing on more than one basis, that is, one the basis of price-output variation as well as on the basis of product variation and variation in selling costs, the situation becomes worse confounded.

Method to simplify the Analytical Problems

Faced with the rather quite formidable problems of analysis as explained above, we have to adopt the scientifically recognised method of adopting some simplifying assumptions. E.H. Chamberlin, who is the founder of the theory of monopolistic competition made some appropriate assumptions in order to put the above explained analytical difficulties out of the way.

In the first place, he made the simplifying assumption that all the firms belonging to a "group" under monopolistic competition have identical sales curves. This implies that at any given price each firm will have only a proportionate share in the total sales of the given "group" of products. For example, if there are one hundred firms, each firm will have one hundredth part of the total sales of the "group" at any given price.

Similarly, the problem on the supply side is also solved by making the simplifying assumption that all individual firms have identical cost curves.

Since the above assumptions are highly unlikely to be fulfilled in real world. Chamberlin rightly describes these assumptions as "heroic" assumptions. Nevertheless, non-fulfilment of these assumptions in real world is not likely to change the essential results of the model. Therefore, these

simplifying assumptions, though "heroic", are methodologically warranted.

The problem of the existence of alternative routes to equilibrium can be tackled by treating one route at a time on the simplifying assumption that the other alternatives are absent. That is to say, we can first assume that there are no selling costs and the product is constant so that only price and output are variable. We may, then assume that the price is constant and there are no selling costs but the product is variable. Thereafter, we can assume that price and product are constant but there are variable selling costs. Once we are able to grasp the essentials of the model of monopolistic competition in these simplified firms, it will not be difficult to understand a more complicated model in which monopolistic competition takes place not on the basis of price-output variation only but on the basis of simultaneous variations in price-output, product and selling costs.

Self-Check Exercise-I

Q. Why demand curve under monopolistic competition slopes downward?

Ans .....

.....

.....

1.5 Equilibrium through Price-Output Variation

We shall, first see how equilibrium under monopolistic competition takes place, when only price and output are variable. In the following analysis we shall essentially follow the analysis of Chamberlin as given in his Theory of Monopolistic Competition.

We make the generally accepted behavioural assumption that the motive of a firm is to maximise its net profits. We also know that the condition of maximising profits is that the firm's marginal cost must equal marginal revenue in such a manner that any increase in its output beyond this point of equality its marginal revenue will make its marginal cost greater than its marginal revenue. This requires us to enquire after the nature of the cost curves and the revenue curves of a firm operating under monopolistic competition.

We have already made following Chamberlin the simplifying assumption that all firms have identical cost curves. As regards the nature or shape of a firm's cost curves in this market form, they will be of the usual U-shaped type.

The next problem is to hypothesize about the shape of the average revenue curve (which is the same as the sales curve) and the marginal curve of a firm under monopolistic competition, though for simplicity sake we have assumed that these curves are identical for all firms. One thing we can say for certain, regarding the shape of the average revenue or sales curve of a firm, namely that it will be sloping downwards towards the right because under monopolistic competition the demands for the product of an individual firm is less than perfectly elastic, as we have already explained above. It is because

the product of different competing firms are not perfect substitutes of one another

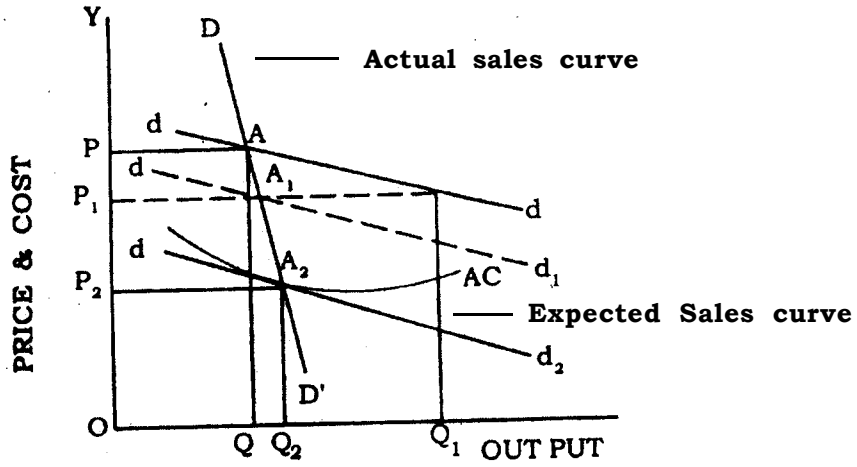


Fig. 3 M.A. I (Econ.), Paper I, Lesson No. 1

though they are close substitutes. But what about the position of the sales curve of an individual firm ? It is not easy to determine it, for the sales curves of individual firms under monopolistic competition are inter-related. Any change in the price of one or more firms will cause a shift in the sales curves of the other firms. Another problem is to make some reasonable hypothesis about the elasticity of the sales curve of an individual firm, that is, whether it will be high or low, though it will be certainly less than infinity. If we make the assumption that whatever an individual firm may do to its own price, the rival firms will stick to their prices and outputs, then the sales curve (average revenue curve) of the firm contemplating change in its price and output will be relatively more elastic like the dd' curve in the diagram no.3. The behavioural assumption underlying this hypothesis is believed by any people to be realistic in the context of monopolistic competition. The argument is that since there is a large number of firms, therefore, if any one firm lowers its own price, its adverse effect on the sales of the rival firms will be widely distributed so that each rival firm will have a very small and insignificant impact on its sales which it will ignore rather than indulge in a competitive price-cutting. Therefore, the individual firm contemplating a reduction in its price can reasonably expect that the rival firms will not immitate or retaliate by reducing their price as will; they will instead stick to their prevailing prices. Thus, on this assumption the individual firm contemplating reduction in its price can expect its sale to increase proportionately must more than the reduction in its price, because its product is a very close substitute of the products of the other firm. Chamberlin names the sales curves ddl' in the above diagram drawn on this assumption as the

expected sales curve.

However, Chamberlin points out, if one firm can make his type of behavioural assumption to plan its strategy, there is nothing which can prevent others to make the same behavioural assumption. And, if all of them or even most of them proceed from this assumption, there will be all round reduction in the prices of the products of the "group". In that case one can have a special advantage over the others. The sales of the products of the "group" as a whole will increase due to the all-round fall in prices, but each firm will have only a proportionate share in the total increase in the sale of the "group". This means that under this changed behavioural assumption, any given reduction in price of a firm will bring about a rather very small increase in its sales compared to the earlier case mentioned above. In this case the sales curve on the average revenue curve of an individual firm will be steep like the DD' curve in the above diagram showing a very less elasticity over its compared to that on the dd' curve which is rather flat. Chamberlin contents that in spite of the large number of firms under monopolistic competition, any reduction in the price of one firm likely to be followed by others earlier or later. Therefore, according to him, the realised or the actual sales are likely to increase along the steeper curve DD' rather than along the flatter curve dd'. He names the steeper DD' curve as the realised sales curve or the actual sales curve.

Having explained the nature of sales curve, we can now proceed further in our analysis. However, we remind you that we are assuming for the present that the product is constant and there are no selling costs.

Let us suppose that the AC curve in the above diagram is the firm's average cost curve and DD' is the actual sales curve (average revenue curve) and OP is the ruling price. This ruling price is most likely arrived at following the profit-maximizing principle. Each firm is producing OQ quantity at this price, because at this output-price each is maximizing its profits on the basis of the actual curve which means that at this output price the marginal cost of each firm equals its marginal revenue. The average cost curve (AC) has its companion marginal cost curve and the actual sales curve (DD') has its companion marginal revenue curve, but these have not been shown in the diagram above in order to avoid unwieldy complications. Moreover, unlike John Robinson, Chamberlin himself has not used these marginal curves in analysis.

The important thing to note is that although every firm under our simplifying assumptions is earning maximum profits at the price OP and output OQ, at which its marginal cost equals its marginal revenue on the basis of the actual sales curve DDi' yet in Chamberlin's model this is not the position of equilibrium. It is only a position of short-period equilibrium. It is because at this price an individual firm will tend to increase its profits on the

basis of the expected sales curve dd. The individual firm may think that if it reduces its own price, the other firms will not follow suit and therefore, it will expect its sales to expound along dd' curve. Supposing it reduces its price to OP_1, because it, along with output OQ will maximise its profits on the basis of the expected sales curve dd'. But sooner or later the other firms will also follow suit. It is not improbable that all of them may be trying to follow this strategy simultaneously in pursuit of higher profit either because each does not know what the others are planning or due to sheer short-sightedness. As a result of it, all the firms will reduce the price to OP_1 and increase the output OQ_1 However, their actual sales will expand not along dd' but along DD'. So they will go on sliding down along the DD' curve as shown in the above diagram. At price OP_1 ,the expected sales curve dd slides down to the position dd_1. The assumption of Chamberlin is that the firms will not learn from their previous experience and will think of increasing their profits once again by expecting to expand their individual sales along the shifted dd_1 curve. This process of price competition will go on till the expected sales curve dd_1 becomes tangent to the AC curve at the point A_2 where the actual sales curve DD' cuts the AC curve. This is the position of the final equilibrium of the individual firms as well as the group. So, each firm will be producing and selling OQ_2 output changing OP_2 price which first equals the average cost inclusive of the normal profit. The position A_2 represents stable equilibrium because in this position no firm can be expected to earn more than normal profit by expanding its sales along the expected sales curve dd as to the right of A_2 the average cost is greater than the price. And it is also higher on the left of it. Hence their will be tendency towards increase or decrease in output. Each firm, If it is in advertently displaced from this position, will tend to return to this position which makes the position A_2, the position of stable equilibrium.

The process of equilibrium under monopolistic competition when any price and output are variable and, moreover, when there is no entry into or exit from the “group” and thus the number of firms remains constant is explained in the foregoing paragraphs.

1.6 Equilibrium with Entry and Exit

However, the assumption of constant number of firms in the proceeding analysis was only a simplifying assumption. We shall now relax this assumption and allow the number of firms to increase or decrease due to free entry as well as free exit.

If, we carefully look at the initial position of “equilibrium”. A in the above diagram, we shall note that here the price or the average revenue OP is higher that the average cost as the point A lies above the AC curve. This means that the existing firms are earning super-normal profits. These super-normal profits

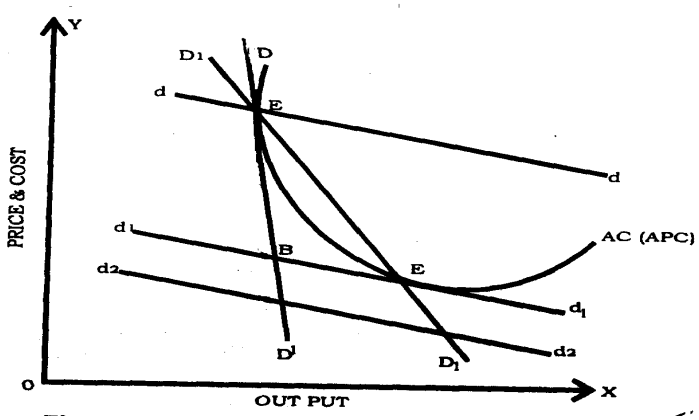


Fig. 4 M.A. I (Econ.) Paper I. Lesson No. 1

will attract new firms into the group in the long period. As a result of it the individual share of each firm will now be less than before at each level of price. This means that the actual sales curve DD' for each firm will go on shifting to the left as the number of firms goes on increasing till it becomes tangent to the average cost curve AC as shown in the Fig.4.

In Fig. 4 above, the actual sales curve DD becomes tangent to the average cost curve AC at point E due to the increase in the number of firms. There are now no super-normal profits which have been competed away. But if we stick to our assumption that each firm continues to believe that whatever it may do to its own price and output, the rival firms will continue with their prices and outputs that they are already charging and producing, then, each one will face an expected sales curve like dd in the above diagram and will, therefore, expect to increase its profits by expanding its output and sales along dd curve. This means that E is not a position of long period stable equilibrium. Since every one is behaving like that, actual sales increase along the DD' curve. Consequently, their short-sighted price cutting competition lands them all into losses. But as long as they expect, despite their post experience, to convert their losses into profits, this short-sighted price-competition will continue and the expected sales curve for each firm will go sliding downwards along the $D_1D'_1$ curve till its takes the position d_1d_1 in Fig. 4 above, in which position this expected sales curve becomes tangent to the cost curve AC. The actual price in this position will be indicated by the point B where the expected sales curve d_1d_1 cuts the actual sales curve DD. Obviously any further price reduction will not be able to convert losses into profits. But there will still be equilibrium because in position B each firm, looking at its expected sales curve d_1d_1 can hope to reduce its bears. So

price-cutting competition continues and the expected sales curve goes on sliding down along DD still further till it attains a position like d_2d_2 when further expansion of output will not even reduce losses. When this happens, some firms will start leaving the "group". As a result of it the actual sales curve 'will start relating upwards as with each exodues of firms, the individual share of a surviving firm in the total sales will go on increasing. This charning of the "group" will go on till the upward elating actual sales curve DD takes the position D_1D_1 when it cuts the curve AC at the point E_1 where the expected sales curve d_1d_1 is tangent to the cost curve AC. This is E_1 the position of long-period stable equilibrium of the firm as well as the "group" under monopolistic competition. Each firm in this position will be earning just normal profits and none can expect to increase its profits by expanding along the expected sales curve d_1d_1 or by contracting along it. Hence, there will be no tendency towards change in the output and price of any firm of the "group".

The above analysis shows that under monopolistic competition no firm earns super-normal profits in the long run. In this respect it resembles perfect competition. But since under monopolistic competition sales curve or the average revenue curve is falling, the marginal revenue is less than price. But in equilibrium marginal revenue equals marginal cost. Hence price under monopolistic competition is greater than the marginal cost. In this feature, it differs from perfect competition but resembles monopoly. Moreover, since equilibrium under monopolistic competition takes place at the point of tangency between the expected sales curves and the average cost curve of the firms and since the expected sales curve is downward sloping on account of which it can be tangent to the average cost curve only to the left of the minimum point on it, the equilibrium output will be less than the optimum output which gives rise to the pehnomenon of excess capacity.

Self-Check Exercise-II

Q. In equilibrium with entry and exit case, at which point equlibrium takes places?

Ans .....

.....

.....

1.7 Equilibrium through Product Variation

Unless entrepreneurs under monopolistic competition are assumed to be incorrigible price-competitors, they are bound to learn from experience the utility of price-cutting competition and think of alternative bases of competition. One possible alternative which is quite prevalent in this type of market firm is product variation.

A firm may try to project its individual product as a qualitatively better

product than its rival products. The product may or may not be genuine improved product but if the firm succeeds in projecting it as such, the firm can increase its output and sales without changing the price. In order to analyse the process of equilibrium in this contest we shall assume that numerous varieties of one and the same product are possible. This is the meaning of a product being variable. Secondly, price will be assumed to be constant at "group" level so that it will give us a sales curve or average revenue curve, that is horizontal as it is under perfect competition. However, its significance under monopolistic competition is different. Under perfect or pure competition horizontal average revenue or sales curve signifies that the firm can sell as much as it likes at the going price. But under monopolistic competition it signifies no more than that the price remains fixed. As regards sales a given variety of the product can be sold upto a definite quantity, though this quantity will most probably be for a variety of product which is successfully projected as an improved product. Lastly, it is assumed that an improved product has higher costs.

The first task for us is to explain the choice of the optimum variety of the product which we may simply describe as the optimum product. Let us suppose that a firm is contemplating the production of a particular variety where costs are represented by the AC curve in the following diagram. The firm expected to sell OQ_1 quantity of it. This implies a profit equaling the area $PR_1S_1T_1$. since PP is the price that shows fixed price at OP and the average cost at the expected sales of OQ_1 units is Q_1S_1. The Firm will

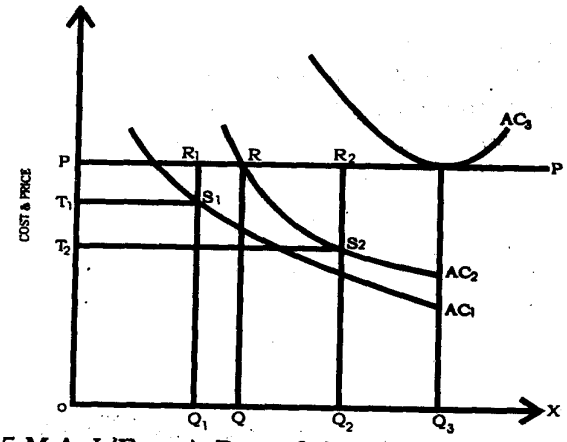


Fig. 5 M.A. I (Econ.), Paper I, Lesson No. 13

consider other possibilities also. Every "improved product will have a higher average cost curve like the AC_2 in the above diagram No.5. The firm in this case expects to increase sales upto OQ_2 units which yields on expected profits equaling the area $PR_2S_2T_2$ which is greater than the area $PR_1S_1T_1$. If any

further improvement in the product raises the AC curve too much and helps in increasing the sales rather in adequately, the area of profit that will average in that case will be smaller than the area $PR_2S_2T_2$. In this situation the second product having AC_2 as its average cost curve gives the highest possible profit. So this is the optimum product and the firm will choose the variety for production and earn the said profits. This is a situation of only short-period equilibrium of the firm.

In the long run the rival firms will immitate this successful innovation of the pioneer firm. This will tend to reduce the sales of the individual firm. It is not only the existing firms which will offer competition by improving their own products bringing them clear and closer to that of the pioneer firm. The abnormal profits will attract new firms also which will further intensify competition. This will ultimately reduce the sales of the individual firm of OQ only. When this happens, all firms will be selling OQ at which the price OP just equals the average cost QR. All earn just normal profits and every one is producing less than the optimum output causing lot of excess capacity.

Assuming that sooner or later same firm hits upon a new improvement yielding larger than the normal profits, the process of product competition in the long period will again take place and ultimately once again each firm will be earning just normal profits. The long run stable equilibrium will be reached when the successive improvements raise the average cost cruve AC to a position like AO_3 in our alone diagram where it becomes tangen4t to the horizontal price line PP. Any further improvement will not help in even recovering the average cost, for the average cost curve will now lie above the price line. Well, this is the outside limit which is attainable if in the case of the product having AC_3 as its average cost curve, the sales of the individual firm is OQ_3. But this amount of sales may not necessarily be attained. If such a product is associated with a smaller amount of sales, there will be losses. In that case equilibrium may take place with an 'inferior' variety in the case of which the AC curve will interact rather than be tangent to the horizontal price line.

1.8 Equilibrium through Variable Selling Costs

A special feature of monopolistic competition is the existence of selling costs. Selling costs are different from production costs. Production costs of a firm are those costs which a firm incurs in order to produce and supply goods to meet an independently given demand for them. They are comprised of not only manufacturing costs but also costs of transport, storing, handling. etc. that is, costs of all those operations of a firm which it has to undertake to manufacture the goods and take them to the final consumers whose demand for them is taken as a datum. Selling costs are different. They are those costs

which a firm incurs in order to influence demand. The objective of incurring such costs is to try to adjust demand to what the firm wants to produce and sell. Firms under monopolistic competition do not accept demand as a datum. On the contrary, thay very often try to influence it through advertisement and other high pressure sales compaigns which entail expenditure in addition to the production costs. This expenditure is known as the selling costs. Their objective is to shift the demand curve, the firm's product to the right so that large quantity of it can be sold at a constant price and to render it less elastic as that the firm has a greater degree of monopoly power.

In order to explain equilibrium through variation in selling costs we shall make come simplifying assumptions. We shall assume the price to be given and constant. The production will be assumed to be given and constant.

We should note that according to Chamberlin selling costs are subject to the law of Non-proportion of Returns : that is, to begin with the sales of a firm increase more than in proportion to the increase in selling costs, but after a stage, they increase less than in proportion to the increase in selling cost. The reason given by Chamberlin in support of the assumption is that in the beginning there is great potential to exploit the economics of division of labour and large scale organisation which, after a point, are depleted giving rise to diminishing returns. Moreover, after a point consumers resistance to sales compaigns also increases. This assumption of non-proportional returns to selling costs implies that the average selling cost curve of a firm will be U-shaped implying that the average selling costs will be increasing after a point.

Our first task is to explain how the equilibrium size of selling costs is determined. We can explain it with the help of the following diagram no. 6. :

The APC curve in Fig. 6 represents the average production costs of the firm. It is U-shaped as production is subject to the Law of Non-proportional Returns. If we add average selling costs (ASC) to the average production costs, we get the average combined costs (ACC). The Curve ACC in Fig. 6 represents the average combined costs of the firm under consideration. It is also U-shaped, since both of its components (APC and ASC) are subject to non-proportionate returns. The above Fig. 6 does not show the average selling costs directly. But the vertical distance between the ACC curve and the APC curve at each level of output and sales represents the average selling costs (ASC) at the level. MCC is the marginal combined cost curve. Since price is fixed at level of, the horizontal line PP' represents the average revenue or price line. Assuming that the firm can sell any amount provided it is willing to under-take the appropriate amount of selling costs, the horizontal line PP' will also represent the marginal revenue curve of the firm. The firm's equilibrium

will take place where the rising marginal combined cost curve (MCC) intersects the marginal revenue (= average revenue) line PP' because this is the condition of maximising profits. This condition is satisfied at point E in our diagram. Thus the firm's equilibrium output and sales are OQ and QB is the average combined cost while QA is the average production cost. The difference between the two (QB-QA = AB) is the average selling costs. Multiplying it with the equilibrium profit maximising output OQ (= AD) we get the optimum size of the selling costs for our firm. This is represented by the area of the rectangle ABCD in our above diagram.

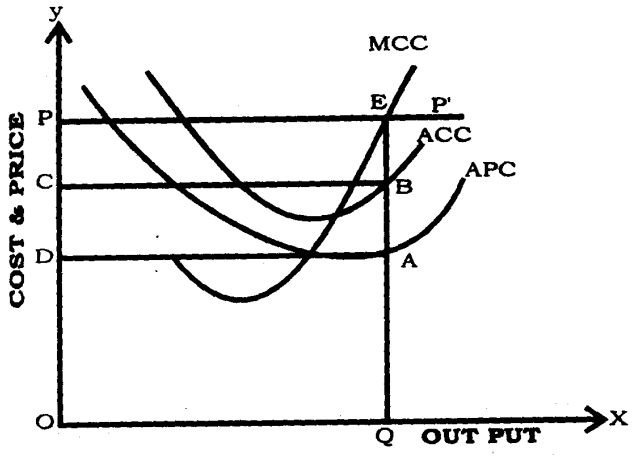


Fig. 6 M.A I (Econ), Paper I, Lesson No. 1

The optimum selling costs are arrived at on the assumption that while it resorts to selling cost, the other firms in the group will not imitate its strategy. Once this particular amount of selling costs is adopted, it becomes for the firm a sort of fixed costs which per unit of output and sales will go on diminishing. In the diagram No.6 APC is the average production cost curve and ACC is the average combined cost curve. The vertical difference between these two curves indicates the average selling costs which because of the fixed total selling costs go on diminishing with increase in output and sales. The firm produces OQ output at which the marginal combined cost equals the marginal revenue which equals the price OP that is fixed. The firm earn profits equalling the area PEBC. But this is only short-period equilibrium. These profits will induce the rival firms also to resort to selling costs and under our initial simplifying assumption that all firms in the "group" have identical cost curves and sales or average revenue curve and therefore, identical marginal revenue curves also, each firm will be undertaking the same amount of selling cost. It will also attract new firms into the group. As a result of it the individual firm will go on diminishing till each firm produces OQ output at which the average combined

cost equals price OP, so that none earns more than just normal profits.

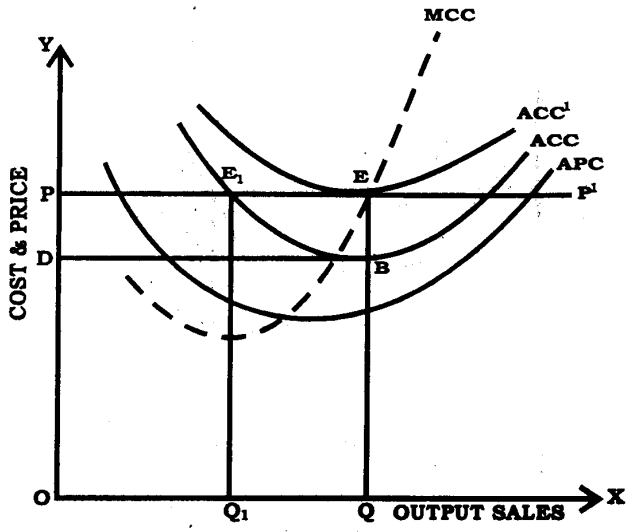


Fig. 7 M.A. I (Econ.), Paper I, Lesson No. 1

But E, at which this position think of increasing the selling costs in order to intensify its selling compaign. This will raise the average combined cost curve upwards of the firm may also succeed in selling larger quantities on account of which profits may again emerge in the short period. But soon others will also follow suit and new firms will also enter in as a result of which the share of each firm in the total sales will go on decreasing till it earns no more than just normal profits. Such rounds of competition on the basis of variation in selling costs may go on until the average combined cost curve ACC becomes tangent to the horizontal price line PP' at E like the ACC^1 curve in Fig. above. This point of tangency is the position of long-run stable equilibrium because now there is no possibility for any firm to increase profits by increasing selling cost, for any such attempt will push the ACC curve above the price line indicating losses at each and every level of output.

1.9 Conclusion: The contribution of the theory of monopolistic competion is indusputable. It has led to re-orientation and refinement of our thinking on monopoly. The importance of trade marks and of advestising and the need for study of product structure and evolution, have become more generally recognised.

LESSON NO. 1.2

AUTHOR : PROF. ROSHAN KHOSLA
PROF. BALBIR SINGH

PRICE-OUTPUT DECISIONS UNDER NON-COLLUSIVE OLIGOPOLY

2.1 Introduction

We have studied price and output determination under three market forms, namely, perfect competition, monopoly and monopolistic competition. However, in the real world economices we find that many of the market or industries are oligopolistic. Oligopoly is an important form of imperfect competition. Oligopoly is said to prevail when there are few firms or sellers in the market producing or selling a product. Oligopoly is also ofter referred as "compeition among the few:. The simplest case of oligopoly is duopoly when there are only two producers or sellers of a product.

2.2 Objectives

The objectives of this chapter is to study price- output decisions under non-collusive oligopoly. While going through this chapter, you will study about various models of non-collusive oligopoly and analystical difficulties in oligopoly market.

2.3. Oligopoly and Duopoly Defined

Among the various forms of market organisation that we come across in the real world, oligopoly is one of the most important market forms. By now, that is, in view of what you have already learnt about the various market forms, you may will be aware that perfect or pure competition as a market form is largely a mere conceptual construct and, therefore, this type of market form in its pure variety exists only in text-books. In real life there are few markets which can be said to near this market form. Monopoly is another pure market form which forms the opposite pole to perfect competition. Monopoly, though not as rare as perfect competition in real world, is not quite common either the real world market forms are monopolistic competition and oligopoly of the two,

it is oligopoly which is a peculiar feature of modern large scale industry.

But, what is oligopoly ? Well, we can define oligopoly as a market form in which there are only few freely competing firms in a given "industry" or "group" producing either standardised (homogenous) product or differentiated products such that an individual firm controls a substantial part of the total supply of the product or products. In view of it, any price-output decision taken by an individual firm has significant impact on the aggregate supply and the market price. When the product is standardised, that is, homogenous, the oligopoly is said to be pure oligopoly. If the product is differentiated, it is said to be differentiated oligopoly.

Duopoly is a special case of oligopoly when the number of firms in a given "group" or "industry" is so small as two only. If in such a market form the product is standardised, the duopoly is said to be pure duopoly. On the other hand, if the product is differentiated, the Duopoly is said to be differentiated duopoly.

Duopoly too is not a very common market form in the real world even within the modern large scale industry. Like perfect competition it too is found much more in textbooks than in the actual world. However, since duopoly is the simplest form of oligopoly, the problem of oligopoly are generally analysed in the context of this simple form of oligopoly (That is, in the context of duopoly) on the not too unrealistic assumption that what is true in the case of duopoly is also true in the case of oligopoly in general.

2.4. Analytical Difficulties

It is generally acknowledged that there are great difficulties in analysing the price-output determination under oligopoly. These difficulties arise from the peculiar structure of the market under oligopoly. As we observed above, the number of firms in an oligopolistic market is small that any change in the price and output effected by any one of the firms has a significant impact on the total condition in the "industry". On account of it any change in the price and output of one firm is bound to provoke a counter-change by the rival firm in their own prices and output which may, in turn, provide a feature change in the price-output policy of the first firm. Such a chain reaction may go on till some sort of market equilibrium is attained. This shows that there is a great degree of inter-dependence of the firm's price-output policies under oligopoly, which suggest a seues of moves and counter-moves through determination under oligopoly a very intricate problem.

It is important in this context to understand the structural difference between oligopoly, on the one hand, and other market firms like perfect competition and monopoly, on the other hand. Under perfect competition as well as monopoly and even under monopolistic competition an individual firm can disregard the behavioural reaction of the rival firms to its own price-output policy. But it can not do so under oligopoly. An individual firm in a perfectly competitive market can afford to disregard the behavioural reaction of the rival firms because it produces only an insignificant part of the total supply of the given commodity, on account of which a

change in the output of a single individual firm does not change the total supply significantly and thus it has no influence on the price. The market structure of perfect competition is such that any individual firm can sell as must as it likes at the giving price. This is the meaning of the individual firm's demand or sale curve being horizontal under perfect competition. So the rival firms are not expected to react and will not react to any price-output policy move made by any individual firm.

The monopolist also has hardly any need to bother about such a reaction because by the very definition of monopoly there is no rival facing a monopolist. Monopoly is as you know, a market form in which there is one and only one firm in a given industry producing a commodity which has no close substitute.

Under monopolistic competition, too, the individual firm will not normally bother about the rival firms reaction to its own policy moves. This is because the number of firms being very large under monpolistic competition, the adverse affect of any policy move by any one firm on the sales of the rival firms would be widely distributed. On account of it each of the rival firm will feel insignificant impact of it which will normally be ignored by it. Hence this is no reaction.

The structural conditions of oligopoly are different. The number of firms being very small under oligopoly, any move made by one of the firms is bound to be met with a counter—move by the rival firms. This makes the price-output decision under oligopoly a tricky one. An oligopolist has to make some assumption with regard to the probable behaviour reaction of the rival firm to his policy move before making the final decision. This behavioural assumption is crucial to the solution of the equilibrium problem under oligopoly. Different assumption in this regard lead to different solution. It is due to this that equilibrium output and price are said to be indeterminate under oligopoly. This is also the reason why there is a wilderingly large number of models of oligopoly.

The difficulty of analysing equilibrium under oligopoly as well as the indeterminate character of this equilibrium lies also in the fact that the sales curve of an oligopolist is indeterminate which infact again, is the result of the specific structure of the market form associated with oligopoly. As we have already observed, the structure of an oligopolistic market such that any price-output more by one of the firms has strong repercussion on the sales of the rival firms. On account of this any change in the price and output of an individual firm will cause a shift in the sales curve of the rival firms. Take the assumption that the simplest firms of oligopoly when there are only two firms, say A and B, lowering of the price and increasing of output by A will shift the sales curve of B to the left indicating lower sales of B at the same price. Thus the sales curve of an oligopoly tends to be always shifting whenever this is a change in the price and output of any other firm. Hence the position of the sales curve of an oligopolist firms becomes indeterminate.

It is only the position of sales curve of any oligopoly firm that is indeterminate, its slope which is broadly indicative of its elasticity is also

indeterminate. This again depends on the nature of the behaviour reaction of rival firms to any price output more made by any one of them. Once again taking the case of duopoly with only two firms, A and B, whether the sale curve facing an oligopolist firm, say, A will be elastic or inelastic depends on A's assumption with regard to the behaviour reaction of the rival firm B to its price-output moves. For example, if A's assumption that whatever it does to its own output and price, B will stick to its own output and price, then the sales curve of A will be rather elastic as shown by the curve dd' in the following Fig 1. On the other hand, if any price-output move by A is limited or retaliated by B, then the sales curve of A will be rather inelastic like the curve DD' in Fig. 1.

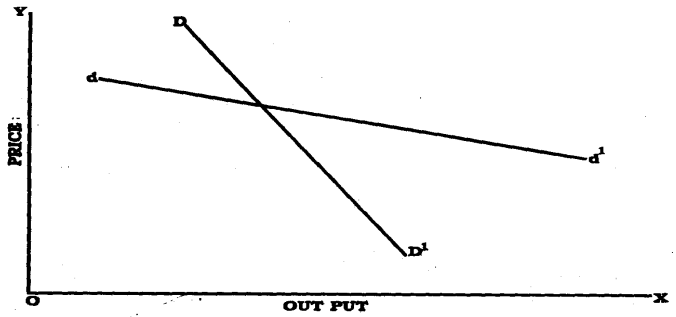


Fig. No.1

Having explained the analytical difficulties with regard to equilibrium and price-output determination under oligopoly, we may now consider some important models of non-collusive oligopoly. Generally, we speak of two types of oligopoly on the basis of the organisational relationship between the firms belonging to a given oligopoly market, when firms belonging to a given oligopoly have a tactic or open agreement of some sort in order to eliminate mutual competition, the oligopoly is said to be collusive oligopoly. But, if the firm do not have any agreement on output and price, tactic or open, and rather compete freely with one another, the oligopoly is said to be non-collusive oligopoly. It is the models of the last type, that is non-collusive oligopoly that we shall expound in this lesson. And, of this is the general convention we shall be illustrating these models with example from the duopoly case which, to report, is the simplest form of oligopoly and is, therefore, the most convenient form for analysing the equilibrium problem under oligopoly.

We shall start with three most important classical models of oligopoly formulated on the basis of alternative behavioural assumptions by Cournot Bertrand and Edg4eworth.

2.5. Cournot's Model

Cournot's model is a model of non-collusive duopoly which can be easily extended to cover cases of oligopoly with more than two firms. August Cournot, an early nineteenth century, French economist, was probably the first

economist who analysed the problem of equilibrium under duopoly. This model is based on the following explicit or implicit assumptions :

1. There are only two producers producing a homogeneous commodity. Incidently, the commodity assumed is mineral water whose production cost per unit is constant, though zero, it being a free gift of nature.
2. The two producers are assumed to have identical constant costs which, in his example if mineral water, are zero.
3. Both the Producers are assumed to be know with certainly the total demand curve for the commodity.
4. The demand curve is assumed to be negatively sloping straight line.
5. Absence of collusion and therefore presence of free competition between the two producers is assumed.
6. It is assumed that the objective of each producer is to maximize his individual profit. And, the most crucial assumption relates to the expected behaviour reaction of each producer.
7. Each producer assumes that whatever he may do to his own output, the rival producer will stick to the output that he is currently producing.

On the basis of the above assumption Cournot's analysis leads to the conclusion that under non-collusive duopoly the equilibrium output of the duopolistic "group" would be two thirds of the competitive equilibrium output which would be equally shared by the two producers that is, the equilibrium output of each one of them would be one-third of the competitive output. How this result follows logically from the above assumptions, is explained below :

Let us name of two producers as A and B, and let the total demand curve for their homogeneous commodity (mineral water) be represented by the straight line QR in Fig. 2 below. Since the cost per unit (average cost) is assumed to be

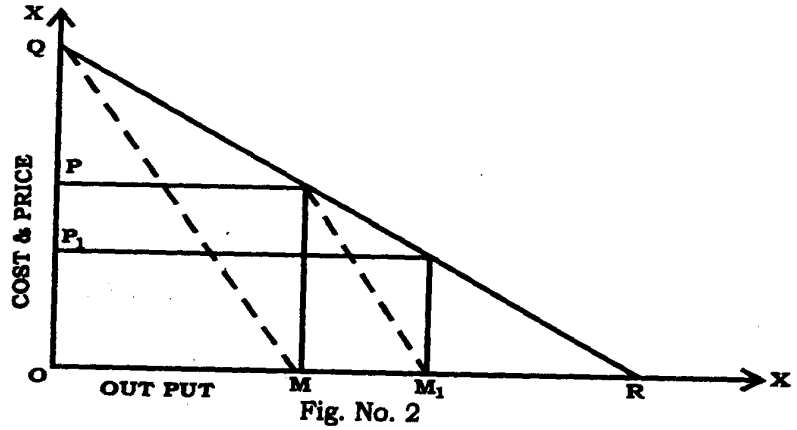


Fig. No. 2

constant and zero (mineral water being a free gift of nature), the marginal cost will equal the average cost and will also be constant at zero. This means that the average cost-cum-marginal cost curve will coincide with the horizontal axis OX. Since both producers are assumed to have identical costs, the horizontal axis OX represents the average cost-cum-marginal cost curve of each one of them.

Let us assume that producer A enters the market first. He is then, the lone producer and seller of the commodity, the total demand for which is represented by the straight the QR in our Fig. 2 above. A will behave like a monopolist and produce OM quantity at which his marginal cost equals his marginal revenue. When he is the sole producer and seller, the demand curve facing him is QR which is also his average revenue curve. QM is its companion marginal revenue curve which meets the marginal cost curve (i.e. the horizontal axis) at point M, i.e. condition of profit maximization. Hence he will produce OM output which is one-half of OR, and charge OP price.

Now let B enter the market. He observes that one-half of market is already occupied by A. He assumes that whatever be his own output A will stick to the output OM which he is already producing. So he considers that only the remaining one-half of the market represented by the portion MR of the demand curve QR is open to him. He will behave like, a monopolist in this part of the market, producing one-half of MR, that is, MM, output (1 = $\frac{1}{4}$ of competitive output OR) which maximises his profit. Now the total output is OM_1..... and consequently the price is brought down to OP_1. This affects the profits of A adversely. So he makes a counter-move on the assumption that B will stick to MM_1 (= $\frac{1}{4}$ OR) output. So he believes that now only $\frac{3}{4}$ of the market is open to him where in he can monopolistically, producing $\frac{3}{8}$ of the competitive output OR. In other words he reduces his output by 1/8 of OR (as 3/8 = $\frac{1}{2}-\frac{1}{3}$). This will be met with a counter-move by B who, finding that now only $\frac{5}{8}$ of the market is open to him, will produce 1/2 $\frac{5}{8}$ = 5/16 of the competitive output in order to maximise his profit. In other words he will increase his output by 1/16 (as $\frac{5}{14}-\frac{1}{4}=\frac{1}{16}$) of OR. These moves and counter-moves will go on infinitely till the equilibrium is attained.

The equilibrium will come about through an infinite series of moves and counter-moves in which A will be reducing his output and B will be increasing

his output in a sequences like the above. When the equilibrium is attained and further moves and counter-moves come to a stop, the total output will be $(1-\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\frac{1}{16}+\frac{1}{32}+\frac{1}{44}-.....\infty)$ OR. The series within the brackets are geometrical series with the ratio which will sum up to $\frac{1}{1-\left(\frac{1}{2}\right)}=\frac{2}{3}$. This means that the equilibrium total output will be $\frac{1}{3}$. We have been describing OR as the equilibrium competitive output because under free and perfect competition, long-period equilibrium takes place at that output at which price equals marginal cost as well as average cost. In this model as depicted in Fig. 2, above this condition is satisfied at OR output because in this example costs are zero. Thus the equilibrium total output in this model is $\frac{2}{3}$ of the equilibrium competitive output.

The output of A equilibrium will be $(1-\frac{1}{2}-\frac{1}{8}-\frac{1}{32}.....\infty)$ OR or $\{1-(\frac{1}{2}+\frac{1}{8}+\frac{1}{32}.....\infty)\}$ Or which works out to be

$(1-\frac{\frac{1}{2}}{1-\frac{1}{4}})$ OR or $\frac{1}{3}$ OR

Similarly, B's equilibrium, output will be $(\frac{1}{4}+\frac{1}{16}+\frac{1}{64}.....\infty)$ OR

$(\frac{\frac{1}{4}}{1-\frac{1}{4}})$ OR = $\frac{1}{3}$ OR

Thus we find that the Cournot's model of non-collusive duopoly, the equilibrium total output is $\frac{2}{3}$ of the equilibrium competitive output which is equally shared by the two producers. This output is greater than the equilibrium monopoly output and hence the price under duopoly will be, according to this model less than the monopoly price.

As we remarked earlier, Cournot's model of duopoly can be extended to cover oligopoly cases with any number of firms. The general formula for this is that the equilibrium total output under oligopoly is $\frac{n}{n+1}$ of the competitive,

output which is equally shared by all the firms, n in the above formula represents the number of firms. If there are three producers, for example, all other assumptions remaining the same, the equilibrium total output according to Cournot's model, would be 3/4th of the competitive output which will be equally shared by all the three producers, each producing 1/4th of the competitive output.

Self-Check Exercise-I

Q. If there are 3 firms in cournot model, what would be the total output?

Ans .....

.....

.....

2.6. Bertrand's Model

Cournot's model was presented in 1838. About half a century later another french economist, Goseph Bertrand, presented an alternative model of duopoly by changing the crucial behavioural assumption of Cournot's model. Cournot had assumed that each producer expects his rival or rivals to stick to the output that he or they are currently producing regardless of what the former does to his own output. This behavioural assumption of Cournot is replaced by Bertrand with the alternative behavioural assumption which states that each producer expects his rival to stick to the price which he is currently charging regardless of what the former does to his own price. Bertrand retains all other assumptions of Cournot's model.

On the basis of this alternative behavioural assumption Bertrand reaches the conclusion that equilibrium total output (long-period) would be the same as under perfect competition and the long-period equilibrium price under non-collusive duopoly or oligopoly would also be the same as under perfect competition.

Obviously, the above conclusion is different from that of the Cournot's model. This difference is the result of the different behavioural assumption made in the two models. How Bertrand deduces his result from his behavioural assumption is explained below :

We assume that it is producer A who enters the market first. Being the sole producer, the whole market is open to him. But he would supply only such an output and charge such a price which would maximise his profit. So he will, obviously, settle for monopoly output and monopoly price. In terms of the diagram of Fig. 2, he will supply OM output and Charge OP price. Now B enters the market. Assuming that whatever the price he may charge. A will continue to charge Op price, he fixes p_1 price which is a little lower than OP which is being charged by A. Now the commodity being homogenous and competition free all the customers will switch over to B and the new customers will also buy from him. It is obvious that in such a situation A will not take things lying down. He is sure to retaliate by reducing the price even lower than that of B which will now take away all the

customers of B to A. A too is assuming that B will stick to his price. Thus there will start what is known as a price war or cut-throat price competition between the two. In the short period the price can fall even below the average cost of production. But no businessman will remain in a particular business in the long period, he is unable to recover his costs inclusive of his normal profit. This means that the price was between the duopolists (oligopolists) will go on till in the long period an equilibrium is attained. In this state of long-period equilibrium the price will equal the long-period average cost. In the case of the mineral water example of Cournot's model, the equilibrium Price will be zero as mineral water being a free gift of nature has zero cost. And, the equilibrium output of the "industry" will be the same as under perfect competition. In term of the diagram of Fig. 2 above, the total equilibrium output will be OR, that is, the same as the competitive output and the equilibrium price also be the same as under perfect competition, that is, zero in this example. The total output and sales will be equally shared by all the producers who make up the given oligopolistic "industry".

2.7 Edgeworth's Model

The third classical model of duopoly (oligopoly) was formulated by the British economist, Edgeworth. In his model, there is no stable equilibrium : instead, there on perpetual oscillations of prices.

The above rather interesting result in Edgeworth's model is also the result of a changed assumption. His assumptions are the same as those of Bertrand including the behavioural assumption of Betrand which stipulates that each producer assumes that whatever he may do to his own price, the rival producer will stick to the price which is currently charging. If Edgeworth adopts all the assumptions contained in Bertrand's model, then how is it that his result is different from that of Bertrand's model ? The answer to this question lies in all additional assumptions made in Edgeworth's model. He assumes that the combined output capacity of the two procucers is less than the competitive output.

The detailed process of the price-output decisions making in Edgeworth's model which rules out a stable equilibrium and instead points towards perpetual price oscillations is explained here under with the help of fig. 3.

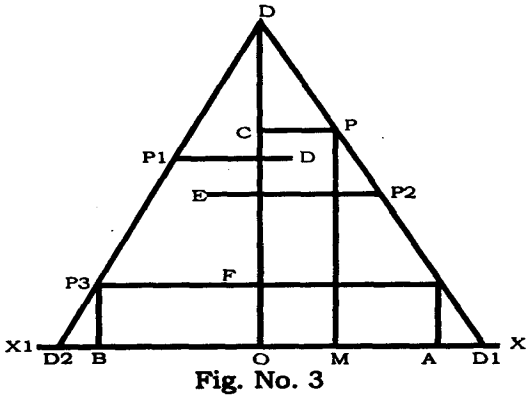


Fig. No. 3

The example taken in this model is also that of zero-cost mineral water. The output of producer A is measured in Fig. 3 along OX and that of B along OX_1. This horizontal axis X^1OX also represents the zero-cost line. The output capacity of A is OA and that of B is OB so that the combined output capacity of the two producers is AB which is less than the competitive output D_1D_2. DD_1 is the demand curve facing A while DD_2 is the demand curve facing B both of which are identical.

Supposing A enters the market first, he being the sole producer will behave monopolistically producing 1/2 of OD_1 (= PC) and charging price P which will maximise his profit. Now B enters the market and assuming that A will continue to charge price P puts in the market the whole of his capacity output (P_1D = OB) and fixes a price lower than what A is charging, say at p_1 as shown in Fig. 3 above. Thus we will encroach on A's market as shown by P_1D. Now A will retaliate by bringing into the market the whole of his capacity output and fixing a price lower than P_1 charged by B on the assumption that whatever he may do to his price, B will stick to his price P_1 So A fixes the price, say, P_2 and selling his capacity output P_2E (= OA) encroaches on B's market. B will retaliate by a similar counter-move, lowering the prices still further. Thus there will be a price-war between the two producers as in Bertrand's model. Sooner or later one of the producers will have lowered the price to such a level at which the demand in his own pat of the market equals his capacity output. In terms of Fig. 3, this comes about when B lowers the price to the level P_3 at which the demand in his our own part of the market is P_3F which equals his capacity output OB. Now there is no question of B encroaching of A's market. Now A seeing that B has done his worst to the price while his part of the market remains unencroached on by B_1, will once again behave monopolistically assuming that B will stick to the price P_3. So, once again, he fixes price P and producers and sells PC output. This attracts B to raise his price, though to a level lower than P. Thus there will start another round of price-cutting competition dragging the price once again to p_3 and then again pulling it up to P. Thus there are perpetual price oscillations without any stable equilibrium.

The above three classical models of duopoly clearly show that there is no unique equilibrium under non-collusive duopoly or oligopoly in general. Equilibrium output and price are indeterminate under non-collusive oligopoly.

It can be easily seen that all the above classical models of oligopoly suffer from the basic weakness, namely, that the oligopolists in these models do not learn from their experience. They are assumed never to revise their behaviour-reaction assumptions in spite of the fact that they are repeatedly falsified. They are assumed to be so short-sighted that they never recognise their mutual dependence. Such an assumption is highly unrealistic.

2.8. Chamberlin's Model

Chamberlin questioned the illogical assumption in all the three classical models of oligopoly discussed above, namely, that the producers do not learn from their experience even when their assumption regarding the behaviour-reaction of the rival producers is falsified again and again. These models imply that the oligopolists are so short-sighted that they are unable to recognise their mutual dependence. Chamberlin does away with this unrealistic assumption and instead assumes that oligopolists are sure to recognise their mutual dependence either intuitively or as a result of experience.

Thus the distinguishing feature of Chamberlin's model of oligopoly is that it is securely based on the assumption that the duopolists or the oligopolists, as the case may be recognise their mutual dependence. Therefore, in his model, the oligopolist does not assume that his rivals will continue to stick to their output or price or both regardless of what he does to his own output or price or both. Instead, he perceives that any move by him to gain advantage at the expense of his rivals will be retaliated. If any individual oligopolist thinks of lowering his price he can easily see that the number of firms in the “industry” or “group” being very small particularly in the case of duopoly, the adverse effect of his price-cutting on the sales of his rivals will be significant. Therefore, he will foresee that his rivals will not stick to their current price and output but will strike back by lowering their prices. On account of this perception he can easily see that his own sales, as the result of price-cutting, will increase not along the elastic sales curve dd' of Fig. I above but along the inelastic sales curve DD' of this Fig. 1. Such a result of a price cut by any of the oligopolists is not likely to increase his profits. Hence, the oligopolists recognising their mutual dependence, will avoid any engagement in a price war one another.

The same recognition of mutual dependence which prevents the oligopolists from indulging in price cutting competition will induce them to fix their price at the level which would have prevailed under monopoly. Of course, this is based on the heroic assumption that the cost curves of the oligopolists are identical and such that, when added together, will become identical with the cost curves of single monopolists. The equilibrium output of the “industry” or the “group”, in that case, will be the same as the equilibrium monopoly output under a single monopolists and this total output will be equally shared by all the oligopolists.

It may be thought that the solution of equilibrium problem under oligopoly as suggested by Chamberlin and explained above points towards “collusion” among the oligopolists. But Chamberlin argues that the monopoly arrangement among the oligopolists that results in his model is not the result

of any collusion among them. It rather results from the oligopolist's intuition or business sense or their experience gained through some earlier price war.

However, regardless of the contention of Chamberlin his model is not a model of a purely non-collusive oligopoly. There may not be in his model an open agreement among the oligopolists on the monopoly arrangement, but there is a tacit agreement all the same.

We see that even on the basis of the four models considered above there is no unique equilibrium under oligopoly. There are quite a number of other models too, some of which we shall examine ahead in this lesson, which point towards still different solutions. In view of it, it is quite apt to state that equilibrium under oligopoly is indeterminate.

We have already pointed out the basic weakness of the classical models, namely, that they implicitly assume that oligopolists do not learn from their experience. That they are permanently short-sighted and therefore fail to recognise their mutual dependence. Chamberlin's model does not suffer from this failing but his model is not a model of a genuine not-collusive oligopoly. But there is another more fundamental weakness which not only Chamberlin's model but also a number of other models share with the classical models. All these models are based on the assumption of perfect knowledge and they rule out uncertainty. As soon as we introduce uncertainty into a model of oligopoly, the analysis of equilibrium under oligopoly becomes even more complicated. This has led some mathematical economists like Von Neumann and Morgenstern to suggest that laws governing the behaviour of oligopolists resemble not to the laws of physics, from which the technique of equilibrium analysis has been borrowed by the economists, but the laws governing the outcome of games and wars which involve strategies and counter-strategies.

There is still another line of reasoning. It is suggested that as fighting out oligopolistic wars in real life is full of uncertainty, it is very likely to prove futile. The quest for maximum profit under conditions of oligopoly involving business wars : strategies and counter-strategies with uncertain results has a very high cost in terms of tensions, strains and anxieties. It is argued that realisation of this truth may induce the oligopolists to abandon the quest for maximum profits. In fact the analysis of the problems of oligopoly has led economists to question the realism and relevance of the profit-maximising assumption of the neo-classical economics. It is suggested that under oligopoly, at least, the entrepreneurs are likely to prefer a relatively leisured and less tense life to the strains and stresses of fighting oligopolistic wars, provided they are earning “satisfying” profits. This suggests that prices and output, particularly prices, tend to be rigid under oligopoly. The rigidity or “stickiness” of prices under oligopoly can be accounted for by the factor that

the oligopolists might be earning "satisfying" profits at the current price level and they may be uncertain with regard to the behaviour reaction of the rivals on account of which they are afraid of experimenting with price changes. Even when they are not uncertain about the behaviour reaction of the rivals, their perception of such behaviour reaction may be such that they do not see any possibility of increasing their profits by changing the price. Consequently, they stick to their prices being currently charged. There are a particular kind of models of oligopoly which explain this last mentioned case of rigidity or stickiness of prices. They are known as the "kinky" or "kinked-demand" models of oligopoly which we explain below.

2.9 Kinky Models of Oligopoly

The kinky models of oligopoly are described so because they postulate the demand curve or average-revenue curve facing an oligopolist as a curve which has a kink in it at the current level of price as shown in Fig. 4 below. OP is the current price, the demand curve (AR curve) facing the oligopolist is DD' which has a kink at k corresponding to the current price P. Its companion marginal-revenue curve is MR curve which too has rather two kinks in it at A and B. The solid vertical regiment AB over it is described as the discontinuity gap which is due to the sudden change in the elasticity of the demand curve from just above

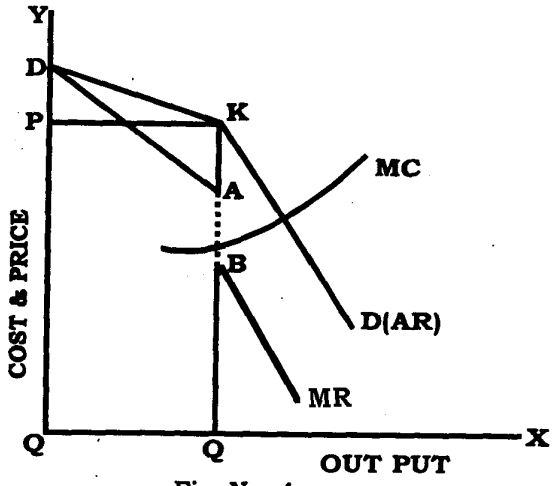


Fig. No. 4

the kink at K to just below it. The portion above it is rather elastic while the portion below it is inelastic. In fact, you can derive this type of kinked demand curve from our Fig. 1 above. The point where, in that figure. DD' and dd' intersect, can be taken as the point indicating the current price. You take the portion of dd' curve (elastic curve) above this point and combine it with the portion of DD curve (inelastic curve) below this point and thus you will get an obtuse-angled kinked demand curve like the DKD curve in our Fig. 4 above.

Note that the kinks A and B in the marginal-revenue curve MR as well as the discontinuity gap AB are exactly below the kink K, that is, if you extend the discontinuity gap AB. vertically upwards, it will pass through K. This model stipulates that the cost conditions of the oligopolist are such that his marginal cost curve MC cuts the marginal-revenue curve in its discontinuity gap marginal revenue is the profit-maximising output and OP is the profit-maximising price.

The oligopolist in this model does not experiment with price-output changes. It is because he is assumed to expect a retaliation by his rivals, if he reduces his price and consequently his sales are expected to increase along the less elastic portion of his demand (sales or average-revenue) curve. Therefore he will not expect to increase his profits by a cut in his price. He will not experiment with an increase in his price either, precisely because in this case he does not expect his rivals to follow him suit. If our oligopolist raises his price, it does not harm his rivals but, on the contrary, is beneficial for them. Hence they are not expected to match any increase in price that out oligopolist may effect. And, the portion of out oligopolist's demand curve above the kink being highly elastic, any increase in his price will reduce his sales proportionately much more and thus ıA ducing his total revenue too. Hence he will not increase his price. Thus the tendency would be to stick to the current price and output. This explains the rigidity or stickiness of prices under oligopoly. It can be seen from Fig. 4 above that even when the costs of the monopolist increase or decrease and in consequence of which his marginal cost curve shifts up or down, the equilibrium price and output of the oligopolist will not change, provided the shifted MC curve continues to cut the MR curve in its discontinuity gap.

Paul Sweezy has suggested that the obtuse-angled demand curve as postulated in the model of Fig. 4 above is peculiar to periods of depression when there develop buyer's markets because then in most of the industries demand lags behind supply, in such a situation any cut in price by any one of the oligopolists is sure to be retaliated with similar cuts by the other firms also, while any increase in price by one will not be followed by others.

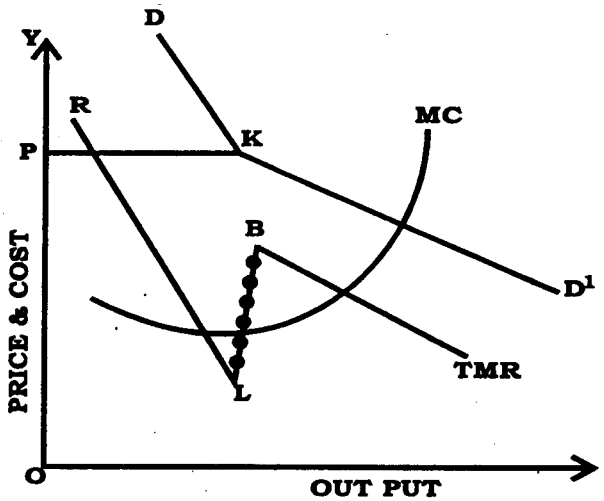


Fig. No. 5

But, argues Sweezy, during periods of boom and prosperity there develop seller's markets as then demand moves ahead of supply. Therefore producers do not find any difficulty in selling. In this condition a cut in price by one will not be followed by others. This means that the demand curve below the current price will be elastic. On the other hand, an increase in price by any one will be followed by others which means that the portion of demand curve above the kink will be inelastic. This behavioural assumption read to boom period will give a reflex-angled kinked demand curve like the one in Fig. 5 this type of demand curve can also be derived form Fig. 1 by continuing the portion of inelastic demand (sales) curve DD' above the point of intersection between DD' and dd' with the lower portion of the elastic of dd.' curve.

In this case also the equilibrium price will be OP and equilibrium output PC which will tend to be rigid so long as the marginal cost curve continues to cut the marginal revenue curve in the discontinuity gap.

It is sometime observed that kinky models of oligopoly explain the rigidity of prices under oligopoly but they do not explain how equilibrium price is determined under oligopoly. This observation is not quite correct because as we have seen above the kinky models are consistent with the conventional profit-maximising principle of price determination, it is, though a different matter, if the current price is made to be determined by some other principle such as the "cost-plus" or "mark up" or full-cost principle and then kinky models are relied on to explain the rigidity of prices. We shall consider the full-cost principle of Hall and Hitch in the lesson on the Marginalist Controversy.

Self-Check Exercise-II

Q. Why there is rigidity of prices under kinky model of oligopoly?

Ans .....

.....

.....

2.10 Stackelberg's Duopoly Model

The profit of each duopolist is generally, taken as a function of the output levels of both, i.e.

$\pi_1 = h_1 (q_1, q_2)$ and

$\pi_2 = h_2 (q_1, q_2)$

The Cournot solution is obtained by maximising π_1 with respect to q_1 assuming and keeping q_2 as constant. Similarly, π_2 is calculated with respect to q_2, where q_1 is assumed to be constant. This means each firm might make certain assumptions about its rival's response. To the extent the firms make erroneous assumptions about each other's response will not be called an improvement over the Cournot's model of duopoly.

An attempt regarding the variation in the sets of assumptions is contained in the analysis of leadership and followership given by Heinrich Von Stackelberg, a German economist. A follower obeys his reaction function and sets his output level that maximise profit given the quantity decision of his rival to whom he regards his leader. But a leader is supposed to obey his reaction function. He assumed that his rival acts as a follower, and maximises his profits, given his rival's reaction function. Each duopolist determines his maximum profit from both leadership and followership and tries to play the role which yields the still larger maximum. In such a situation four outcomes are possible : (1) I (duopolist) desires to be a leader, and II a follower; (2) II desires to be a leader and I a follower; (3) Both desire to be leaders; or (4) both desire to be followers.

Stackelberg tried to make an improvement, though implicit, in Cournot's model. He assumes that one duopolist is enough sophisticated to recognise that his rivals acts on the Cournot's assumption. It enables the sophisticated duopolist to determine the reaction curve of his rival and incorporate it in his own strategy for maximum profit. It can be shown with the help of a diagram.

The isoprofit curves and the reaction functions of the duopolists have been shown in figure 6. Suppose there are two firms A and B. If firm A is sophisticated oligopolist it will assume that firm B will act according to its own reaction curve. This presumption would allow firm A to select its own production level which provides it the maximum profit. In the fig. 6 this has been shown by point a which is on the lowest possible isoprofit curve of A. This indicates the maximum profit A can earn given B's reaction curve. Here firm A acting as a monopolist will produce X_A and firm B will react by producing X_B on the basis of its own reaction curve. The oligopolist who acts on Cournot's assumption becomes followers and the sophisticated one becomes the leader. The follower becomes worse off in comparison to Cournot's equilibrium. It is because with this level of output he faces an isoprofit curve which is relatively, at a longer distance from his axis.

Suppose, if B is the sophisticated leader, it would like to produce X-B which is indicated by point b on A's reaction curve and which provides the maximum possible profit to B in the face of its isoquant map and A's reaction curve. In this case firm B, being leader would earn higher profit than A, as compared with Cournot's equilibrium solution.

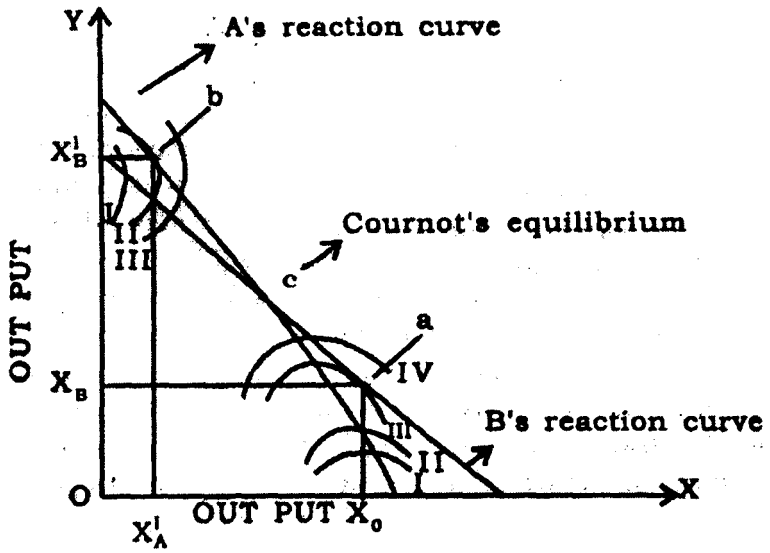


Fig.6

But, there can be a situation where both firms are sophisticated. In this situation both will try to act as leaders and the situation is termed as stackelberg's disequilibrium. Due to the actions of the both either there would be a price war until one of the firms accepts its defeat and starts acting as a follower or there can be collusion between the two firms. In this case, the collusion point would be on (or nearer to) the Edgeworth contract curve where both the firms obtain higher profits. It implies that naive behaviour does not pay and the firms should realize their interdependence. If firms do not take into consideration the actions and reactions of each other, both will be worse off, due to the price war. Thus, it is by realising the other's reactions each firm can earn a higher lever of profit for itself.

But, when the model is assessed critically, it is said that in a Cournot-type market situation the sophisticated duopolist bluffs the rival one, by producing level of output higher than the one that would be produced under the Cournot equilibrium. And also if the naive rival, sticks to his Cournot behavioural reaction style and being misled, produces less than what he would have produced under the Cournot equilibrium.

LESSON NO. 1.3 **Prof. Upinderjit Kaur**

PRICING AND OUTPUT UNDER OLIGOPOLY

1. Oligopoly: Meaning
2. Cost, Demand and Product Differentiation
3. Pure and Differentiated Oligopoly
4. Collusion verse Independent Action
   - 4.1 Perfect Collusion
   - 4.2 Imperfect Collusion
   - 4.3 Independent Action
5. Collusive Oligopoly Models
   - 5.1 Perfectly organised collusive oligopoly models.
     - (i) The compelety contralized cartel
     - (ii) Model of market-Sharing cartal
   - 5.2 Unorganized collusive Oligopoly Models
     - (i) The Model of Low Cost Price Leader
     - (ii) The model of Doninant firm as Price leader
   - 5.3 Unorganised non-Collusive mogopoly models
     - (i) The Model of price wars
     - (ii) The Model of price Rigidity

1. Oligopoly: Meaning

Oligopoly is a market structure where there are a few sellers selling either identical products or differentiated products. If the products are identical sellers, it is the case of pure oligopoly; if the products are differentiated, it is the case of differentiated oligopoly. A single seller occupies a position of sufficient importance in the product market as changes in his price activities do have repercussions on the others in the market. The other sellers react to the market activities of the one, and their reactions, in turn, have repercussions on him. The individual seller is aware of this inter-dependence and in changing his price, output, sales promotional activity, or quality of product, he must take the reasons of others into account. Thus a few seller in oligopoly make all the difference, in the sense that each seller is producing a large and a significant portion of the market output so that its actions and reactions are of importance to the other sellers. It is very unlike a firm in perfect competition, where it is producing a small and insignificant portion of the market output and where it cannot influence the price by its own individual action.

Oligopoly pricing is not as neat and precise as the theories of perfect competition and monopoly. It is due to the uncertainty with regard to the rival's reaction to the various kinds of activities on his part. It is also due to the fact that oligopoly covers a wide range of cases, each with its unique

characteristics. Thus, the oligopoly situation cannot be generalised like the position of other market structures. As such, several models have been developed which cover a large part of the oligopoly situations in the real world.

2. Cost, Demand and Product Differentiation

Here it is assumed that the oligopolistic firm buys its resources competitively. Its cost curves are like those of purely competitive firm and pure monopolist. In other words, the costs of a firm in oligopoly can be rising upwards.

It is the demand conditions that differentiate oligopoly from other market structures. Since what one firm is able to do in the market is conditioned by ways in which other firms react to the market activities of the one. The extent of this oligopolistic uncertainty is highly variable from case to case. In certain cases the firm knows the actions and reactions and so can be certain about its demand curve while in most other cases these actions and reactions are not known and knowable and it is very diffcult to predict the demand curve under such a situation. Thus, when the firm does not prossess this knowledge, the position and the shape of the demand curve it faces, are highly conjunctural. What makes oligopolistic market structure different from others is the interdependence of demand among the firms of an industry.

3. Pure and differentiated Oligopoly

When the firms in oligopoly are selling identical products, it is called pure oligopoly and when they are selling slightly differentiated products, it is called differentiated oligopoly. The distinction between differentiated oligopoly and pure oligopoly does not really matter in our analysis of pricing and output. As a practical matter, sellers in most oligopolistic industries sell differentiated products. Nevertheless, some of the fundamental principles of differentiated oligopoly, as well as pure oligopoly, are seen most clearly when we assume that pure oligopoly exists. For example, instead of a single market price, under differentiated oligopoly, a cluster of prices may occur. Televisions may range between Rs. 15580 to 25,000. The various price levels reflect consumer's vies regarding the respective qualities of the different seller's wares and the availability of different markets. The analysis is simplified if we assume that pure oligopoly exists. It does not distort the basic pricing principles seriously, by reducing a cluster of prices to single market price for the product.

4. Collusion Versus Independent Action

There is a tendency among the oligopolistic firms to form a collusion although collusive arrangements are very difficult to maintain. This tendency towards collusion is indicated by the three types of incentives that exist in the oligopolistic market structure. First, the firms in oligopoly can increase their profits by decreasing the competition and acting in a more or less monopolistic fashion. Second, collusion can decrease the oligopolistic uncertainty which is so much the characteristic of oligopolies and which reduces the profits considerably by not enabling the firms to act in the monopolistic manner. In the third place, collusion among the firms already

in the industry will facilitate blocking of newcomers from entering into that industry. However, once the collusion comes into existence, there is also tendency on the part of a single firm breaking away from the collusion in order to enhance the profits. It is possible to classify oligopoly on the basis of the degree of collusion present in its structure. The following three forms may be distinguished :

4.1. Perfect Collusion

4.2. Imperfect Collusion

4.3. Independent Action on the part of Individual Firms

4.1. Perfect Collusion

Perfect collusion can take the shape of cartel arrangements. A cartel is a formal organisation of the producers within a given industry. Its purpose is to transfer certain management decisions and functions of individual firms to a central association in order to improve the profit positions of individual firms. Cartels are prohibited in some countries but they have existed extensively in some countries and on an international plane. The extent of the functions transferred to the central organisation varies in different cartel situations. We will make a mention of only two representative cartel situations. The first is the Centralised Cartel ; it implies a complete cartel control over the member firms. The second is the Market Sharing Cartel meaning thereby that only fewer functions are transferred to the central association.

The centralized cartel implies that decision making with regard to pricing, output sales and distribution of profits is accomplished by the central association, which markets the product, determines the prices, determines the output that each firm is to produce and divide profit among member firms. Member firms are represented in the central association, and cartels policies presumable result from exchange of ideas, negotiations and compromises. The market sharing cartel is a somewhat looser form of organisation. The firm forming the cartel agree on market shares with or without any understanding regarding prices. Member firms do their own marketing but are careful to observe the cartel agreement.

4.2. Imperfect Collusion

Very often cartels are not allowed and there is a legal ban on the formation of cartels. So formal organisation having the shape of a cartel cannot exist. Things cannot be settled in black and white. As such, informal agreements or tacit arrangements are arrived at in order to avoid the legal implications. Under such form of agreements, the firms agree to fix prices and outputs and thus escape from prosecution under the anti-trust laws. The price leadership arrangements of a number of industries—steel, automobiles, sugar and others are typical of this class. Tacit unorganised collusion can occur in many other ways also. Gentleman's agreements of various sorts with regard to pricing, output, market sharing and other activities of the firms within the

industry can be worked out on the lunch table or on some social occasions of different kinds.

4.3. Independent Action

Many a time, collusive agreements are not arrived at instead firms of an industry go it alone. There are two possible outcomes of such independent action. First the firms acting despondently often do not know the reactions of other firms to its own price formation. It very often invokes retaliatory action which results into price wars. Second, in some industries independent action may be consistent with industry's stability over time. Firms may have learnt by experience what the reactions of rivals will be to actions on their part and may voluntarily avoid any activity that will rock the boat. It is just possible that the management of each firm is well satisfied with present prices, outputs and profits and is content to let things continue as they are rather than change and start a chain reaction in the shape of price war. Such a situation is described as Price Stability.

We shall take now these models one by one.

5. Collusive oligopoly Models:

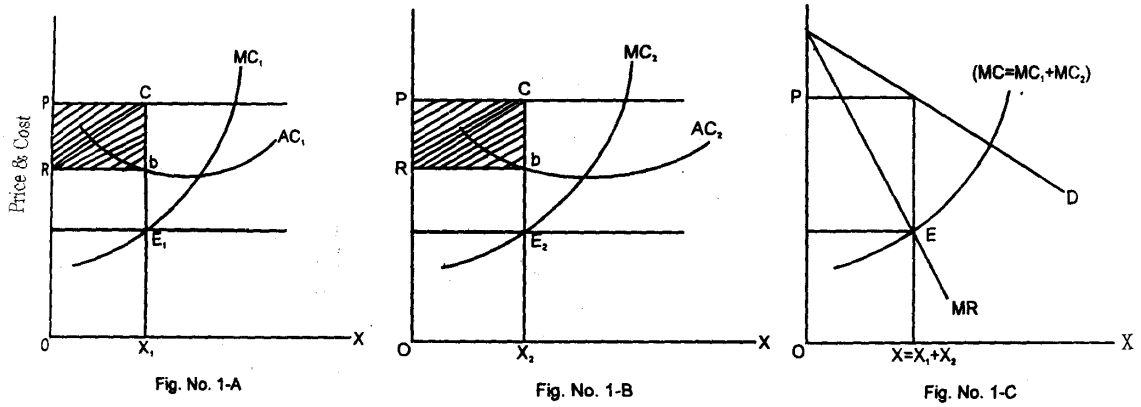
5.1. Perfectly Organised Collusive Oligopoly Models

Let us first take up the two cases of[2] perfectly organised collusive oligopoly for the purpose of determining price[2] and output. The analysis assumes short run where the individual firms do not have the time to change their plant size nor is it possible for new firms to enter the industry.

(i) The Completely Centralized Cartel : It refers to collusion in its most complete form. Its purpose is the joint or monopolistic maximization of industry profits by several firms of the industry. Ideal or complete monopolistic price and output determination by the cartel will rarely be achieved in real world, although it may be approached in some instances.

In a completely centralised cartel, individual firms in an industry surrender the powers to make price and output decisions to a central association. Quotas to be produced are determined by the association and so is the distribution of industry's profits. Policies adopted are to be those which will contribute most to total industry profits. To simplify the analysis, let us take two firms in an industry producing identical products. These two firms join and form a central association to which they delegate the authority to decide not only the total quantity and the price at which it must be sold so as to attain maximum group profits, but also the allocation of production among the cartel members and the distribution of the maximum joint profits among the participating members. The authority of the central association is complete clearly the central association will have access to the cost figures of the

individual firms and for the purposes of the present model we unrealistically assume that the association can have its market demand curve and the corresponding MR curve. From the horizontal summation of the MC curves of the individual firms, the market MC curve is derived. The firm acting as a multi-plant monopolist, will set the price as defined by the intersection of the industry MR and the MC curves.



The Centralised Cartel

The cost structures of the individual firm are shown in the fig. 1-A and 1-B. From the horizontal summation of the MC curves we obtain the market MC curve. This is implied by the profit maximization goal of the cartel; each level of the industry output should be produced at the least possible cost. This if we add the output of A and B that can be produced at the same MC, clearly the resulting total is the output that can be produced at this common, lowest cost. Given the demand curve DD in fig. 1-C; the monopoly solution which maximises joint profits is determined by the intersection of MR and MC at the point i.e. E. The total output is X and it will be sold at price P. Now the central association allocates the production among firm A and firm B as a monopolist will do, that is by equating the MR with the individual MCs. Thus, firm A will produce X_1 and firm B will produce X_2. Note that the firm with lower costs produces a large amount of output. However this does not mean that it will also take a larger share of the attained joint profit. The total industry profit is the sum of the profits from the output of the two firms denoted by the shaded areas of figures 1-A and 1-B. The distribution of profits is decided by the central association of the cartel.

Self-Check Exercise-I

Q. Who decides the distribution of profits under completely centralized cartel?

Ans .....

.....

.....

(ii) The Model of Market-Sharing Cartel : This form of collusion is more common in practice because it is more popular. The firms agree to share the market, but keep a considerable degree of freedom concerning the style of their output, their selling activities and other decisions. We illustrate the market-sharing cartel with the determination of quotas. This method of sharing the market is the agreement on quotas, that is, agreement on the quantity that each member may sell at the agreed prices. If all firms have identical costs the monopoly solution will emerge with the market being shared equally by the member firms. For example, if there are only two firms with identical costs, each firm will sell at the monopoly price one-half of the total quantity demanded in the market at that price. Suppose establish the rule of a single price in the product market.

Market-Sharing Cartel : Identical Cost Conditions with two firms :

In the figure 2, the industry demand curve for the product is DD. Each firm faces demand curve dd for its own output. Each has a short run average cost curve and a short run marginal cost curve represented by SAC and SMC respectively. The marginal revenue curve faced by each firm is MR. Profit maximizing output for each firm will be X, at which SMC is equal to MR. Each firm will want to charge price p. Together the firms will produce an industry output of X that will fill the market at price p. Such will be the case since dd lies halfway between the market demand curve and the price axis.

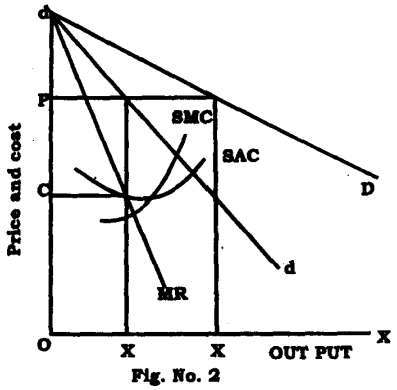


Fig. No. 2

Another popular method of sharing the market is the definition of a region in which each firm is allowed to sell. In this case of geographical sharing of the markets, the price as well as the style of the product may differ. There are many examples of regional market-sharing cartels, some operating at international level. However, even a regional split of the market is inherently unstable. The regional agreements are often violated in practice, either by mistake or intentionally, by the low-cost firms who have always the incentive to expand their output by selling at a lower price openly defined or by secret price concessions or by reaching adjacent markets through advertising.

It should be obvious that the cartel models of collusive oligopoly are 'closed' models. If entry is free, the inherent instability of cartels is intensified, the behaviour of the entrant is not predictable with certainty. It is not certain that the new firm will join the cartel. On the contrary, if the profits of the cartel members are lucrative and attract new firms in the industry, the newcomer has a strong incentive not to join the cartel, because in this way its demand curve will be more elastic, and by charging a slightly lower price than at the cartel, it can secure a considerable share in the market on the assumption that the cartel members will stick to their agreements. Cartels being aware of the dangers of entry, will either charge a low price so as to make entry unattractive or may threaten a price war on the newcomer. If entry occurs and the cartel carries out its threat of price war, the newcomer may still survive, depending on his cost advantage, and his financial strength in withstanding possible losses during the initial period of his establishment, until he reaches the size which will allow him to reap the full scale economies that he has over those enjoyed by the existing firms.

5.2. Unorganized Collusive Oligopoly Models

When cartels are not allowed to take shape, some tacit or gentleman's agreements take place to avoid the legal prosecution. Such form of collusion is price leadership. In this form of coordinated behaviour of oligopolists one firm sets the price and others follow it, because it is advantageous to them or because they prefer to avoid uncertainty about their competitors' reactions even if this implies departure of the followers from the profit maximising position. Price leadership is widespread in the business world. It may be practiced either by explicit agreement or informally. In nearly all cases, price leadership is tacit since open collusive agreements are illegal in most countries.

Price leadership is more widespread than cartels, because it allows the members full freedom regarding their product and selling activities and thus is more acceptable to the followers than a complete cartel, which requires the surrendering of all freedom of action to the central association.

If the product is homogeneous and the firms are highly concentrated in a location of price will be identical. However, if the product is differentiated, prices will differ, but the direction of their change will be the same, while the same price differentials will broadly be kept. There are various forms of price leadership. The most common types of leadership are given here :

(i) The model of the Low-Cost Price Leader : Let us suppose that there are kept firms in the industry, that a tacit market sharing arrangement has been established with each firm assigned half the market, the product is homogeneous, and that one firm has lower cost than the other. A conflict of interests occurs with regard to the desirable price to be charged :

Price Leadership by a Lowest Cost Firm

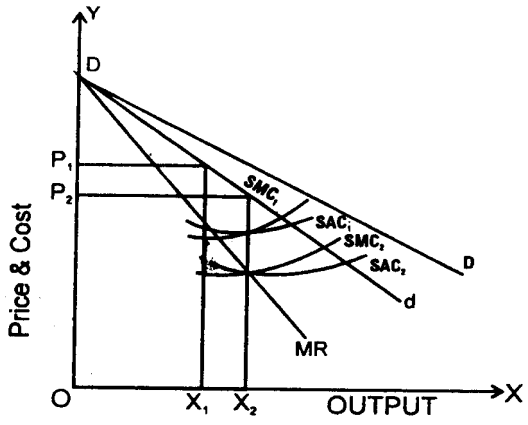


Fig. No. 3

In Figure 3, the market demand curve is DD. Each firm faces demand curve old. The cost curves of the high-cost firm are SAC_1 and SMC_1 and those of the low-cost firm are SAC_2 and SMC_2. The marginal revenue curve of each firm is MR. The high-cost firm will want to produce an output of X_1 and charge a price of P_1 whereas the low-cost firm will want to produce an output of X_2 and charge a price of P_2.

Since the low-cost firm can afford to sell at a lower price that the high-cost firm can, the latter will have no option but to sell at the price set by the low-cost firm. Thus the low-cost firm becomes the price leader. This sort of situation has several ramifications depending on the comparative cost structures of the firms, the number of firms in the industry, the shape and the position of the market demand curve and the share of market that each firm is to receive.

Although the price leadership model stresses the fact that the leader sets the price and the follower adopts it, it is clear that the firms must also enter the share of the market agreement, formally or informally otherwise the follower could adopt the price of the leader but produce a lower quantity than the level required to maintain the price set by the leader in the market, and thus push (indirectly, by not producing enough output) the leader to a non-profit maximising position. In this respect the price follower is not completely passive, he may coerced to adopt the leader's price but unless tied by a quota-share agreement (formal or Informal) he can push the leader to a non-profit maximising position.

Self-Check Exercise-II

Q. Why is price leadership more wides widespread than cartel?

Ans .....

.....

.....

(ii) The Model of the Dominant Firm as Price Leader : In this model, it is assumed that there is a large dominant firm which has considerable share of the total market, and some smaller firms, each of them having a smaller market share. To avoid large-scale price cutting, tacit collusion may occur in the form of price leadership by the dominant firm. Suppose the dominant firm sets the price for the industry and allows the small firms to sell what they desire at that price. The dominant firm then fills out the market.

Under the situation, each small firm will behave as if it were in a competitive market. It can sell all it wants to sell at the price set by the dominant firm. It faces a perfectly elastic demand curve at the level of the established price. The marginal revenue curve of the small firm coincides with the demand curve faced by it, hence to maximise profits the small firm should produce the output at which its marginal cost equals marginal revenue and the price set by the dominant firm.

A supply curve for all small firms combined is obtained by summing the marginal cost curves of all the small firms horizontally. It shows how much all small firms together will place on the market at each possible price. The curve is labelled MCs in figure 4.

Price Leadership by a Dominant Firm.

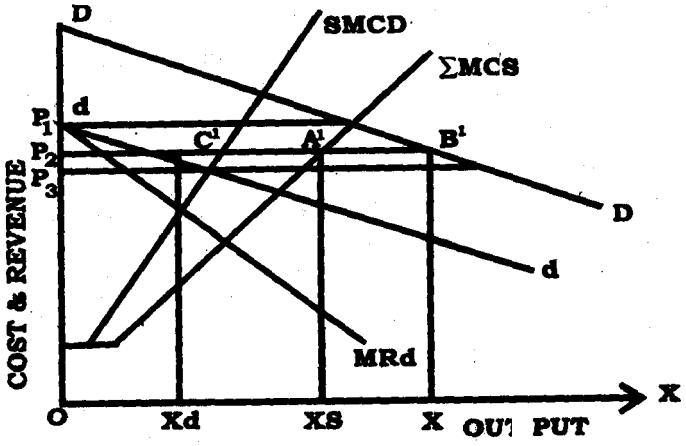


Fig. No. 4

The demand curve faced by the dominant firm can be derived from this information. The market demand curve DD shows quantity of the product, consumers will take off the market at each possible price, whereas the ∑MCs curve shows how the small firms combined will sell at each possible price. The horizontal difference between the two curves at all possible prices show how much the dominant firm can sell at these prices. The demand curve faced by

the dominant firm is dd and is obtained by subtracting ΣMC_s curve from the DD curve horizontally. To show in detail how dd is obtained suppose the dominant firm sets the price of P_1. At this price the small firms will fill the market leaving no sales for the dominant firm. At a price of P_2 the small firms fill the quantity P_2A^1 leaving A^1B^1 for the dominant firm to sell. In order to place the demand curve for the dominant firm's product in proper relationship to the quantity and price axis of the figure, we can set point C so that P_2C^1 equals A^1B^1. This process can be repeated at various assumed prices. A line joining all these points thus will be dd, the demand faces by the dominant firm. At any price below their respective average variable costs, the smaller firms will drop out of the market, leaving the entire market to the dominant firm.

The marginal revenue curve of the dominant firm is MRd and its marginal cost curve is SMCd. Profits are maximum for the dominant firm at an output level Xd at which SMCd equals MRd. The price charged by the dominant firm is P_2. Each small firm maximises profits by producing that output at which its marginal cost is equal to its marginal revenue which for each small firm is equal to its price P_2. The total output for the small firms combined is xs, the output at which ΣMC_s equals P_2. Total industry output is Xd + Xs which is equal to X. Profit for the dominant firm is Xd times the difference between price P_2 and dominant firm's average cost at output. Average cost curves are not shown in figure 4.

The price leadership model will lead to a stable equilibrium if the leader has the power to make the other firms in the industry follow his price increases or price decreases and provided that there is some agreement for sharing the market so that the followers produce the right quantity that is the quantity which is required to maintain the price set by the leader, with him producing as much as is compatible with this profit maximising policy.

In order to have the power to impose his price, the leader must be both a low cost and large firm. Although two models were developed, one for a low cost leader and another for a dominant firm leader, in practice the power of a leader depends both on his cost and size. If a firm has low costs but is very small compared with the leader it may not find it possible to survive price or advertising or product design war that dominant firm may start. On the other hand, if a dominant firm loses its cost advantage, it loses also its power to impose and increase in price, since the smaller firms having lower costs, will normally not follow price increases.

5.3. Unorganised Non-Collusive Oligopoly Models

In the case of unorganised non-collusive oligopoly, the formal or tacit agreement is not possible and the firms act independently. Since there are a few firms in oligopoly and this makes the firms interdependent on each other, the

output that one firm can sell be changing its price depends on the manner in which other firms react to this price change. The range of possible reactions is fairly broad. Rivals may just meet the price change; They may change price in the same direction but by less than the change of the original seller : they may exceed the price change : they may improve the quality of their products, they may engage in extensive advertising compaigns or they may react in many other ways. Inability of the individual seller to predict, which reactions will occur and in what degree will they occur, results in an absolutely uncertain behaviour on the part of the firm. It leads to either price wars or price rigidity. Let us anslyse these situations :

(i) The Model of Price Wars : A persistent danger of price wars exists in oligopolistic industries characterised by independent action on the part of individual firms. Little of precise nature can be said about these. One seller may lower his price to increase his sales. But this move takes customers away from the rivals, and the rivals may retaliate with a vengeance. The price war may spread throughout the industry, with each firm trying to undercut others. The end result may well be disastrous for some individual firms.

The specific cases of price wars are varied. But they orginate from the inter-dependence of sellers. A new firm opening up in a locality or an existing firm attempting to revive lagging sales may be the initiating factor. Surplus stocks at existing prices and limited storage facilities have touched off price wars in many industries. In a young industry, sellers may not have learnt what to expect of rivals or they may be scrabbling to secure an established place in the industry and may inadvertently start a price war.

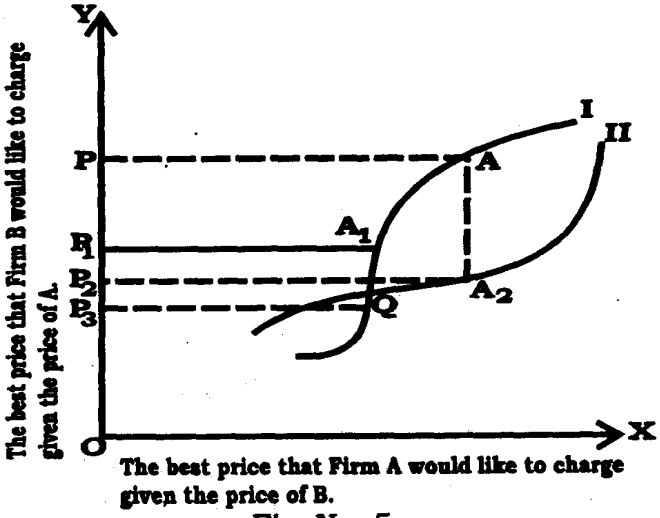


Fig. No. 5

In a fig. 5 we note two reaction curves : The curve I shows A's reactions to price set by the firm B or it shows the best price that firm A would like to charge given the price of B. The curve II shows B's reaction to the price set by

A or in other words it shows the best price that firm B would like to charge given the price of A. If firm B charges a price P firm A would like to charge a price of PA. And if firm A sets this price of PA, firm B would like to charge a price of P_1 to which A's reaction would be that it would like to charge a price of P_1A_1 and the reaction of firm B to this new price of P_1A_1 set by A would be that it would set a price of P_2 and so we go on approaching the equilibrium point Q at the intersection of the two reaction curves. With the curves as drawn the equilibrium is stable. We may note here that the reaction curves themselves may not be stable : for instance at Q both firms are unprofitable. Either one may eliminate or absorb the other, or there may be collusion or a new set of curves to raise the prices to higher levels.

Maturity on the part of the long established industry may substantially lessen the dangers of price wars. Individual firms may atleast have learnt what not to do and may carefully avoid any activities that conceivably could touch off price wars. They may have established a price or a cluster of prices that is tolerable to all from the point of view of profits. Such prices are thought by many to be rather rigid over time although there is no clear cut evidence that this is the case. Individual firms are thought to engage in non-price competition rather than in price rivalry in order to increase their respective shares of the market and profit.

(ii) The Model of Price Rigidity : An analytical device frequently used to explain oligopolistic price rigidity is the kinked demand curve. These are a few assumptions of this model. First, it assumes that the industry is a mature one either

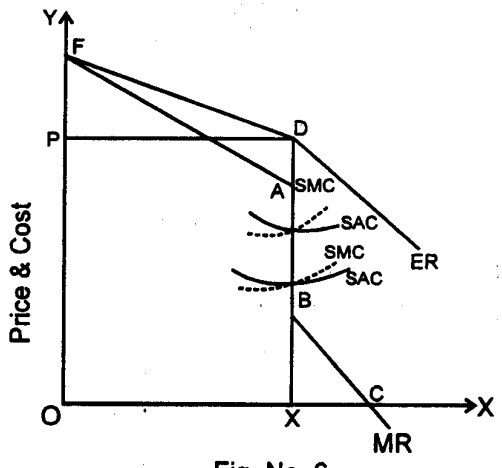


Fig. No. 6

with or without product differentiation. A price or a cluster of prices fairly satisfactory to all firms has been established. Second, if one form lowers price other firms will follow or undercut it in order to retain their shares of the

market. For price decreases the individual firm cannot hope to do more than hold its former share of the market and it may not succeed in doing even that much. Third, if one firm increases price, the other firms will not follow the price increase. The customers of the price raising firm will shift to the others, now relatively lower-priced firms ; and the price-raising firm will lose a part, but not all of its share of the market.

The demand curve in such a situation will take the shape of FDE as in fig. 6. The firm has established price P, If it decreases the price below P, the other firm follow and it retains only its share of the market. For price decreases, then the demand curve faced by the firm is DE and it will have about the same elasticity at different prices as the market demand curve. Should the firm increase the price above P. Other firms will not follow and it loses a part or all of its share of the market to other firms. The demand curve faced by the firm for price increases in FD and at each possible price it will have considerably greater elasticity than the market demand curve. The demand curve FDE is not smooth one. It has a kink in it at the established price P.

Corresponding to the kinked demand curve FDE, the marginal revenue curve (FABC line) is discontinous at output X. Given the cost structure represented by SAC and SMC. SMC cuts MR in the discontinuous portion. Output X and price P are the profit maximising output and price. This is a fairly rigid price in the sense that any changes for example represented by SAC_1 and SMC_1 which cut the MR within the discontinuous portion AB, give no incentive to the oligopolistic firm either to change the price or the output. But in case the cost changes are sharp enough to cut the MR either in the FA or BC cost portions, it will impel the oligopolist to change the price and output.

Similar price rigidity is maintained even when there are changes in the demand. Let the initial position of the oligopolist be as in Fig. 7-1. Assume his costs do not change and the market demand for the product increases. The demand curve faced by the oligopolist, shifts to the right, to $F_1D_1E_1$ as is shown in Fig. 7-2 but it remain kinked at price P. The marginal revenue curve moves to

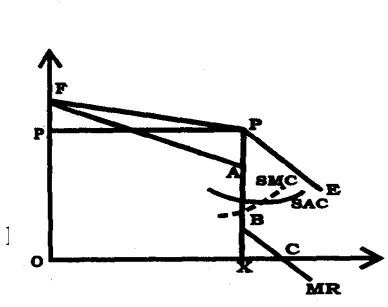


Fig. No. 7.1

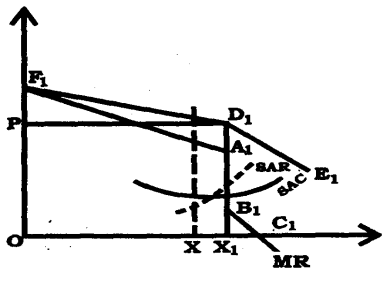


Fig. No. 7.2

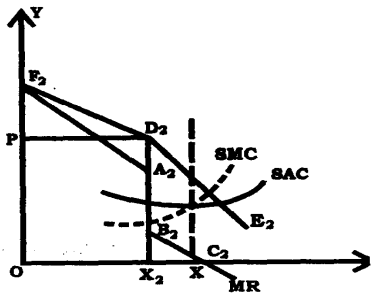


Fig. No. 7.3

right also with its discontinuous segment always occuring at the output at which demand curve moves to the right also with its discontinuous segment always occuring at the output at which demand curve is kinked. If the increase in demand is limited one so that MR cuts MC in the discontinuous portion (A_1B_1) the firm will continue to maximise profits at the price P but at a large output X_1. A decrease in market demand shifts the firm's demand curve to the left, to $F_2D_2E_2$ as is shown in fig. 7-3. Here again there is no incentive to change the price although output decreases, until the demand curve shifts far enough to the left for the MC curve to intersect the B_2C_2 segment of the MR curve. Thus price remains stable at P level.

LESSON NO. 1.4 **AUTHOR : PROF. ROSHAN KHOSLA**

THE MARGINALIST CONTROVERSY

4.1 Introduction

In 1939 these started a gradually mounting dissatisfaction with the traditional neo-classical theory of the firms its assumptions and its marginalistic behavioural rules. In England the publication in 1939 of empirical evidance by Hall and Hitch converning the behaviour of firms in the real world spurred a series of articles and treatises dealing with the weakness of traditional theory i.e. The marginalist controversy.

4.2 Marginalism

In order to understand the so-called marginalist controversy it is useful to start with first understanding the particulars of marginalism. Even though what you have already learnt and what you are going to learn through this course on micro-economics is nothing but marginalist economics or marginalism, yet it is helpful to highlight those particular features of marginalist economics which are highly relevant in the contest of the marginal controversy.

Marginalism in economics is the name given to a particular development in the history of economics which took place mainly during the last quarter or so of the nineteenth century with the publication of the works of such diverse economists as Walres, W.S. Jevons, Alfred Marshall and, along all the economists of the famous Austrian school led by Carl Menger. All these economists more or less, independently devised a technique of analysis in economics which made a heavy use of the "marginal" concepts in economics. In the theory of demand, for example, the concept of the "marginal utility" was introduced and it was demonstrated that on the side of demand the price of a commodity is determined by its marginal utility which, as you know, is the rate of change in the total utility or satisfaction (which a consumer expects to get) per unit of change in the quantity consumed or purchased by the consumer. Similarly, on the side of supply, the concept of the "marginal cost" was introduced and it was sought to be demonstrated that on the side of supply the price of a commodity was determined

by its marginal cost which is the rate of change in the total costs of production of a commodity per unit of change in the total output of it. In symmetry with it, it was contended in the theory of distribution that the price of a factor of production or factor service determined its share in the total production of a society and this price was determined by the "marginal productivity" of the given factor of production.

Thus, whether it was consumption, production, exchange or distribution, each type of economic activity was explained with the help of some "marginal concept or the other. The consumers of a commodity, it was held by the marginalists, tend to purchase and consume such a quantity of it that would equate its price with the marginal utility of it. Each producer would produce such an output of a commodity which would equate his margin cost of producing the output with its price. People producing different commodities and exchanging them against one another would exchange these commodities in such a manner, that is at such sales of exchange that the ratio between the marginal utilities of any pair of goods for any pair of consumers consuming these goods would be the same. Each producer would employ a given factor of production to such an extent that its marginal productivity equals its price.

It should be clear from above that the term, marginalism, in economics is used to describe that particular school of economic thought or economic scientists who believe that each and every sphere of economic activity can be explained with the help of the marginalist analysis. Since the times of the pioneers of this technique of analysis there have been further developments and refinements in this technique of analysis and the theories or hypothesis that resulted therefrom but the essentials of the marginality method have remained the same. For example, the old concept of marginal utility which was earlier predominantly cardinal in nature was substituted with ordinal concept of utility and the concept of the marginal rate of substitution. Similarly, when it was not valid under competition, the marginalist method in itself was not abandoned; only pointed out that under the marginalist hypothesis that the price of a commodity equals or is determined by its marginal cost was true only in the case of perfect competition and was not valid under imperfect competition, the marginal method in itself was not abandoned; only its particular formulation in this context was reformulated but only in marginalist terms. "In equilibrium marginal cost equals marginal revenue" was presented as refined and more general substantive proposition in place of the old, less general, proposition. "In equilibrium marginal cost equals price".

This school of economics relying almost solely on the technique of marginalist analysis is also very frequently referred to as neoclassical economics. It should now not be difficult for you to recognise that what you are learning in this course on microeconomics is nothing but the marginalist economics of the neoclassical school.

4.3 The Marginalist Controversy

Having taken a clear view of what marginalism is, we are now in a position to go over to knowing what the so-called marginalist controversy is. As

a matter of fact, in a broad sense marginalist controversy should refer to all the critical economic literature that has been aimed, from time to time, at questioning the basic assumptions and premises of the neoclassical marginalist economics as well as results of its analysis as embodied in its various hypothesis or theories. However, the term, marginalist controversy is usually used in a rather narrow sense. In this narrow and limited sense the term refers to the debate that was initiated almost half a century ago by the publication of an empirical study, by two Oxford university economists. Hall and Hitch, of the behaviour of business firms with regard to the determination of the price of manufactured goods. Their investigations into the problem of price determination and their conclusion were published in the May, 1939 issue of the Oxford Economic Papers under the title, "Price Theory and Business Behaviour". It was probably the first empirical study which questioned the marginalist theory of pricing which, as you know, holds that prices are determined by the marginalist principle which, in the context of the business firms, implied that they fix such prices of their products which would equate their marginal costs with their marginal revenues. Thus, in its restricted sense the marginalist controversy refers to the controversy over the marginalist theory of pricing of the neoclassical economics.

However, during the next decade or so after the publication of the Hall-and-Hitch study referred to above, some economists extended the scope of this controversy a little further so as to cover not only the neoclassical theory of pricing manufactured commodities but also the neoclassical theory of pricing of factors of production according to which the factor prices are shown to be determined by their respective marginal productivities.

Lester, for example, questioned the validity of the marginal productivity theory of factor pricing in the context of wage determination in his paper. "Shortcomings of Marginal Analysis for Wage-Employment Problems" published in the March, 1946 issue of the American Economic Review.

The marginalist controversy that we shall be explaining and discussing in the following sections of this lesson is the marginalist controversy in this restricted sense.

However, it should be noted that the whole superstructure of marginalist theories of the neoclassical economics is based on some basic assumptions from which they follow as neatly as the theorems of Euclidan geometry. The empirical studies we have referred to above and which have brought the marginalist theories under controversy have led to casting a strong doubt on the realism and relevance of these basic assumptions of the neoclassical theory of pricing. In view of it, it should be considered proper to start with the description of these basic assumptions of the neoclassical theory.

4.4 Basic Assumptions of Neoclassical Price Theory

The most basic and crucial assumption of the neoclassical theory of pricing is its behavioural assumption. As you know, the neoclassical theory assumes people to behave rationally. And, to the neoclassical economists rational economic behaviour has only one meaning which may be described as "maximizing" behaviour. In other words, rational economic behaviour for the neoclassical implies that people as consumers behave in a manner so as to maximise their total satisfaction from a given money expenditure and as predictors and sellers of commodities they behave in a manner so as to maximise their pecuniary, that is money profits.

It is to be seen that maximising profits by a firm is a problem which is very much amenable to mathematical analysis once you make this behavioural assumption, a mere application of deductive logic leads to the neoclassical principle of marginal cost pricing—the principle that states that in equilibrium the price of a commodity equals its marginal cost. However, in order to arrive at this deductive hypothesis the theory needed some assumptions regarding the structure of the market.

The neoclassical model till the absorption of the conclusions of two famous works on price theory published almost simultaneously in 1932-joan Robinson's Economics of Imperfect Competition and Chamberlin's Theory of Monopolistic Competition—into the established neoclassical price theory, was, on the whole, a model of perfect competitions wherein monopoly was treated, it was treated at all, as an exception. In other words, apart from the crucial behavioural assumption described above, another basic assumption of the neoclassical theory was the assumption of perfect competition which, in its turn, implies a set of sub-assumptions which were described as the necessary conditions required for perfect competition. These necessary conditions for perfect competition to exist are : (a) large number of producers of a given commodity, each one of whom produces only an insignificant part of the total supply of the given commodity, and free competition among these producers; (b) large number of buyers buying the given commodity, each one of whom purchases only an insignificant part of the total purchases made of the commodity, and free competition among these buyers ; (c) the commodity concerned should be homogeneous or standardised which implies that for the buyers all units of the commodity are the identical, regardless of who has actually produced and supplied it; (d) perfect mobility of producers (sellers as well as buyers; and above all, (e) perfect knowledge.

When the above conditions are satisfied and the market is perfect, it can be easily deduced that price of commodity under conditions of perfect competition will be in equilibrium, equal its marginal cost, if as postulated by the neoclassical, producers seek to maximise their profits. The condition of profit maximization is that the marginal revenue be equal to the marginal cost

of the producer of the given commodity. So long as the marginal revenue (addition made to the producer's total revenue when output is increased by one unit) is greater than the marginal cost (addition) made to the producer's total costs when output is increased by one unit the producer's profit will go on increasing with every unit increase in his output. It is maximum when marginal revenue equals marginal cost. Moreover, under perfect competition marginal revenue of an individual producer always equals his average revenue which is only another name for price. This is because under perfect competition an individual producer of a given commodity supplies only an insignificant part of the total supply so that any change in his own individual output has no effect on the market price. Consequently, his marginal revenue always equals the price of the commodity. Since profit is maximum when marginal revenue equals marginal cost and marginal revenue under perfect competition equals price hence under perfect competition price equals marginal cost. It was even stated that the marginal cost determines the price.

However, it was realised that when there was a monopoly in the market or the market was imperfect in some other way, the price is greater than marginal revenue as the demand curve facing an individual producer is, then, not horizontal, as it is under perfect competition, indicating infinite elasticity, but is sloping downward indicating less than infinite elasticity. This implies that the equilibrium price under monopoly and imperfect competition exceeds marginal cost. This makes the neoclassical hypothesis that price equals marginal cost a restrictive proposition valid in the case of perfect competition only. Nevertheless, its more general proposition derived deductingly from the profit-maximizing behaviour assumption, namely, producers fix a price and produce an output at which their marginal revenue equals their marginal cost would still be a valid deduction.

But the question is whether the business firms in the real world do actually seek to determine their price and output by equaling their marginal revenue and marginal cost. An important locuna of the neoclassical price theory was that it was never verified empirically. Therefore, this theory was, in fact, not a theory in the scientific sense but only a tentative hypothesis. The controversy over it was bound to take place and it did take place when it was put to an empirical test.

Self-Check Exercise-I

Q. Give the assumptions of Neoclassical Price Theory?

Ans .....

.....

.....

4.5 The Hall-Hitch Study Report

Hall and Hitch of Oxford University, England, were the first to put the conventional marginal cost pricing theory of neoclassical economics to empirical testing. They sent out detailed questionnaires to a reasonable sample to business firm in order to investigate empirically whether in the real-world business firms really do determine their prices and outputs according to the marginal principle as invariably stated in all the text-books on price theory, ever since the marginal revolution-took place in the history of economics. The results of their empirical study were published in their report under the title Price Theory and Business Behaviour in 1939. They reported that they were unable to obtain any date about the elasticity of demand, or about the relationship between price and marginal cost for the products of the business firms who were assisting them in their enquiry. It was because they did not operate along the principles of price output determination as expounded in the traditional marginalist price theory. Consequently, they did not feel the need of collecting and keeping data on marginal costs and marginal revenues, etc. which are of vital importance, if the business firm actually did behave in the manner in which they are shown to behave in the neoclassical price theory.

On the other hand, Hall and Hitch found that 30 of the 38 business firms who were assisting them in the enquiry tried to operate not according to the marginal principle but according to some form of pricing policy which Hall and Hitch described as the “full cost” principle. They explicitly emphasised that these firms appeared not to pursue the goal of maximum profits and they did not aim at producing an output which would equate their marginal cost and marginal revenue. Thus their empirical test clearly contradicted the marginalist price theory.

It may be contended by the upholders of the neoclassical price theory that the business firms might appear not to maximise their profits in the short period in fact, they argued, the firms may deliberately avoid producing an output that would equalise their marginal costs and marginal revenues in the short period and thus maximise their short-period profits, but they through this deliberate policy simply show their pragmatic preference for sacrificing immediate short-run profits for the sake of larger profits in the long run. Such an argument, though never mentioned in the text books on neoclassical price theory of otherwise in the context of perfect competition, has been mentioned by very few perceptive text-book writers in the context of monopoly (See W.J.L. Ryan, Price Theory). The Hall and Hitch study did not find any evidence to support this contention either. In fact, they emphasised in their report that the price behaviour of the firms, that they studied, was not just superficially different from that portrayed in the usual neoclassical economic analysis. On

the contrary, it was not inspired by the basic postulates of that analysis. They pointed out that the actual procedures followed by the different firms in determining their output and price were not identical, but the general pattern of their price determination was quite clear. According to them, it was a pattern which could be described as the full "cost" principle.

The conclusions of the Hall-Hitch study flew in the face of the conventional neoclassical price theory and clearly implied an attack on marginalism. This was the first salvo fixed against marginalism. It was followed further in the studies conducted by Lester, Oliver, Gordon, Andrews and Barback.

4.6 Attack on Marginalism

The major grounds on which the Hall-Hitch study and the later studies referred to above attacked marginalism may be described briefly as follow :

First, and fore most, it was pointed out in these studies that motivation for profit maximization on the part of the real-world business firms as distinguished from the imaginary entrepreneurs of the neoclassical model is so infrequent in practice that a theory which, like the neoclassical theory, starts with the postulate of profit-maximizing behaviour of business firms must produce unrealistic results. It is the basic postulate of profit maximizing behaviour of producers in the marginalist price theory which is its Achilles heel.

Secondly, they point out that the demand curves or schedules with the help of which the entrepreneurs of text books on marginal set price theory, do so much of their calculating and adjusting in order to arrive at the price-output combination ensuring for them maximization of profits are, in practice, unknown to them, whether as objective facts or subjective estimates. Hence the marginal theory is inapplicable in practice.

Thirdly, it is also contented against the marginalist theory that even if it is accepted for the sake of argument that marginal cost and marginal revenue can be equalised, they can not be kept in equality with each other in face of short-run changes in demand schedules as well as cost-schedules.

Fourthly, Hall and Hitch also pointed towards the unrealism of the marginalist postulate regarding the market structure. They observe that the market structure which is typical in the actual world is not that which is associated with perfect competition but one which is akin to oligopolistic structure. They contend that oligopolistic elements are much more common in the real-world markets than the conventional marginalist theory would acknowledge and recognise. As a matter of fact, it is the recognition of the oligopolistic nature of the real-world market structure which listed to the most forceful questioning of the postulate of profit-maximizing behaviour by the

critics of the marginalist theory.

In a paper, "Short-Period Price Determination in Theory and Practice", authored by Gordon and published in the June, 1948 issue of the American Economic Review, Gordon called attention to the fact that in the real-world business firms have non-pecuniary objectives also which find no recognition in the conventional marginalist theory. He stressed the point that these non-pecuniary and semi-pecuniary considerations probably affect the behaviour of business firms to a much greater degree, but their indirect effects on profits defy exact or even any kind of calculations. There are any number of such non-pecuniary or semi-pecuniary considerations such as; considerations of maintaining and even enhancing the good will of the firm preventing organisation of its work force into a recalcitrant union, maintaining a policy of selling through particular distribution channels, etc. Now, such considerations may have an influence on profits, but, argues Gordon, because the extent of that influence cannot be judged because the degree of attainment of the subsidiary objectives (i.e. non and semi-pecuniary objectives) itself usually cannot be measured, and because such objectives may only be pursued in large discrete steps, therefore for these reasons marginal adjustments of this kind of activities becomes out of question. As a matter of fact, such things as goodwill and the desire to maintain capacity working and avoiding the losing of employers may get elevated to the status of ends without any calculation of their effect on profits.

Prof. Barback, in his empirical study, Pricing of Manufactures, has also emphasised the above point. He argues, on the basis of his empirical investigations, that the business firms in real life do have non-pecuniary and semi-pecuniary objectives such as goodwill, liquidity, balance-sheet strength, prestige, retention of skilled labour, steady working of the plant and equipment, preservation of the firm's identity and distinctive character, the maintenance of the prestige of a brand name, and retaining an un-profitable line in order to fulfill customer's demand and to do so at the existing price. These objectives, says Barback, are so frequent and persistent that, although in the long run they may be reckoned to serve the end of increasing profits, yet they accord a place of their own. Marginal adjustments ubiquitously suggested the conventional marginalist theory can not be made in the case of the activity of pursuing these objectives.

Prof. Barback's study also finds no evidence for supporting the realism of the assumption of profit-maximizing behaviour by the firms which underlies the marginalist price theory. Profits are, no doubt, important for business firms but the degree of importance according to Barback, is not absolute. His finding support the view that the common situation is that a certain comfortable level

of profit is sought as a first requirement. Where ownership and control are not divorced from each other, such factors as worry and taxation enter to set a limit on the profit motive. There are other sellers and factors also which centre around ignorance of crucial facts and pursuit of competing ends. Barback concludes that firms do typically aim to increase their profit level to increase is not the same thinking as to maximise : the former does not imply the satisfaction of the conditions of marginal equalities. In actual practice the firms try to increase (not to maximise) their profits by trying to sell more at the existing prices whatever they may be.

The other findings of Barback as described here under also contradict rather than corroborate the deductive hypotheses of the marginalist theory. These findings are as follow :

(1) Business firms pay more attention to the immediate future as regards their price policies as remote future is very much less knowable and much more uncertain. In making the initial inestment decision, they might look at the longer horizons but where pricing is concerned, horizons end to be close without either the possibility or intention of profit maximization being present.

(2) Survival and the avoidance of loss at any time is considered more important than achievement of increased profits.

(3) All the firms examined by Barback first fixed their price upon some principle, which varied but which was never the marginal principle, and then sold as much as possible at that price.

(4) The evidence of Barback's inquiry confirmed Hall and Hitch thesis that business firms have very little knowledge of the elasticity of demand for their products and consequently in selling their prices they do not reckon in terms of (i.e. elasticity of demand) in a manner conforming to the marginal principle. They were found to be much more concerned with the fact of the fluctuating sales at any given price. In technical terms it implies that the firms were concerned more with the shifts in the demand curve facing them than with the shape of this curve.

(5) It was found that in situations of changes in demand and costs, the firms studied did not react in the manner as suggested in the marginal principle. So far as changes in demand are concerned, the firms set a price and then sold as much as they could at that price. The price could change under some circumstances of altered demand but normally it did not change. Barback supplies two powerful reasons for this type of reaction contradicting the marginalist theory. One of these reasons is fear of damaging goodwill, and the other is the fear of the damaging future growth of the market. A reduction of output to meet a fall in demand is generally resisted on account of the firm's desire to retain skilled employees. Their first reaction in such

circumstances is to increase sales effort. Where after by unavoidable, output may be, in the end, curtailed but cut in price is resisted. The important point to note is that output is responsive to changes in demand but price is not.

Gordon has also raised objections to the assumption, which is generally made in the marginal analysis, of single-valued continuous cost and revenue functions. For example as he points out, on the cost side, multi-product firms with common variable costs are forced to adopt more or less arbitrary criteria of cost allocation between different products.

In fact, they cannot make calculations of continuous changes in cost as the output of one of the products varies. In other words, calculation of marginal cost in such cases is not possible and the neoclassical equality of marginal cost and marginal revenue could not be effected even if the firms are supposed to be trying a attain that equality as sanctified in the marginal principle.

In addition to the above objections raised against the marginalist theory of pricing, the empirical studies have also questioned the realism of the assumption of perfect knowledge and absence of uncertainty thereof. The point is that once you allow uncertainty to enter the picture, the pursuit of the goal of profit maximization becomes even the more unrealistic and unwarranted assumption, thus showing the neoclassical marginalist price theory to be based on false premises. It is the continuous and many-sided state of flux in the conditions confronting firms in the real world which lies at the heart of Gordon's criticism of the marginalist theory. As things are, suggested Gordon, continuous adjustment amidst so much change is beyond them. And, uncertainty about the future not only makes the problem of marginal adjustments much more intractable but also imports its own problem into the picture viz., the pursuit of subsidiary objectives along side the aim of making profits and the problem of framing and explaining expectations, neither fits the marginalist mould, according to Gordon.

We may conclude the long discussion of the empiricist's attack on marginalism as regards pricing of manufactures is concerned with the observation of Barback : “The continuous and many-sided sate of flux in a firms environment involves it in such ignorance and uncertainty that in a theory of pricing it is necessary to abandon the demand curve, and with it the possibility of supposing that marginal adjustments can be made or marginal equalities achieved, unless by accident and then surely temporarily”.

6. Attack on Marginalism in the Theory of Distribution

In the preceding section we explained the major points of attack on the marginalist theory of determination of prices of manufactured or final goods.

But we know that the marginalists brought the theory of distribution or factor prices within the ambit of the general marginalists theory by presenting their marginal productivity theory of distribution. This marginalist theory is also deductively derived from the basic neoclassical assumption of profit-maximizing behaviour of the firms who employ different factors of production in order to produce the final goods. The employers are assumed to be balancing the revenue and cost of employing an additional unit of a factor on the margin. In parallel with the marginal analysis of price determination in the case of final goods, an employer's profits on the employment of an additional unit of it with constant quantities of the other cooperating factors adds to his total revenue an amount which is neither more nor less but exactly equal to the amount that would be added to his total costs by the employment of that additional unit of the factor. In other words, the marginalist theory of distribution hypothesises that each employer employs so much of a given factor as would equate for him the marginal revenue product of the factor with its marginal factor cost. If, however, perfect competition is assumed which is a key assumption of the original neoclassical model, marginal factor cost for a firm equals its average factor cost or the factor price. A further implication of this proposition is that the employers will vary the employment of a factor of production inversely with changes in its price, increasing employment when the factor price falls, and decreasing employment when the factor price rises.

Lester tried to test this theory empirically in the context of the factor, labour, and found it inconsistent with actual facts just like the marginalist theory of prices of final goods, in his paper, “Shortcomings of Marginal Analysis for Wage-Employment Problems” published in the March, 1946 issue of the *American Economic Review,* he presented the results of his empirical study. The conclusions were that most businessmen do not make the amount of employment they offer a function of wage sales, partly because the technological processes of some businesses required an invariable labour force with a given plant, or more generally, that repreatd changes in the amount of labour employed or in its capital equipment, to meet changes in the relative costs of factors concerned were impracticable. As a matter of fact, as far as theory of distribution is concerned, the neoclassical marginalist theory made a crucial but rather unrealistic assumption that factors of production can be freely substituted for one another and, therefore, factor propositions were assumed to be freely variable. But, as Lester's study points out, the existence of idle capacity, the cost of using which would be very low highlights the point that it is often not practicable to substitute capital for labour. Apart from the above two points which highlight the unrealism of the assumption of freely variable factor propositions Lester also found that many businessmen believed

that cutting back employment and output increases variable costs per unit of output, on account of which they did no respond to an increase in wage rates by cutting back employment and output. In the work-a-day would the firms are actuated with other considerations also. For example, they are actuated in their decisions by the state of their other books, that is, the current and the prospective demand for their goods, with the fulfilment of which the goodwill and reputation of a firm is involved.

In more recent times, P. Sraffa and his followers like joan Robinson have mounted a powerful attack on marginalism as regards the theory of distribution in general and the theory of capital in particular. The earlier attacks on marginalism that we referred to above in nature. But the attack of Piero Sraffa and his followers from the Cambridge University of England is rooted in logic. In the marginalist theory rate of interest (profit) is portrayed to be determined by and equal to the marginal product of capital. The contention of Piero Sraffa and his followers is that capital, real capital as distinguished from financial capital, cannot be measured unless we already know the rate of interest, while the rate of interest cannot be known unless we know the marginal productivity of capital for knowing which measurement of capital is essential.

4.8 The Full-Cost Pricing Principle

So far we had been engaged in examining rather sampling, the empiricist's attack on marginalism. We shall close this lesson with a description of the full-cost pricing principle which Hall and Hitch presented in their study, “Price Theory and Business Behaviour” published in the May, 1939 issue of the Oxford Economic Papers to which we have already referred above.

As we have already observed, the empirical study of Hall and Hitch led them to conclude that “the way in which businessmen decide what price to charge for their products and what output to produce costs doubt on the general applicability of conventional analysis of price and output to produce casts doubt on the general applicability of conventional analysis of price and output policy in terms of marginal cost and marginal revenue”. Apart from the practical problem of knowing the demand curve with its elasticity and all that facing a business firm, it was the basic assumption of profit-maximizing behaviour of firms in the conventional analysis for which they found hardly any empirical evidence. Instead, their empirical study revealed to them that in the actual world the firms try to fix their price and output according to a rule which can be described as the full cost principle.

Full costs have a specific meaning in the hypothesis of Hall and Hitch. Full costs have for Hall the Hitch, three components. The first and primary component is direct costs of production which are the same as the variable costs comprising mainly labour and raw material costs. The second component accounts for the

costs of fixed factors used in the production. And, the third component is the profit margin which is added to the sum of direct costs and overhead or fixed costs. While there is no problem with regard to the calculating of direct costs, there is a problem with regard to calculating overhead costs which are inputted costs; the problem is with reference to which level of output. These overhead costs are to be calculated. Hall and Hitch hold that businessman generally calculate their overhead costs on the basis of the expected or planned output in a given period or on the basis of some conventional or normal output. There is problem with regard to determining the profit margin which is added to the two types of costs already mentioned. The opinion of Hall and Hitch is that whatever else may be the detemining factor in this matter, their study revealed that it was definitely not a desire to maximise profits. In their opinion formed on the basis of their empirical study of business behaviour, the businessman generally added to direct and overhead costs, a profit margin which was regarded as normal or satisfying by them. The sum total of these three elements makes up the full costs. The businessman, according to Hall and Hitch fix their price equal to their average full costs, that is, full costs per unit of output.

It should be noted that the real-world business firms in the model of Hall and Hitch are oligopolistic firms which explains as to why these firms change a price equaling the average full costs rather than a price which would maximise their profits. In the first plan the firms believe that if they fixed a price higher than the average full costs, it might bring more than the normal or satisfying profits that are provided for in the full costs, but it contains the danger that the abnormal profits made thus possible might attract new firms into the field increasing the competition and decreasing profits even below the normal. Secondly, as we pointed out earlier also, the real world firms were discussed by Hall and Hitch to be ignorant of the exact nature of demand curve with its elasticity and all the which could help them in fixing a profit-maximising price, if they really behaved so as to maximise their profits and assuming that they were aware of the concepts of marginal revenue and marginal cost. In reality, their investigations revealed to them that the real-world businessmen were ignorant of these concepts. Lastly, Hall and Hitch also gave a reason which refers to a moral or ethical elements which is rather dubious. According to them, the businessmen behave according to the moral principle that there is a price which ought to charged and this moral or ethical price is the one which provides for a normal or first satisfying profit rather than maximum or just an abnormal level of profits. This price, according to this moral consideration, is a price which just equals the average full costs and this is the price which ought to be charged regardless of whether it is a period of booming business or depression.

The above also implies that having fixed the prices equal to the average full costs the firms would desist from changing it frequently. Full cost pricing,

according to Hall and Hitch, is resorted to an account of some tacit or open agreement among the oligopolistic group, considerations of long period demand and costs, and even some normal considerations. Frequent changes in prices are resisted because the consequences of such changes are uncertain. This last consideration led them to the hypothesis of sticky or rigid prices under oligopoly as embodied in the "kinky" models of oligopoly to which we have already referred in a preceding lesson. Prices are not changed frequently and, therefore, are rigid, because (a) when considering price cuts the firms fear retaliatory price cuts by rival firms, (b) although they are ignorant of rival firm's reaction to a price rise, yet they are afraid that the rivals might not follow (c) prices may not be lowered even by actual or tacit agreement because the firms are convinced that the demand for the "group" of products they are producing is not sufficient elastic to justify such a collusive decrease in prices, (d) prices may not be even raised through open or tacit agreement among the firms of the group for fear of new entrants in the long run which might endanger even their existing normal profit ; and, moreover, (e) changes in prices are frequently costly, a nuisance to salesmen and are disliked by both merchants and consumers. These factors explain the rigidity of prices under oligopoly.

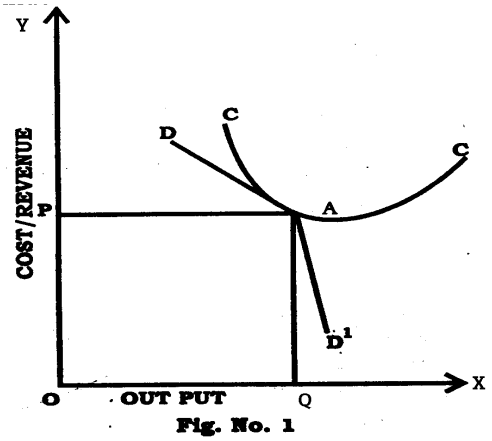


Fig. No. 1

Thus Hall and Hitch have combined the full-cost principle with the kinked-demand curve hypothesis to explain how prices are determined under oligopolistic condition. The kink in the demand curve facing an oligopolist develops at the full cost price level as shown in the Fig. No. 1.

In the above figure it is assumed that the firm has planned to produce OQ output either because it expects to sell this much of its output or because this is its

customary or conventional output. At this output the full cost per unit of output is QA which, as already explained, comprises average direct costs, average overhead or fixed cost and a profit margin. So the firm will fix its price at OP which equal the full costs per unit of output that is QA. The demand curve facing the firm is DD' with kink at A which corresponds to the price OP fixed according to the full cost principle. The position of the demand curve above the kink, that is the position DA is elastic because the firm is afraid that any increase in price effected by it will not be followed by the rival firm and therefore its own sales would be reduced proportionately much more than the increase in its price. This deters it from experimenting with an increase in price. Below the kink the demand curve is inelastic because the firm believes that any decrease in its price would be surely retaliated with a matching decrease proportionately less than the decrease in its price. Hence the firm does not experiment with a decrease in its price either. Thus the price remains rigid.

It can be seen that the general charge against the kinky models, namely, that they explain the rigidtly or stickiness of prices under oligopoly but do not explain how prices are determined under oligopoly, is not valid in the case of Hall-Hitch model explained above. It is because this model explains the determination of prices in terms of the full-cost principle and only then explains the rigidity or stickiness of price under oligopoly with the help of the kinked-demand curve hypothesis.

Self-Check Exercise-II

Q. Which study Report have combined the full-cost principle with the kinked-demand curve hypothesis?

Ans .....

.....

.....

LESSON NO. 1.5 **AUTHOR : DR. R. K. MAHAJAN**

AVERAGE-COST PRICING THEORY

1. Introduction

In the earlier lessons you have studied that the major goal of the firm is profit maximisation and the equilibrium price and output is determined by the conditions: MC=MR and MC curve cuts MR curve from below. But during the great depressions of 1930's and afterwards, the economists found that the actual behaviour of the firm in price determination, has not at all so. Marginal analysis of the firm was challenged by empirical analysis of the behaviour of the firm. This sets some economists thinking about the need for building a realistic theory of pricing.

Two investigations of pricing behaviour have been made in England, one by a group at Oxford University who interviewed thirty eight business tycoons, mainly engaged in the manufacturing sector and concluded that :

It casts doubts on the general applicability of the conventional analysis of price and output policy in terms of marginal cost and marginal revenue, and suggests a mode of entrepreneurial behaviour which current economic doctrine tends to ignore. This is the basis of price what we shall call the 'full-cost' principle.

The study of the group was published in Oxford Economic papers by R.L. Hall and C.J. Hitch under the title 'Price Theory and Business Behaviour in 1939. The second study was conducted by Clive Saxton which was published by Oxford University Press in 1941 under the title "Economics of Price Determination." Most other economists made efforts for giving an alternative theory/method of price determination. Most of the studies concluded that most of the enterpreneurs set prices of their products on the basis of cost plus, a fair profit percentage, and did not think in terms of

marginal cost or marginal revenue at all. By cost they usually mean full allocated cost at current output and wage levels. By 'fair profit' is meant a fixed percentage make-up which differs greatly among industries and among firms.

In nutshell, the Hall and Hitch study which was followed by many other empirical studies proved the practical irrelevance of MC=MR approach. They proved that the price policy in real life situation is based on some sort of 'cost-plus' formula. The price once fixed according to this principle will be stable, eventually with costs rather than with demand. A detailed discussion about the 'Average-cost principle' (A-C pricing) of 'Full-cost principle' is given in the subsequent paragraphs.

2. Objectives

he main objectives of this lesson are :

* to discuss the challenges to marginalism in introduction;
* to explain the representative model of Average-cost pricing;
* to examine the predictions when dynamic changes take place; and
* to assess the average-cost pricing principle critically.

3. AVERAGE-COST PRICING PRINCIPLE

We have discussed above that a number of economists have developed Average cost pricing models. The basic characteristic of model is that the price of the product is determined as :

P=AVC + GPM = AC

Where AVC = Average Variable Cost and GPM = Gross Profit Margin

In other words, the firm sets a price equal to its total average cost which includes a certain net profit margin.

3.1 AVERAGE-COST PRICING AND GOAL OF PROFIT MAXIMISATION

In average-cost pricing model it is assumed, explicitly and implicitly, that the goal of the firm is long-run profit maximisation. However, the profit maximisation goal is not achieved by maximising profits in each one period within the time horizon of the firm. It has been established that short run profit maximisation attained by marginal analysis (MC=MR) in each period does not lead to long-run profit maximisation as postulated by traditional theory. It is mainly because of the fact that the individual time periods (short run and a long run) are not independent of each other. Decisions taken in anyone period are influenced by decisions in earlier periods and will affect decision in future period. Therefore, marginal analysis does not correctly describe businessman's behaviour. Instead long run profit-maximisation is attained by equating price to the average cost of the firm.

3.2 DEMAND SCHEDULE

For analysing long run behaviour of the firm, we would require knowledge of its long run demand and cost schedules. In the wake of uncertainty it is difficult to prepare these schedules. The uncertainty is caused

by the fact that tastes of the consumers are continuously changing in the market and the reaction of the competitors is difficult to predict. Past experience do not help much in reducing the uncertainty in this dynamic and continuously changing world. Therefore, A-C-pricing theorists reject the demand schedule as a tool of analysis. However, in the traditional theory of the firm, demand schedule is one of the most important tools of analysis.

Self-Check Exercise-I

Q. In Average-cost pricing theory, when is long run profit maximisation attained?

Ans .....
.....
.....

3.3 A-C-Pricing and Cost Schedule

Long run costs of the firm are also uncertain. Rapid technological change and changes in factor prices make it impossible to obtain reliable estimates of the long run cost schedule. Thus average cost pricing theories take into consideration short-run average cost.

It is assumed that the short-run average variable cost has saucer-type shape. This is mainly because of the fact that firms build into their some 'reserve capacity' which is required for various reasons, For example (a) to meet seasonal fluctuations in demand; (b) to allow a smooth flow of production when break-down to plant occurs; (c) to meet a growing demand until further expansion of scale is realised; and (d) to allow for making minor changes in the design of the product whenever there is a change in the tastes of the consumers.

The shape of the average variable cost and other costs are shown in the figure 1. The decrease in short-run average variable cost (SAVC) is due to the better utilization of some of the fixed factors. So far the SAVC is falling the SMC is also falling.

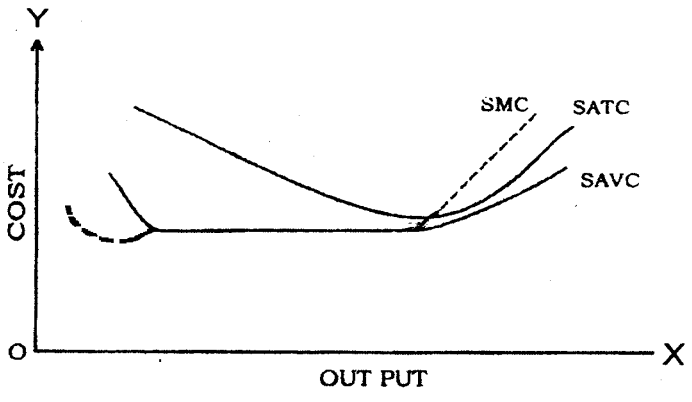


Figure: 1

The increasing part of SAVC reflects of the wastage of raw material, the higher repair charges and overtime payment to the labour force. When SAVC is rising the SMC lies about it. Over the flat stretch of the SAVC, the SMC is equal to the average variable cost. Pricing is based on the flat stretch of the SAVC.

When firms producing the output at a level less than the normal capacity, they will have high costs. But they will not charge a high price in order to cover their costs because they expect to eventually reach the normal range of output. Similarly when due to increasing demand pressure firms produce at increasing part of their average cost, they will not change a higher price to cover such costs because they are afraid of losing their goodwill.

4. PRICE DETERMINATION : 'THE MARK-UP RULE'

The determination of A-C pricing involves two stages :

(1) The firm defines the desired price (P) in order to cover its total cost when its plant is operating its optimal range of capacity and earn a reasonable' profit.

(2) The firm compares its estimated price with the level of price at which entry would occur, and sets the price at a level (P*) which would effectively discourage entry.

Subjective Estimate of the 'Desired Price'

For determining the desired price the firm used the mark-up or cost-plus pricing rule. According to this rule :

P = AVC + GPM

AVC is cost-plus :- It is assumed that average variable cost (AVC) is known to the firms with certainty. The flat stretch of the SAVC curve represents normal utilisation of the plant capacity of the firm. The aim of the firm is long-run profit maximisation. However, given the uncertainty in the environment, the firm bases its price decision on the short-run average variable cost (SAVC).

It is because of the fact that the firm believes that its cost will not increase even if it expands its scale in the long-run (rather cost may fall in the long-run due to economies of large scale). Thus the short-run average-cost is thought to be a good approximation to the long-run average-cost.

The 'Plus' in A-C Pricing :- The mark-up or gross profit margin (GPM) may be added to average variable cost. This GPM will cover the average fixed cost (AFC) and yield a normal profit :

GPM = AFC + NPM

AFC is calculated by dividing total fixed cost (TFC) with the 'planned' or 'budgeted' or the 'normal' output (X*). Thus AFC = TFC/X*.

The net profit margin (NPM) is known to the established firms as a matter of experience. The firms should yield a 'fair' return on capital so that capital keeps flowing regularly in the industry for investment in the long run. For a new product the firm is assumed to add the NPM which is 'safe' in the sense that it does not attract the entrants.

Actual Price Setting

It is not necessary that the 'desired' or 'standard' price (as experienced above) will, actually be charged. The 'desired' price may be taken as the initial basis of the actual price. The level of actual price depends upon the threat of potential entry. Actual competition by existing firms may be resolved by tacit collusion or price leadership. Tacit collusion takes various forms. The calculations of the actual price of the product are on the basis of average-cost data published by trade associations.

When the firms in an industry are having widely different costs, pricing on the basis of average-cost by each firm indepdently may result in market instability and price wars. For the smooth functioning of the industry, the firm with the lowest cost will be considered as the leader. The less efficient firms will be price takers. Although the price leader calculates the price of the product on the basis of average-cost rule, yet the leader will charge the actual price (P*) depending on two factors. (a) on potential competition; and (b) on general economic condition (Prosperity and depression). If the entry of new firms is restricted, actual price (P*) will be higher than the leader's normal price (P) who will be earning just normal profits. Thus GPM is competitively—determined by the threat of potential entrants. In other words the average—cost—pricing has a strong link with entry-preventing behaviour.

Gross profit margin is also readjusted when an entrant charges a low price. It is found that in a seller's market a higher GPM is generally charged when general economic conditions are booming. But in periods of depressed business the GPM is downward readjusted.

Let we explain the determination of price in our 'representative' average-cost pricing model with the help of Figure-2. The horizontal lines are not demand curves, but show the price that would be charged under certain conditions.

In Fig. 2 the SATC curve includes the net profit margin. The price leader would normally desire to charge the price P (or OP) which is equal to short-run average cost (aX*) and his 'gross profit margin' (ab). At OP price the price leader would sell the budgeted output (X*).

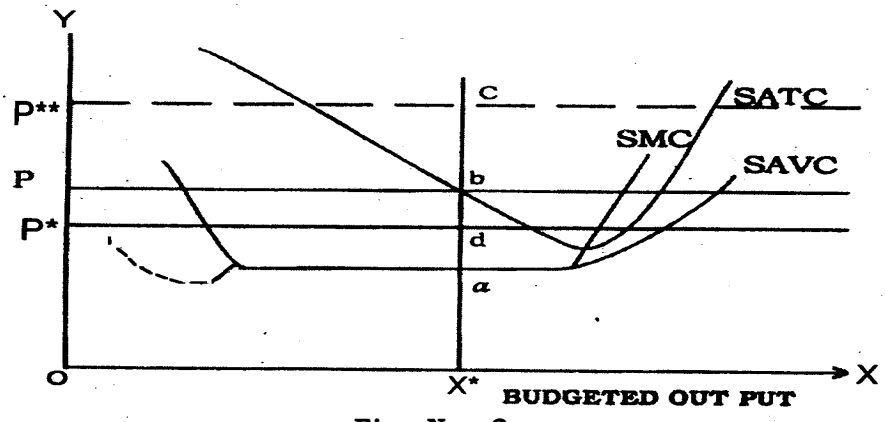


Fig. No. 2

However, if barriers to entry exist (or their is booming business) the leader would charge the price P*. It is evident from the figure that the effective GPM at P* is ac which is greater than ab (ac > ab). If the threat to entry is strong (or there is depressed business) the leader would charge the price P*. Which is lower than the 'initial' or 'normal' price P. In this case, effective GPM would be ad<ab.

From the above discussion it is clear that average-cost pricing model discards demand curves. Price is mainly based on the costs of the firm. These costs are short run costs because the long run costs are infected by uncertainty.

Self-Check Exercise-II

Q. Give the two stages in determining Average cost pricing?

Ans .....

.....

.....

Prediction of A-C Pricing Theory in Changing Market Conditions :

Let us see what happens to Average-cost pricing when there is a change in costs, change in demand and imposition of a tax.

Change in Cost : A minor change in costs may not be passed on to consumers rather the firm would tend to absorb it. This may be done by way of variation in quality or quantity of the product. For example, suppose a small increase in the cost of production is there by way of increase in factor prices. The firm may offset the loss by way of new packing or reduce the quantity of the product. Similarly, if there is minor decrease in price of the product due to a small decrease in price, the firms would improve the quality or increase the quantity of the product.

However, it there is a substantial change in cost, the price of the product will be changed accordingly. For example, a substantial fall in cost due to mechanical progress in industry or fall in factor prices will result in decrease in price, otherwise the supernormal profit would attract, new entrants which will endanger the long-run profitability of the existing firms.

Change in Demand : If there is increase in demand, the firms in the short-run will follow queuing policy (first come, first serve principle) rather than rush for increase in price. It is mainly because of the fact that the firms are uncertain whether the pressure of increase in demand will last for long. They will also not like to damage their goodwill by exploiting a 'temporary sellers' market, The price of the product need not rise when the increase in demand persists. The firm will install new equipment and expand their capacity which lowers long run average cost (LRAC). This expectation of LRAC deters firms from rising the price of the product.

Similarly, if demand declines in the short run firms would avoid increasing in the price to cover probably high cost. In this condition, while holding the price unchanged, the firm would search for the causes of decline in demand. For example there may be a change in the tastes of the consumers, the firm would make some necessary improvements in the product so that it suits according to the tastes of the consumers. But if there is secular decline in demand price, the weak firms (faces with decreased liquidity) may resort to price-cut. This may lead to price war. The efficient firms would emerge from this price war and the market would settle to a new equilibrium.

Imposition of Tax : The imposition of a corporate tax (lump sum or profit tax) will affect all the firms of the industry. As a result, the tax will be shifted on the customers hence firms will raise the price of their products. Similarly, the imposition of the direct tax per unit of output would shift AVC upwards and, even if the GPM remains the same. Therefore, the price of the product would increase by the full in the amount of tax.

It is evident that both corporate and specific tax will pass of the customers. In the former case the AFC will shift upward and the GPM will be accordingly readjusted, while in the later case the tax per unit of output shifts upwards the AVC.

5. CRITICAL EVALUATION OF AVERAGE-COST PRICING

Most of the models of the A-C Pricing and based on empirical tests with the help of survey method. The finding of many of these surveys have come under attack on the following grounds :

(a) Small and non-random business survey using questionnaire and interviews are unreliable method of obtaining data on price determination ;

(b) The results of such surveys have been misinterpreted and

(c) The marginalist explanation of price determination has been incorrectly presented and therefore unduly criticised.

Other criticisms of A-C pricing principle are :

1. The average-cost pricing theory is not different from other known theories of the firm. For example, average costing rule of pricing are compatiable with Baumol's sales maximisation hypothesis, Cyert and March's satisficing behavioural model, with short-run marginalistic profit-maximisation behaviour and with long-run profit maximisation.

2. If should be clear that the 'mark-up' margin would be different, depending on the goals of the firm, and hence the price level would be different. Thus, unless we know what the goals of the firm are, it is not possible to come to know from the pricing rules of thumb whether it is a sales maximiser, or a satisficer, or a firm aiming at the long run profit maximisation because all these motivations may bet attained by applying an average-cost

routine in price setting. However, the empirical evidence regarding the goals of the firm is far from conclusive. However there are certain merits of average-cost princing principle :

(a) Average cost pricing is easier to apply, because the concepts it involves are familiar to business persons and accountants, while the concept of elasticity is not perhaps understood by the average business person.

(b) Average-cost pricing rule facilitates price setting in multi-product firms. In these firms acquisition of information on price elaticities for all products is both difficult and costly.

(c) Trade associations publicise information of costs of individual product lines. These informations can be very well utilised in calculating the average-cost pricing.

Baumal's Sales Revenue Maximization Model and Bain's Theory of Limit Pricing

Structure:

I. Introduction

II. Objectives

III. Baumal's Sales Revenue Maximisation Approach

i) Single Product Model: Price and Output Determination with Sales Maximization

ii) A Single Product Model with Advertising

iii) Sales Maximization in a Multi-product firm

IV. Bain's Limit Pricing Theory

i) Assumptions

ii) Barriers to entry and limit price

V. Summary

I. Introduction: The traditional models of price theory are generally based upon the assumption of profit maximization being the sole objective of the firm. But practically, the firms may be working on many other objectives other than the objective of earning handsome profits. Under oligopolistic market conditions, in order to play safe, the firms accept a 'reasonable' amount of profits so that their share in total demand remains stable. The firms may be lowering its price to avoid an entry by a new firm which will otherwise eat into its share of market. Besides, in large corporations where ownership is separated from management, the objective of sales maximization may take the place of profit maximization because the managers may be more interested in sales maximization with stable profits. In this perspective, the theories given by Baumal and Bain are diversions from the traditional theories aiming at the goal of profit maximization. These theories explain why the profit motive lags behind other non profit motives and how the oligopolist behaves when he works on motives other than the motive of profit maximization.

II. Objectives : The objectives of the present lesson is to provide an insight into more practical theories of the firm. These theories are closer to the reality as compared to earlier theories. These theories enable us to understand the behavior of the firms in real life and answer the question why the firms are not always charging profit maximizing price.

III. Baumal's Sales Revenue Maximization Approach:

Neo-Classical analysis of firm is based on the assumption that profit maximization is the ultimate objective of a firm. Prof. Baumal has challenged this assumption. He argues that manager-dominated large firms are more interested in maximization of sales rather than profits. Modern firms measure their success by growth in sales and market share. Actually, Baumal worked as a consultant to several large firms and his experience showed that managers are more interested in promotion of sales. By sales, he meant revenue earned by selling the product. His hypothesis is called 'Sales Revenue Maximization Hypothesis'. However, firms do not ignore profit motive altogether. A certain minimum level of profits is necessary not only to finance the future expansion plans of the firms but also to provide enough dividends to its shareholders to keep them satisfied. So, the firms have to work under the minimum profit constraint. But, once this objective is achieved, promotion of sales becomes the major objective. In other words, the firms seek to maximize their sales revenue, subject to a minimum profit level. There are several reasons why managers are more interested in sales e.g.

- Evidence suggests that salaries and other earnings (incentives) are correlated more closely with sales than profits.
- Banks and other financial institutions are more willing to finance firms with a large and growing volume of sales.
- Firms with growing sales, find it easier to keep their employees happy.
- Growing sales give prestige to the managers whereas the profits go into the pockets of the shareholders.
- A firm with growing sales is able to increase its market share and so its power to adopt competitive tactics also increases.
- Managers prefer 'steady performance' to 'spectacular performance'. The steady performance can be achieved only by sustaining the level of sales.

Further, Baumal explains that though, there is an element of interdependence among firms in the market, especially when they make radical changes, but while adopting routine changes they believe that other firms would not react to their actions. Besides, the internal organization of large firms is so complex that decision making process is very long. So, even if the rival firms react, it will take a long time for them to adjust themselves accordingly. However, other firms will react quickly if there is a threat to their market share as they are also sales maximizing firms.

The basic assumption of this model is that the firms try to maximize their sales subject to constraint of minimum profits. The minimum level of profits is exogenously determined by the demand of its shareholders, banks and

other institutions. The model assumes conventional U-shaped cost curves and negatively demand curves.

Self-Check Exercise-I

Q. Give any two reasons why managers are more interested in sales?

Ans .....
.....
.....

Explanation of the Model:

i) Single Product Model: Price and Output Determination with Sales Maximization

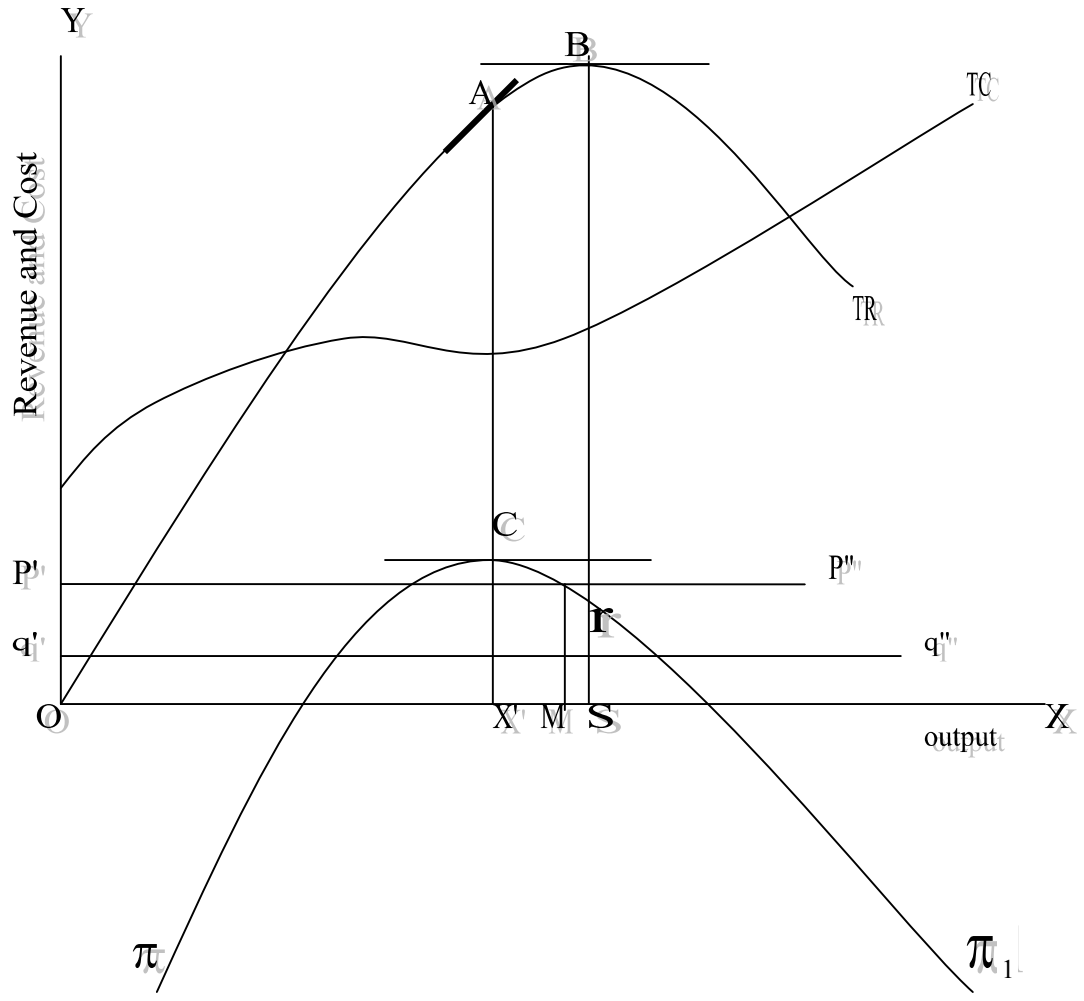


Diagram: 1 Single Product Model: Price and Output Determination with Sales Maximization

In this diagram, total sales revenue is maximum at point B, where the slope of TR curve is zero. At this point the firm produces OS level of output. π π1 is the profit curve of the firm, which is derived from the difference of TR and TC curve. The diagram shows that the profits of the firm are maximum at point C, where the slope of the profit curve is zero but the slope of the TR curve is positive. The profit maximizing output of the firm is OX'. But as the firm is a sales maximiser, subject to a minimum profit, it will chose output level OS, with minimum profit constraint of q'q". At this level of sales the firm is earning Sr level of profits, which is greater than the minimum profit constraint of oq' level of profits. Baumal says that the constraint of minimum profits becomes operative only if it comes in conflict with the goal of sales maximization e.g. if firms aims to get OP' minimum level of profits, then the firm will be selling OM, instead of OS because by selling OS amount the firm will be getting Sr amount of profits which is less than the minimum acceptable profits (OP'). Thus, in this case the firm will try to maximize its output subject to minimum profits and chooses output OM, which is greater than the sales maximizing output OX' and slightly less than the sales maximizing output OS.

Besides, an increase in fixed cost of a firm or imposition of lump-sum tax can also change the equilibrium position of the sales maximizing firm. An increase in fixed cost shifts the total profit curve downwards (because the profits are difference of total cost and total revenue). As a result the firm will reduce its output and try to increase the price of the product to shift the burden of increased cost on the consumers. Diagram 2 shows the equilibrium output of the sales maximizing firm with constraint of minimum profits.

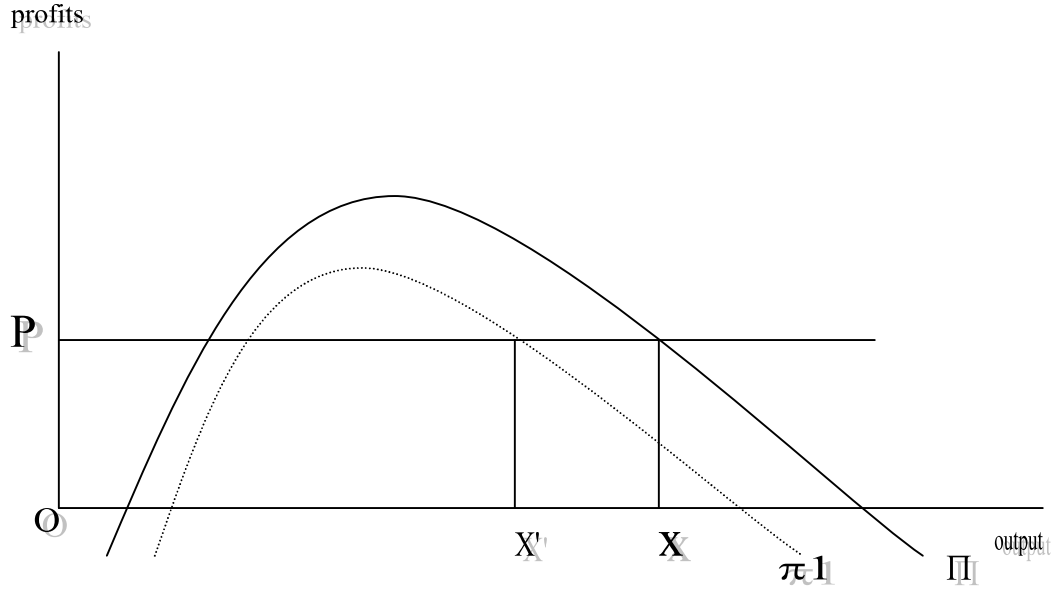


Diagram 2

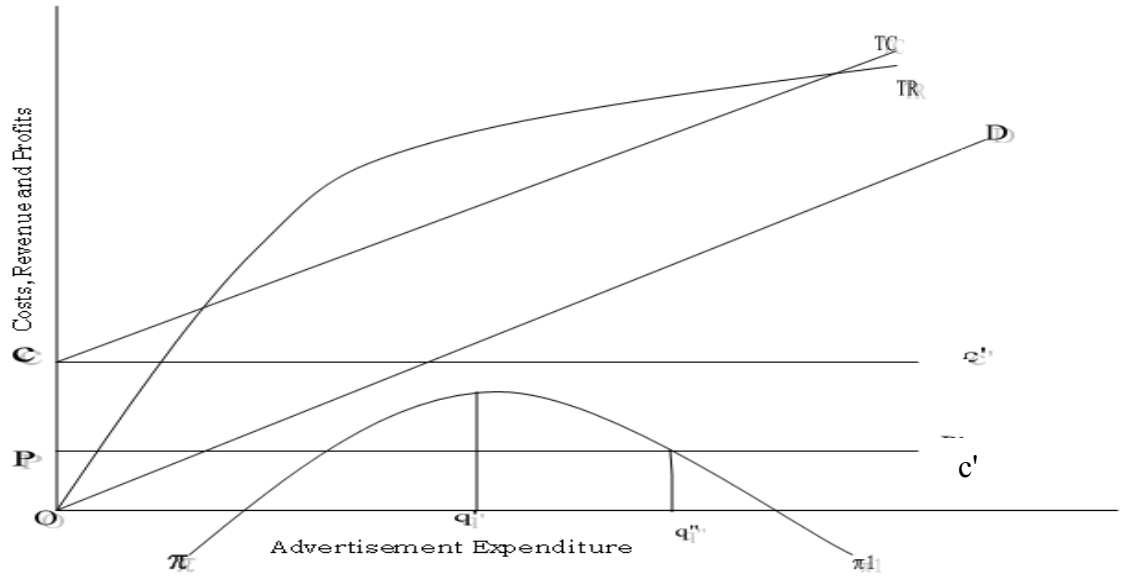
Diag 2 shows that with increase in the fixed cost, the profit curve of a firm shifts downward from Π to π1. If the minimum acceptable level of profits for the firm is OP, then the firm will reduce its output from OX to OX' after an increase in its fixed cost.

Baumal explains in his theory that under profit maximization strategy, the change in fixed cost does not change the equilibrium position of the firm in the short run because any change in fixed cost, does not change the position of the marginal cost curve. So, there will be no change in the equilibrium position of the firm in the short run.

ii) A Single Product Model with Advertising:

Under oligopoly, non price competition is the main form of competition. Although Baumal's model focuses on advertising, the other forms of non-price competition such as product change, service and quality can also be analysed along similar lines. Baumal assumes that sales revenue increases with increase in advertising expenditure, though at a diminishing rate. Advertising shifts the demand curve of the firm to the right and the firms are able to sell more and earn more at a given price. Besides, Baumal assumes that production costs are independent of advertising cost and price is also assumed to be constant.

Firms in an oligopolist market will always prefer to increase their sales by advertising instead of a price cut. While effects of a price cut are uncertain, advertising will always increase sales revenue. Therefore, a sales maximiser will go on increasing advertising expenditure until he is stopped by profit constraint.

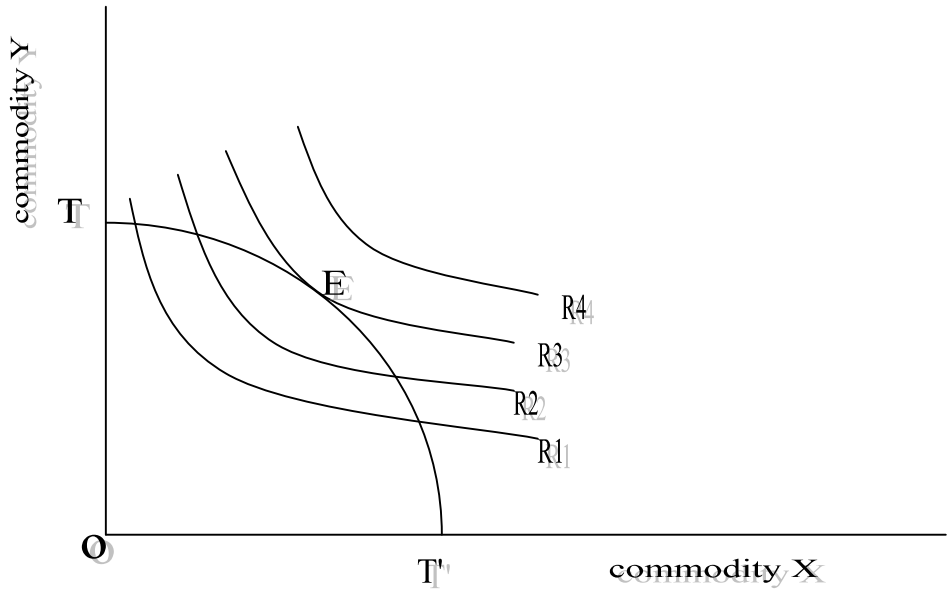


Diag. 3 : Sales maximization with expenditure on advertisements.

In above diagram, advertising expenditure is taken along X-axis and cost revenue and profits along Y-axis. Production cost CC' is shown to be independent of advertising expenditure. By adding production and advertising cost, we get total cost which is a function of advertising expenditure. Total profits are obtained by subtracting TC from TR. We can see clearly from the diagram a profit maximiser will spend Oq' on advertising while the expenditure of sales maximiser will be higher i.e. Oq" as the sales maximiser will go on increasing his advertising expenditure until he is stopped by minimum profit constraint of OP level of profits. There is no possibility of unconstrained sales maximization under this model because total revenue does not have a peak value as it goes on increasing with increase in advertising expenditure.

iii) Sales Maximization in a Multi-product firm:

In real world an oligopolist firm may be producing a number of products and using a number of inputs. By using two products and two inputs model, we can see how a sales maximiser will choose his output.



Diag. 4 Sales Maximization in a Multi-product firm

Let us assume that the firm produces two products X and Y. TT' is the transformation curve, showing various possible combinations of X and Y with given outlay of the firm on two products. R1, R2, R3 and R4 are the iso-revenue curves of the firm. Under the given conditions the sales revenue of the firm will

be maximum at R3, on point E. a profit maximiser will also produce combination E as sales revenue and profits will be maximum at the same point because the costs are fixed in this diagram. The equilibrium is attained when

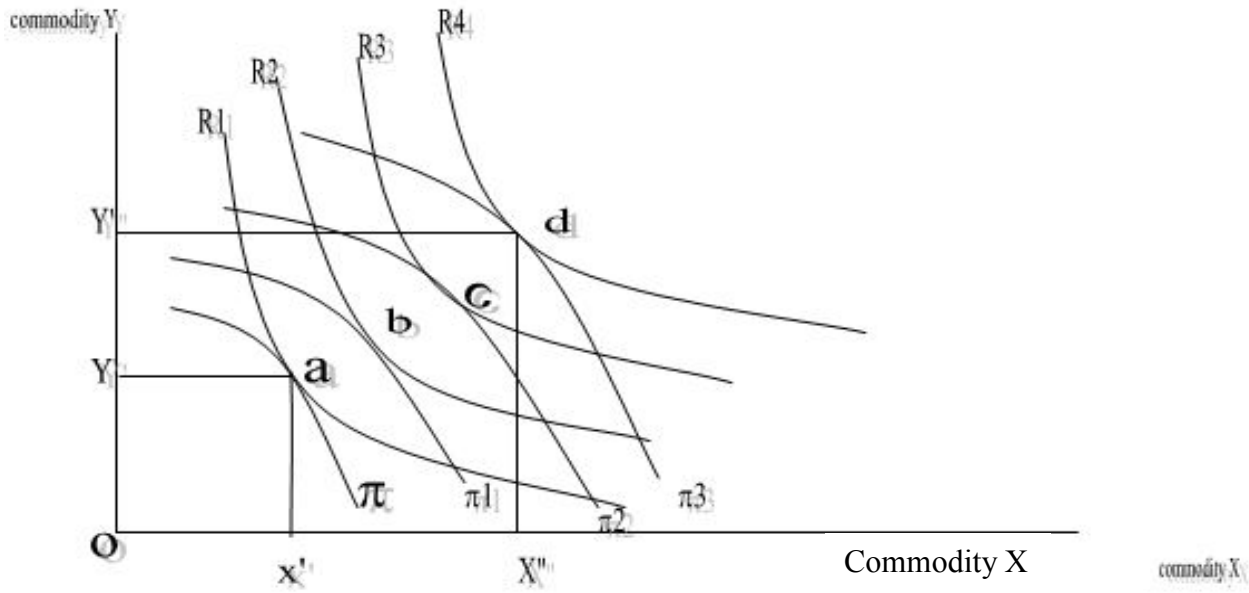
$MRT_{yx} = \frac{MR_x}{MR_y}$ (slope of iso-revenue curve).

However, if resources are not fixed and a firm can use increased quantity of inputs to produce any product, the equilibrium of a profit maximiser will be different from that of a sales maximiser. This can be shown by using iso-revenue as well as iso-profit curves. The iso-profit curves are concave towards origin showing that profitability of x and y decreases after a certain level of output due to downward sloping demand curves. Since products compete for resources of firms, an iso-profit curve nearer to the origin shows higher profits.

The diagram 5 shows that a profit maximiser will choose point a where its profits are maximum and it produces combination X' and Y'. In case of a sales maximiser with a profit constraint the combination d will be produced and sales revenue will be highest at R4.

Two major implications of Baumal's model are:

1. Output will be higher and prices will be lower in this model as compared to the profit maximizing model.
2. prices remain sticky as under sales maximization straegy, the producers tend to increase advertising rather than lower the prices of their product.



Diag. 5 : Sales maximization in a multi-product firm with variable inputs

Though, the model by Baumal is a break from the earlier theories on oligopoly, yet, it has also invited criticism from various scholars e.g. W.G. Shepherd had criticized the model by Baumal, on the ground that it analyses oligopolistic market with usual demand curves, while the demand curves under oligopoly are kinky. If the kink is large enough, profits as well as sales will be maximum at the same level of output. However, this criticism is invalid if firms indulge in non price competition.

C.J. Hawkins has criticized Baumal's conclusion that a sales maximiser will produce more and spend more on advertising expenditure than a profit maximiser. Actually, the sales maximiser spends on advertising only after calculating the responsiveness of revenue to advertising and a price cut. He would spend on advertising if the responsiveness of revenue to advertising is greater as compared to that of a price cut.

To sum up we can say that Baumal's approach is a significant alternative to the profit maximization approach and so, it brings us close to reality.

IV Bain's Limit Pricing Theory:

J.S. Bains, through his paper 'A Note on Pricing in Monopoly and Oligopoly' in 1949 and then in his book *Barriers to New Competition*, published in 1956, formulated the Theory of Limit Pricing. Bains made a distinction between 'actual competition' among established firms and 'potential competition' arising from threat of new entry of firms. According to Bains, existing firms recognize their interdependence and take their decisions on basis of actual competition. At the same time, the threat of potential entry is also an important determinant of pricing policies of firms. On the other hand, the traditional theories of monopoly and oligopoly do not take into account the threat of a new entry. Under perfect competition and monopolistic competition, only the effects of actual entry are analysed for long run equilibrium. Besides, the model by Cournot, Edgeworth and Chamberlin are closed models as they do not allow any new entry in the market. In contrast to it J.S. Bains emphasizes that the decisions of the firms are influenced not only by actual entry but also by potential entry. The firms under oligopoly do not just aim to maximize their short run profits, as these may induce new firms to enter the market. Entry of the new firms will reduce profits of the existing firms in the long run. So, existing firms do not charge a price that will maximize their short run profits, rather it will charge a lower price to prevent the entry of new firms. This is known as limit pricing or entry preventing pricing. Limit price is the highest price, which the existing firms think they can charge without attracting new firms to the industry.

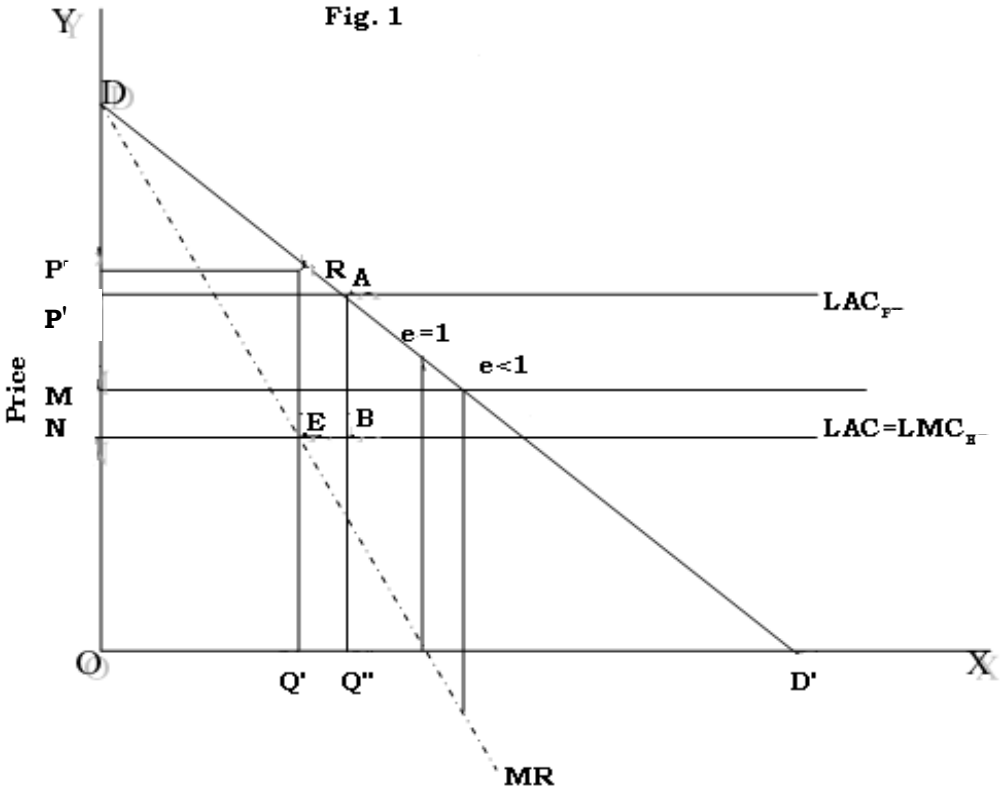
i) Assumptions: Bains analysis of Limit Pricing is based upon following assumptions:

1. There is existence of collusive oligopoly, where firms collude to set a price that will prevent the entry of new firms.

2. Product of all the firms in the industry as well as of potential firms is homogeneous.
3. In each industry, the economies of scale have been fully realized and so, the cost has reached the minimum scale.
4. The cost remains constant beyond the optimum scale and cost curves of the existing as well potential firms are known.
5. The long run average cost curve (LAC) is same for all of the existing firms.
6. The market demand curve is known to all the firms- existing as well as potential.
7. Price is same for all firms as they are selling a homogeneous product.
8. All firms have equal market share not only among the existing firms but the potential entrants as well. This share of market demand remains constant at all price levels.
9. The existing firms seek the maximization of their long run profits.

While deciding about the level of Limit Price, the oligopolists calculate a number of things, e.g. the expected cost of the potential entrants, their own long run average cost, the size of market and price elasticity of demand, so that the potential entrants do not have any incentive to enter the market. The determination of limit price is explained by Fig. 1. In the figure, DD' is the demand curve of a firm under collusive oligopoly, MR is the corresponding marginal revenue curve and the LAC=LMC curve is the long run average cost curve of the existing firms. E is the point of equilibrium as the long run average cost curve cuts long run marginal cost curve at this point. The profit maximizing output is Q' and profit maximizing price is OP' with P'REN total profits. This price is even greater than the cost curve of the potential entrants. So, this price may attract new entrants in the market. With entry of the new firms, the existing firms will have to lose some part of their sales as the total market demand will be distributed equally among all the firms (due to assumption of homogeneity of the product). This uncertainty induces the existing firms to adopt some entry prevention price. So, instead of fixing profit maximizing price, the existing firm may fix the price at P", which is equal to the long run average cost curve of the potential entrants i.e. LAC'. At this price the existing firms, still will be earning super normal profits as this price is greater than their long run average cost. But as far the potential entrants are concerned, they will be discouraged to enter the market at this price because after their entry, the supply of the product will increase, which will further reduce the price below OP" i.e. below the average cost of the potential entrants. In other words, at the post entry price the potential entrants will have to suffer losses. Therefore, they will not be interested to enter the market at the price OP", that is why this price is known as entry preventing price or the limit price. But at this price the existing firms will be enjoying total profits equal to P"ABN,

which is less than the equilibrium profits. Thus, the firms are sacrificing some of their current profits to prevent new entry of the firms and thus avoiding uncertainty of their profits in the long run.



With his limit pricing approach, Bains tried to explain why sometimes oligopolists choose a price where marginal revenue is negative and elasticity of demand is less than unity. If OM is the long run average cost curve of the potential entrants, the firms will still set their limit price at this level, even though their marginal revenue is negative for this price. With OM cost of the potential firms, the existing firms will be forced to limit their price at this level as it will be preventing the entry of new firms and it is still higher than their own average cost. Thus, even if the marginal revenue is negative at this price, the existing firms are successful both in preventing the entry of new firms and still earning profits.

Self-Check Exercise-I

Q. What do you mean by limit Pricing?

Ans .....

.....

.....

ii) Barriers to Entry and Limit Price:

By a new entry, Bain's means establishment of a new productive capacity by new firms. Here, Bains differentiate among a takeover, cross entry and new entry. According to Bains, Takeover of an existing firm, increase in productive capacity by an old firm and cross entry i.e. entry by a firm which is established in another line of products is not considered a new entry.

Bain's in his work 'Barriers to Entry' explained why oligopolists were able to set limit price above the competitive price. It is because of the cost difference between existing firms and the potential firms. This comparative cost advantage acts as a barrier to entry. This difference of costs determines the margin by which the existing firms can reduce their price in order to prevent new entry. Bain's calls it 'Condition to Entry', by which he means the margin or the extent to which the established firms can raise their price above competitive price without inducing entry (competitive price is equal to the LAC or ON).

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

where, E stands for condition of entry, P' is the limit price and P is competitive price (=LAC)

$$EP = P' - P$$

$$EP + P = P'$$

$$P' = P(1 + E)$$

Thus, E is the premium earned by existing firms due to difference in cost conditions of the existing and potential firms.

Entry, according to Bains is a long term phenomenon. Any firm takes time to enter a market and start its production. Though, this time can vary from industry to industry, the length of this time can also be an important determinant of barriers to entry. The longer is this time lag, the lesser will be threat to entry. The lag to entry i.e. the time required to establish a new firm depends upon various factors which determine the barriers to entry. These are discussed below:

Product Differentiation Barriers: Traditional theory stresses that product differentiation gives firms a degree of control on the price of the product. Advertising and selling activities also intensify the product differentiation and create preference among consumers for their product.

Product differentiation also creates a strong barrier to entry. If the preferences of consumers are strong for existing brands, new entry will be difficult. A new firm will be able to attract customers of other brands by either offering a very low price or by heavy advertising and selling cost.

Bains study of twenty manufacturing industries showed that product differentiation was the most serious barrier to entry. The strength of this barrier depends upon the size of advertising and selling costs required to create goodwill. It also depends upon the durability and complexity of products because while purchasing such products buyers rely on reputation which new firms do not have. But, product differentiation may also work in opposite direction as it may also encourage entry. In the modern industrial world product innovation is the main weapon of competition. Therefore, a new entrant may be encouraged to introduce a new styled product.

Absolute Cost Advantage: Absolute cost advantage enjoyed by established firms over new entrants also acts as a strong barrier to entry. This advantage can arise out of various factors viz a) skilled and experienced management personnel; b) patents and superior techniques available to established firms; c) control over supply of key raw materials; d) lower cost of raw materials to established firms due to exclusive arrangements and due to bulk buying; e) lower cost of capital for established firms as new firms have to pay a higher rate of interest for raising funds and f) lower cost of production for established firms due to integration of processes and backward and forward linkages.

An absolute cost advantage barrier loses their significance if new entrant is already an established firm in the same industry but was producing another line of product. Such entrant has its own managerial staff, technical know how, an access to raw material, internal financing and capital market. Even if the new entrant is not a established firm it can also have an edge over the existing firms, when it brings up to date machinery while existing firms have the old machinery are reluctant to replace it immediately. Besides, a new firm can take better decision regarding the location of the plant.

Barriers from Initial Capital Requirements: A new entrant needs a large amount of initial capital. The required amount of initial capital depends upon the technology of the industry in which the entry is considered. If the existing firms have integration of processes, new firms will have to enter with fully integrated production units. Therefore, capital requirements of new firms will be high. Also, the banks may be reluctant to finance a new firm and capital market is almost inaccessible to the new firms. Even if the new firms are able to arrange the funds, they have to pay a higher rate of interest.

Economies of Scale: Economies of scale enjoyed by existing firms may be real or pecuniary. Real economies are those which result from lower inputs used per unit of output. They may be technical (resulting from using a more efficient large scale plant), managerial or labour economies (resulting from greater specialization). Pecuniary economies arise from bulk buying at lower prices, lower transportation cost when output is large and lower advertising and selling

cost per unit of output. When economies to scale are very large, barriers to entry are very strong.

V. Summary: Above discussion shows that the firms under oligopoly work on the objectives other than that of the profit maximization. The model given by Baumal suggested sales revenue maximization as an alternative to goal of profit maximization. He gives two cases –one is that of a single product firm, with or without advertising and another is that of the multi-product firm. Baumal found that the managers are more involved in maximization of sales than profits, as their own utility function maximizes with achievement of goal of sales maximization of profits. On the other hand, Bain explained that the oligopolist firms charge less than the equilibrium price to control the entry of new firms. Bain suggests that firms are more interested in the long run profits than the short run profits. So, in order to ensure long term profits, they put barriers to new entry in the market by charging such a price which discourages the new firms to enter the market. In this way they avoid uncertainty in future regarding their share of market and so the long run profits.

LESSON No. 1.7 **AUTHOR : KANWALJIT KAUR GILL**

BALBIR SINGH

MANAGERIAL THEORIES

The chapter consists of two managerial models:-

(A) Marris's Model of Growth of Firm

(B) Williamson's Model of Managerial Discretion.

(C) Sylos-Labini model of limit Pricing

(A) Marris's Model of Growth of Firms
1. Introduction
2. Objectives
i) Objectives of the owners or shareholders
ii) Objectives of manager
iii) Objectives of the firm
3. Contraints
i) Managerial constraint
ii) Job security constraint
iii) Financial security constraint
4. Equlibrium of Firm and the Mechanism of its Growth
B) Williamson's Model of Managerial Discretion
i) Main proposition of williamson's model
C) Sylos-Labini model of Limit pricing

1. Introduction

Marris's theory of growth of firm is applicable to the firm which is owned by shareholders and managed and controlled by the managers. It is also known as the model of 'managerial enterprise'. Since objectives of shareholders and the managers are different (though they are interrelated), these effect growth of the firm differently.

2. Objectives

i) Objectives of the owners or the shareholders are: maximising the return on their investment in the firm. This implies that dividend and the capital gains should be there throughout the life of the firm. This is possible only when the market value of the equity shares of the firm is high, and it is earning sufficient profits. If the profitability or the market value of the shares of the firm declines, there is all possibility that firm may start dying, or it may be taken over by the other firms. In this situation there will be threat to the job security of the manager also.

ii) Objectives of manager are mainly concerned with his job security. Manager's interests are tagged with higher pay, perks, position, power, prestige etc. This means they are interested in the higher rate of growth of the firm, to ensure his continuity.

Thus **'security constraint'** is the basis of Marris's model of growth of firm, since it provides security of profits to the shareholders and security of job to managers of the firm.

Marris's theory is basically related with stock market changes in the value of shares. Present market value of the firm is determined by discounted stream of future earning, dividends, plus capital gains of current shares. It is calculated by a simple formula: Higher the expectations of the earnings by shareholders, greater will be its value in the stock market and vice versa. Thus goal of profit maximisation, is directly linked with consistent growth in market value of the equity shares of the firm.

From the above discussion we can state goals/objectives of firm, owners or the shareholders and of the managers categorically as follows :

iii) Objectives of the firm :

- balanced rate of growth of the firm (g), via;
- maximisation of rate of growth of demand for the product of the firm (g_d) and
- maximisation of growth of capital supply (g_c)

i.e. $g = g_d = g_c$.

Objectives of the owners or the shareholders are :

- maximisation of profits
- maximising the rate of return over their investment realised through dividend and capital gains
- Steady rate of growth of the firm throughout its life,
- Consistent growth of the market value of equity shares.

The last two objectives are related with having public image in the market.

Objectives of the Managers :

- job security;
- higher pay, perks, power, position, prestige etc.; and
- maximisation of rate of growth of the firm and not the absolute size.

The objectives are also known as utility function of owners (which include profit, size of output, size of capital, share of market and public image) and the utility function of managers (which includes pay/salary, status/position, power, prestige and job security). By maximising the objective of the firm i.e. rate of growth of demand and capital, managers and the owners maximise their utilities.

The mechanism of the growth of firm can be explained with the help of certain relationships subject to certain constraints. These constraints are also explained by Penrose. These are as follows :

3. Constraints :

(i) Managerial Constraint

(ii) Job Security Constraint

(iii) Financial Security Constraint

(i) Managerial Constraint :

At any point of time the capacity of the top management is given. In other words we can say that there is a ceiling to the growth of the firm set by the capacity of its managerial team. Managerial capacity can be increased by —

- hiring new managers;
- training the existing managers with the help of research and development
- co-ordination and cooperation of the existing staff

But when new managerial staff is arranged it may face various difficulties. He will be altogether new to the system and it will take time to adjust with the production process and 'learn' the mechanism of the new organisation. Further, rather than shifting from one place to another managers prefer to be promoted within the same growing organisation rather than move to a larger one, where the environment might be hostile to the newcomer. Thus there is a definite limit to the rate at which management can expand and remain competent and equally efficient. Therefore, the best effort is to coordinate and seek cooperation from the existing staff, which is having requisite experience. A new manager requires time before he is fully equipped and is ready to join the teamwork for the efficient functioning of the organisation. Similarly research and development sets a limit to the rate of growth of the firm via this managerial constraint. Because the work in R and D is again a teamwork and as such it cannot be expanded quickly, simply by hiring new personnel for this. In this way managerial constraint of the firm sets limit to the rate of growth of demand (g_d) and rate of growth of capital supply (g_c).

(ii) Job Security Constraint :

Job security is the main and an important objective of the manager. Therefore, no manager will like to take any such risk which may harm the steady growth of the firm. They desire package in the service conditions in the form of security, generous pension scheme and other perks etc. In case there is general failure then there can be dismissal of the manager. And the show holders may decide to replace the old manager. This will be reflected in two cases : one, financial failure or the bankruptcy of the firm, and second, render the firm to be taken over by the other more efficient firms. In both these cases job security is threatened. In case of financial failure the owner will not like to continue with the existing manager and in case of takeover the new owners would have manager of their own choice. Thus in order to have continuity the managers choose projects which guarantee a steady performance rather than risky ventures which may be highly profitable or successful, but will endanger the manager's position if they fail.

(iii) Financial Security Constraint :

Job security of the manager is attached with the financial constraint of expansion of the firm. Marris suggests that job security is attained by adopting a 'prudent financial policy'. A sound prudent financial policy consists of determining the optimum levels of three crucial financial ratios, viz.; the leverage or debt ratio, liquidity ratio and the retention ratio.

(i) **Leverage Ratio** or debt ratio is defined as the ratio of value of debt to the gross value of total assets of the firm.

(ii) **Liquidity Ratio** is the ratio of liquid assets to the total gross assets of the firm.

(iii) **Retention Ratio** is the ratio of retained profits (net of interest on debt) to the total profits.

According to Marris all these financial ratios in unison act as a financial security constraint for the firm. The manager would not like to depend more on debt or borrowing, otherwise most of the funds will be used for repayment of loans and interest. Therefore leverage ratio should be kept low. On the other hand too low or too high liquidity ratio is not welcomed. The managers have to choose an optimal liquidity ratio for the smooth functioning of the firm. Retention ratio is related with the retained profits, which are the most important source of finance for the growth of capital. However, the firm cannot retain all profits. A part of these is to be distributed among the shareholders to avoid a fall in the price of share and keep the value of the firm up in the eyes of general public (public esteem is one of the objectives of owners) Marris assumes that there is negative relation between job and the financial constraint. That is if the financial constraint increases then the position of the firm becomes more vulnerable to bankruptcy and of take-over and consequently the job security of the managers is reduced. Financial security constraint sets a limit to the rate of growth of the capital supply (g_c). Thus the main conclusion in Marris' theory of growth of firm is that the various pressures lead the manager to maximise the rate of growth of the firm, subject to constraint imposed by the security motive.

4. Equilibrium of Firm and the Mechanism of its Growth :

According to Marris the firm will be in equilibrium where the utilities of managers and owners/shareholders are equal and balanced. That is the point where maximum balanced growth rate is achieved.

i.e. $g = g_d = g_c$

Now the question is that how g_d and g_c are determined in Marris Theory ? What are the determinants of demand for products of the firm and supply of capital ? In order to answer these questions Marris has specified few relationships to explain the mechanism of growth and to decipher the determinants of demand for the product of firm and supply of capital. These relationships are

- The steady state growth condition
- The growth in demand function
- The growth of supply function and

- The cost of expansion function.

(i) The steady state growth function :

Marris assumes that under this state of steady growth the variables such as assets, employment, sales, profits, etc., grow at the same constant exponential rate over time. There will be several ratios of these variables which will also be constant e.g. profit margin, rate of return on capital, capital output ratio. This implies that demand and supply side of the firm grow over time at the same rate.

The supply side of the firm is related with assets base which include physical and financial assets, marketing expenditure and technical know how. Demand side is affected by the product structure of the firm which goes on changing with the introduction of every new product or the change in product line. This is also known as diversification process. For every new product there will be new capital output ratio and different value added to sales ratio.

Under the assumption of steady state growth, demand, as measured by sales value, grows at the same (constant) rate as gross assets on supply side.

(ii) The growth in demand function :

On demand side it is stated that, if the demand for the existing product or the potential product is high then the firm will grow. Every product produced by the firm has a life-cycle. Its demand will be low in the first round, then rises rapidly, then after being stagnant for some time, it declines. This explains the shape of demand curve of the firm and its growth. If the demand for the product has reached the saturation point then the firm would not grow. To avoid this situation, diversification is advocated by Marris.

(iii) The growth of supply function :

As mentioned earlier supply side of the firm is determined by the physical and the financial assets of the firm. The growth rate of assets will be determined by the ratio of new investment to capital employed. The new investment depends upon the availability of financial assets which can be raised through ––

- retained earnings,
- borrowings and
- issue of new equity shares.

All this fund raising activity is determined by the capacity and the credit worthiness of the firm.

(iv) The cost of expansion function :

This relationship explains that the rate of diversification depends on cost of expansion which in turn effects the profit rate on capital. Diversification is important for the growth of demand of the firm. If the cost of expansion grows fast the profit rate on capital is likely to decline. This shows that the rate of diversification is directly related to capital output ratio and inversely related with profit margin.

Maximum growth and profitability situations of the firm can be explained with the help of following diagram :

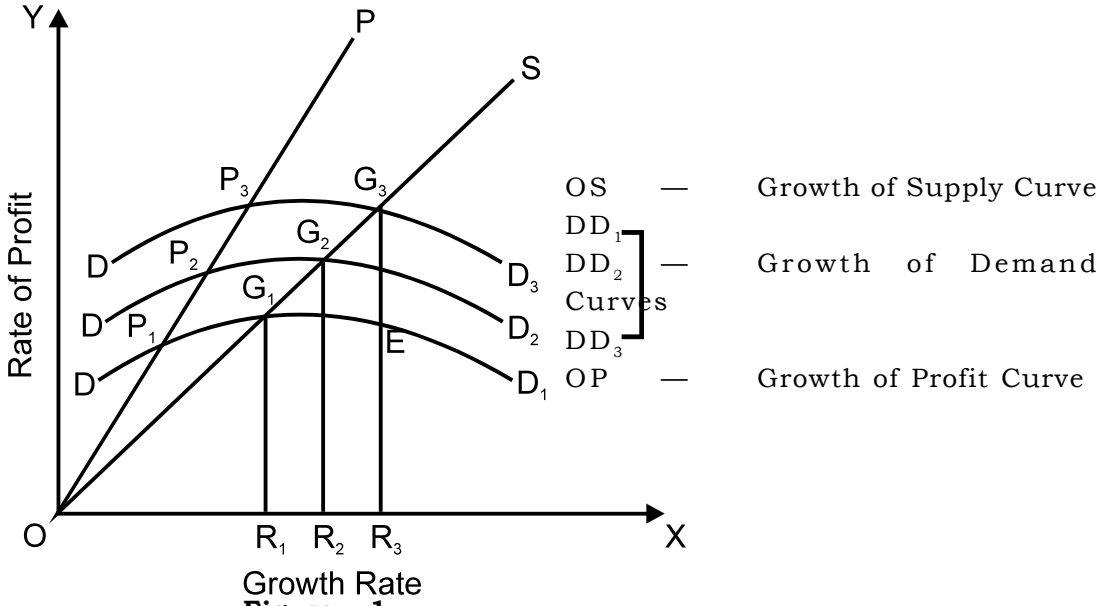


Figure - 1

In this diagram, on X-axis growth rate is measured, y-axis measures rate of profit. DD_1, DD_2 and DD_3 are growth of demand curves. Points G_1, G_2, G_3 show the maximum attainable growth rates for the firm, under alternative growth of demand curves, on OS, which is growth of supply curve. If the firm has profit maximisation as the objective then P_1, P_2 and P_3 will be the levels of maximum attainable profit rates with respect to these given demand curves.

Thus Marris has integrated Downie's and Penrose' Theory of growth of firm, where they take a number of constraints, internal and external. His theory is quite realistic and well explained in detail.

Self-Check Exercise-I

Q. According to Marris, when will firm be in equlibrium:

Ans .....

.....

.....

(B) Williamson's Model of Managerial Discretion

Williamson explains theory of growth of firm with a model of Managerial Discretion. By managerial discretion, Williamson means, the liberty of using funds on such projects which allow them to materialise their personal favourite projects. These are the discretionary investment expenditures which give them a special sense of satisfaction.

This theory is based on the fact that through growth of the firm managerial utilities function is to be maximised alongwith the maximisation of owner's utilities. Here the manager has the discretion with which he pursues the policies which

maximise his own utility rather than attempting the maximisation of projects, the owners or the shareholders utility.

We know that managerial utility function includes such variables as salary, security, power, status, prestige and professional excellence, etc. All these variables except the salary, are non-measurable. Therefore, the concepts of 'expense preference' has been introduced to understand the theory. 'Expense preference' is the satisfaction which managers derive from certain types of expenditures. E.g. staff expenditure, emoluments and funds available for discretionary investment give to the managers a positive satisfaction, because these expenditures are a source of security and reflect the power, status, prestige and their professional achievement.'

Staff expenditure, emoluments and the discretionary investment expenses are measurable in money terms. Thus according to this model the utility function of managers can be written as :

$U = f(S, M, I_D)$ where S is staff expenditure including managerial salaries and administrative and selling expenditure; M is managerial emoluments and I_D is the discretionary investment. This discretionary investment is the amount left from the reported profits, after subtracting the minimum profit (π_0) and tax (T).

$$I_D = \pi_R - \pi_0 - T$$

In large firms, external pressures, like share holders, product competitors or management of other more aggressive firms, are ineffective and dormant, or they face institutional friction in operating. Therefore, the management is freed from the basic obligation to operate at greatest efficiency to maximise profits. Thus manager can exercise his discretion to satisfy more individual or personal managerial objectives (salary, security, dominance and professional excellence).

(i) Main Propositions of Williamson's Model :

(i) Shareholders are relatively powerless when it comes to having any significant influence in directing corporate behaviour. This is simply an acceptance of 'divorce of ownership from control'.

(ii) Management is not forced to pursue profit maximisation to ensure its own survival. Williamson stresses the diminished impact of competition in product markets, in forcing the businesses to operate with maximum efficiency and increase profits. As most of the product markets are characterised by elements of monopoly or oligopoly and with product differentiation, there is reason to feel threatened by the other rival firms.

(iii) It is held that the corporate take-over process will not ensure that even in a world of imperfect product market, firms failing to earn maximum profits will be acquired by the more efficient with the consequent elimination of the management of the former. In other words, poor firms survive take-over by the more efficient firms.

Therefore, it is concluded that management survival is not dependent upon the achievement of maximum profitability. Rather management in large businesses, are subject to some discretion in their behaviour. And this discretion is exercised in satisfying certain things like managerial goals of salary, security, dominance and professional excellence.

This model can be explained with the help of a map of indifference curves and the curve showing relationship between staff expenditure (S) and the discretionary profits (πD).

Discretionary profit πD is defined as profit left after subtracting the minimum profit/requirements (π_0) and the tax (T) from actual profit (π).

$$\pi d = \pi - \pi_0 - T.$$

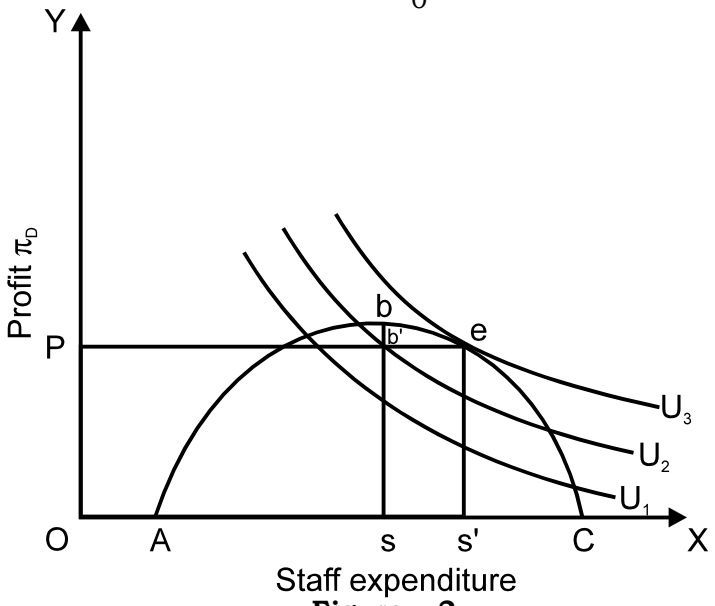


Figure - 2

On OX we take staff expenditure s, and on OY we take discretionary profits πD. Indifference curves U_1, U_2 and U_3 give same level of satisfaction to the manager with respect to different combinations of S and πD. The convex nature of indifference curve shows the diminishing marginal rate of substitution of staff expenditure and the discretionary profit. These curves do not intersect the axis. This implies that neither S nor πd can be negative. In other words this assumption restricts the choice of manager to positive levels of staff expenditure and the discretionary profits.

Actual profits, in Williamson model is obtained by subtracting production cost (C) and staff expenditure (S) from sales revenue (R) i.e. π = R - C - S.

It is assumed that firms operate at optimum level of output where MR = MC and secondly market environment is given. Then the curve AbC in Figure-2 shows that up to the level of Ab, profit is maximum and staff expenditure equal to As is increasing. After this point if production increased then profit starts

declining, staff expenditure is still increasing continuously. Here minimum profit constraint is not taken into consideration that is the reason, why this curve is touching the X-axis. But this situation of zero profit is not acceptable. Therefore, let us take the condition of minimum acceptable profit constraint OP (This is similar to the minimum. profit constrained given by Baumol) shown by a straight line parallel to X-axis i.e. Pe. The equilibrium of the firm is at the point where highest managerial indifference curve U_3 is tangent to the profit-staff expenditure curve AbC at the point 'e'. At this point of equilibrium, profit is lower by bb' when staff expenditure is higher by ss'. But in this model this situation of lower price, lower profit with higher output and staff expenditure is acceptable to the manager. This implies that staff expenditure, managerial emoluments and discretionary investment spending will be higher for the firm that maximises managerial utility than for the firm that maximises profit.

Self-Check Exercise-II

Q. Why do you mean by discretionary profit in williamson's Model of Managerial discretion?

Ans .....
.....
.....

(C) Sylos-Labini model of Limit Pricing

Sylos Labini model has been given as some other scholars like J.S. Bain, Williamson's Models which is known to an improvement over J.S. Bains's Model.

The model of Limit pricing primarily based on the economics of scale as barrier to the entry of the potential firms. The explanation he put forward regarding determinating factors of limit price is known as more exact and also propounded a postulate about the pattern of behavior of the established firms along with that of potential entrant firms which is described as sylos postulate. He gave this version in his book, Oligopoly and Technical Progress (1957)

Sylos assumes a given market demand for output with the unitary elasticity of demand and further considers the product is homogeneous and being produced by few firms with a price leader. Besides This, the further assumes that three plant sizes are available for production. Economies of scale occurs as the size of plant increases. But due to the trigid nature of technology, that the assumes, the continuous LAC (Long run average cost) can not be drawn. Instead, we have straight line cost-curves implies the larger plant size the lower the average cost.

Smaller firms can do influence the price individually and so are price taker. The largest firm fixed the price which is accepted by all the firms. However, this price must be low enough to prevent entry of the new firms. Sylos further says that the largest (low cost) price leader firms is fully aware of costs of all plant sizes as well as the market demand for the product. Beside this, the assumed that the new firms that will entry the industry must set up the plant which is of smallest size. Sylos still makes another behavioral that assumption redrawing the expectations. of the existing firms and expected firms will not enter the industry, if it estimates that with its entry price will not decline below his average cost of production. Another assumption he takes is that the new extranet expect that on is entry the existing

firms would keep their output constant at the pre entry level so that the increase in quantity demanded caused by the decrease in price due to its entry.

Limit Price

Taking into consideration the above assumptions it can be explained, how and where the limit price is fixed in this model. Sylos is of the view that there is a normal rate of profit which must be earned by firms., if they want to remain in this industry. Due to this, the minimum acceptable price should cover the average total cost (ATC) along with the normal rate of profit. The lowest acceptable price is determined according to full cost principle. that is

P_i = ATC (I+r)

Where P_i is the minimum acceptable price to the firms with P_i ith plant size. ATC is the average total cost of the size ith plant and represents the normal rate of profit.

This model of limit pricing has been shown in figure. The market demand curve, has been shown by DD curve. Beside this AC_1, AC_2 and AC_3 are the average cost curve of the large size, medium size and small size firms respectively. The output OQ_s (which will be simply called as Q_s denotes the level of output with minimum average cost of the small size plant (firms) as been noted earlier above. It is assumed in the model that the new firms will enter in the industry with the small size plant with average cost equal to AC_3 beside this, in view of various firms have different plant sizes having differential costs, the price leader which is known to be the most efficient firm with lowest average cost AC_1 will set a price which is acceptable to the least efficient firms with higher average cost AC_3. In this model the most efficent firms, that is the price leader think it profitable for competing away the small firms and in setting price he makes is on the other hand.

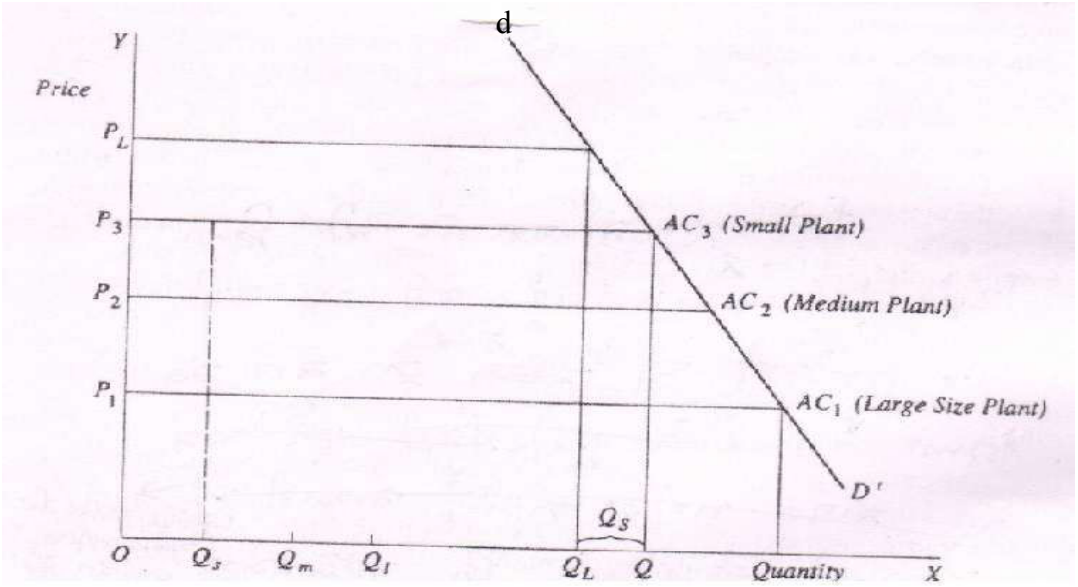


Fig. 44.2 Determination of Limit Price: Sylos's Model

sure that the least efficient firm with smaller size plant continues to make the least normal profits and so the price fixed is acceptable to it. In Figure 1 the most efficient firm fixes a price above average cost AC_3 of the firms working with least efficient plant-size. The question is where exactly at what level above AC the price leader will fix the price. As said above, the price leader will fix the price which is above the average cost AC_3 of the least efficient firms and is acceptable to them but which is also prevents the entry of new firms in the industry. No to determine this limit price the price leader has to know the quantity demanded at price P_3 which is equal to AC_3 of the least efficient plant, It is clear from figure that at price $P_{3,}$ the quantity demanded equals OQ. Given that the new firms can enter the industry of plant size with productive capacity equal to OQ_s or simply Q_s than Q_L is equal to $Q\text{-}Q_s$ shows the quantity of output corresponding to which price will be set. It can be known from the figure the quantity O_L of output can be sold at price P_L. Sylos further says that P_L is the limit price that will deter the entry P_L a new firms. It is because at the Price P_2 a new firm with an economically viable production Q_s entered the industry. The total supply of output Q_L+Q_s will just exceed Q due to which the price would fall just below the average cost AC_3 of the least efficient firm which is also the average cost of the new entrant.

Moreover, according to this model, the potential entrant is aware that with its entry, the resultant increase in supply of output, price in the post-entry period will decrease below its own average cost of production, so he will not enter the industry. Thus P_L is the limit price that will be fixed to prevent entry into the industry. Further, it should be taken into consideration that with limit price at P_L all firms will make supernormal profit. The limit price Pl that corresponds to output Q_L is known as the equilibrium price as it fulfills the two necessary conditions i.e., first, it is acceptable to all firms and also prevents entry. It can also be mentioned that P_L is the upper limit of the limit price. The price equal to P_3 is the lowest limit. So the equilibrium price can not be hire than P_L and not lower than P_3. So any output smaller than Q_L will not prevent the entry of new firms, as output larger than Q_L will bar entry into the industry. It is due to the reason as is clear from the figure Q_s will increase the supply of output to less than Q and so price will not decline to the level of p_3 and thus it will be worthwhile for the new firm to enter in the industry and make profits. But on the other hand, out put greater than Q_L will debar entry of the firm because new firm with minimum output Qs will enhance the supply of output to more than Q and so price will decline below Ac_3 resulting in losses too the new firms.

The above analysis of sylos model follows the limit price is fixed(determined) by the factors given below:

At the first place the absolute size the market the greater the size of the market, the lower the limit price.

Secondly, the price elasticity of demand is also an important factor (i.e. the greater the price elasticity of demand for the product, the lower will be the limit price that the establish firms may set, a price to prevent entry into the industry. At the third place that technology fixes the various sizes of plants and their average cost of products. Moreover, the technology also determines the minimum efficient plant size. It implies that larger the minimum efficient plant size, the higher will be the limit price. Besides, the prices of factors of production together with the technology determine the total average costs of the firms.

Criticism of Sylos's theory of limit-pricing

The criticism of the theory may be divided in two groups(i) Unrealistic assumptions and (ii) due to assumptions which, even may be relaxed do not affect the validity of the model.

The criticism of the second group constitutes the three points. In the first place, the theory adopted a methodologically naive (narrow) approach, based on numerical examples. Secondly, Sylos has used a definition of unitary elasticity which is confusing one. Thirdly, he has assumed a very rigid technology, with strong discontinuities.

The points of criticism in the first group in on the plausibility of Sylos's Postulate (assumption). It is said that the Strategy of keeping pre-entry quantity is not the best alternative action to the existing (established) firms.

Actually, the Syloys Strategy implies a defensive attitude i.e., the existing firms practically give up their initiative in price-setting, as the price is determined by the quantity which the entrant prepared to sell in the market. It may be the distinction of the existing firms to retain their control on the price and adopt other methods i.e., increase their pre-entry output. The 'retaliation strategy' will lead to a reduction in price, Probably below the LAC of all firms.

SUGGESTED READINGS

1. Advanced Economic Theory, Micro Economic Analyses – H.L. Ahuja. (Chapter 22 and 42)
2. Modern Micro Economics – A Koutsoyiannis (Chapter 15, 16, 17, 18, for each theory)
3. Industrial Economics – An Introductory Text Book – R.R. Barthwal. (Chapter 3, 15)
4. The Economics of Discretionary Behaviour : Managerial Objective in a Theory of the Firm. – O.E. Williamson.
5. Sylos- Labini, Oligopoly and Technical Progress, Cambridge, 1957