Non-Competitive Markets

Monopolist Market, Relationship between Marginal Revenue and Price Elasticity of Demand, Monopolist's Equilibrium

Objectives

After going through this chapter you shall be able to understand the following concepts

- Basic Features of Monopoly
- Causes of Monopoly
- Short Run and Long Run Equilibrium in Monopoly Market

Introduction

We know that in a perfect competition market, there exist a large number of buyers and sellers. The products of the firms in this market are homogenous and are perfect substitutes of each other. However; in the real world a perfectly competitive market structure hardly exists.

This chapter deals with a more realistic market structure- Monopoly. Unlike perfect competition, monopoly consists of only one seller or firm. This single firm caters to the needs of a large number of buyers. Also, as this is the only firm in the market, so this is also regarded as industry.

Basic Features of Monopoly

The following are the basic features of monopoly market structure.

1. ***Single seller/firm/industry***- In a monopoly market there exist only one individual seller or a group of individuals owning a single firm. As, there is only one firm in the industry, so the firm itself is regarded as the whole industry. The sole control over the production and supply of output rests on the monopolist's decision.

2. ***No close substitutes***- The goods produced by the monopolist have no close substitutes.

3. ***Restricted entry of new firms***- The entry into the monopolist market is restricted. In other words, no new firm can enter the monopoly market. There may be various legal barriers such as, patent rights, cartel laws, exclusive rights, etc. to restrict the entry of the new firms.

4. ***A monopolist is a price maker***- Since, a monopolist firm is the single firm in the market, therefore, it enjoys full control over the price and output decisions. The monopolist has the total freedom to fix the price level, which maximises his profit. Therefore, it can be said that a monopoly firm is a price-maker.

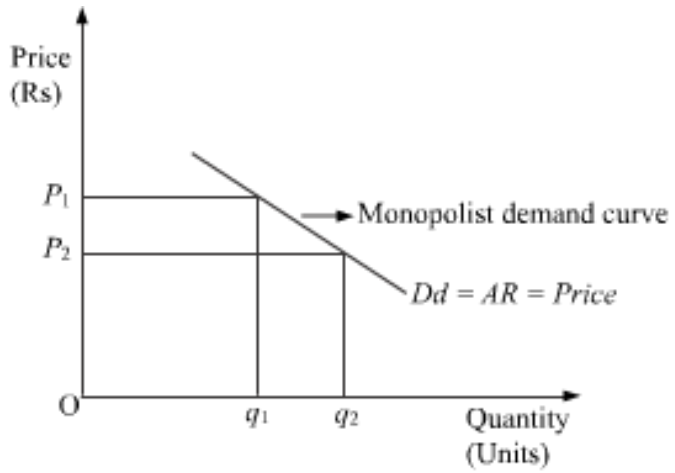
5. ***Monopolist has perfect knowledge***- It is assumed that a monopolist has perfect knowledge about different conditions prevailing in the market. He is well informed about the types of demand prevailing at different markets segments and accordingly varies price of his product.

6. ***Price discrimination***- Price discrimination implies charging different prices for the same product from different buyers at the same time. A monopolist firm enjoys the freedom to follow price discrimination. That is, in other words, it can sell the same product to different buyers at different prices at different time periods.

Monopolist's Demand Curve

A monopolist firm is a price-maker. It fixes the price of its commodity in such a way that it maximises its profits. However; it should be noted that the monopoly has no control over the quantity that he can sell in the market. Rather, it depends on the buyers that what quantity of output they want to purchase at the price fixed by the monopolist.

If the monopolist fixes a higher price, then lesser quantity of the output will be demanded and lesser quantity will be sold in the market. On the other hand, if he fixes a lower price, then higher quantity of the good will be sold. This implies the negative relationship between the monopolist's price and the quantity demand by the buyers. Therefore, a monopolist firm faces a ***downward sloping demand curve***.



In the figure, *Dd* is the monopolist demand curve. At price OP_1 the quantity demanded is Oq_1. If the monopolist wishes to sell a higher quantity say Oq_2, then he must lower the price level to OP_2.

Important Note: *The demand curve faced by monopolist is also the price line, i.e. the demand curve itself is the AR curve for the monopolist*.

Causes for Emergence of Monopoly

The following are the various causes that are responsible for the emergence of monopoly.

1. ***Patent Rights***- Patent rights refer to the exclusive rights given to the innovators of a new product for the use and sale of their invention. The main rationale behind providing patent rights is to provide recognition to the innovators, who undertake rigorous research and development and also bear the risk associated with the inventions.

These rights also prohibit the use of the same production methods and techniques by the other producers. Hence, no duplicity or imitation of either the products or of the techniques is possible till the expiry of the patent rights. Thus, granting of patent rights automatically result in monopoly.

2. ***Cartels***- Cartel refers to a formal agreement between a group of firms, aiming basically at avoiding competition among themselves to control the major market share. The cartel firms work together and in sync with each other. They jointly control the output and pricing decisions in the market.

Their collective working restricts the other firms to enter the market. Hence, the cartel firms create a form of joint monopoly market. For example, Organisation of Petroleum Exporting Countries (i.e. OPEC) enjoys a monopoly status in the petroleum industry all over the world.

3. ***Legal Barriers created by the government/Licensing***- Sometimes government grants license to one of the producers to undertake the production of a particular good or to provide a particular service. Hence, results in creation of monopoly status. For example, in India, Indian Railways enjoys the monopoly in the railways sector.

4. ***Endowment/Owning resources***- Monopoly may also emerge as a natural phenomenon. It may be possible that a particular productive resource is owned by an individual or a group of individuals, who enjoys full right over the product. For example, an individual owning a well or the only spring of water in a particular village enjoys full control over the price of water as there is no close substitute available.

Short-run Equilibrium under Monopoly

Similar to the perfect competition, a monopolist also tries to maximise his profits. It is also assumed that he does not hold any stock of output produced, i.e. he sells whatever he produces. The criteria for the profit maximisation (or short run equilibrium) remain the same as that of the perfect competition market. That is,

1. By TR-TC Approach- The profit will be maximised, where the vertical difference between the TR and TC curves is the maximum.

2. By MR-MC Approach - The profit will be maximised, where;

a. MR = MC
b. Slope of MC > Slope of MR, i.e. MC curve should be upwards sloping at the equilibrium level of output
c. Price ≥ minimum of SAC curve

The short-run equilibrium for monopoly market can be analysed under the following two different situations of cost of production.

1. When the cost of production faced by the monopolist is ***zero***
2. When the cost of production faced by the monopolist is ***greater than zero*** (positive)

Situation 1: When the Cost of Production is zero

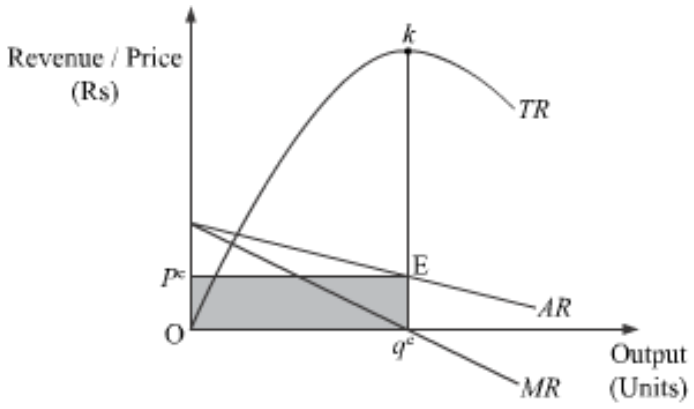
Let us suppose that there is a village which is situated sufficiently far away from the other villages and there is only one well in the village on which all the villagers depend for their water needs. Assume that this well is owned by a particular individual and he has the exclusive right over the use of the well.

He also has the right to exclude others from the use of the well. Thus, he enjoys a monopoly position and can charge any price that he wishes to charge for the water (output). This implies that the cost of producing water is zero.

We know that profit of a firm is given by the difference between Total Revenue and Total Cost

i.e. Profit (π) = $TR - TC$

In the case considered above, TC equals zero (as the cost of producing water is zero). This implies that the profit (π) will be maximised where Total Revenue (TR) is maximum. This situation is explained diagrammatically as:



In the figure, TR represents the Total Revenue curve, AR and MR represent the Average Revenue curve and Marginal Revenue curve, respectively. The AR curve is the demand curve and depicts the price charged per unit of water. In the figure, it can be observed that the TR curve is maximum at point k.

The price at which the buyers demand the output is given by the AR curve. Corresponding to the point k, the price charged by the monopolist (as given by the AR or Demand curve) is OP^e. The corresponding quantity is equilibrium output, i.e. Oq^e.

The amount of TR is ascertained as price times quantity i.e. $OP^e \times Oq^e$, represented by the shaded area of the rectangle OP^eEq^e. The shaded area also depicts the amount of profit as the total cost of production is zero in this case.

Total Revenue = area of rectangle of OP^eEq^e

Profit = area of rectangle of OP^eEq^e

Equilibrium Output = Oq^e

Equilibrium Price = OP^e

Situation 2: When the Cost of Production is Greater than Zero (i.e Positive)

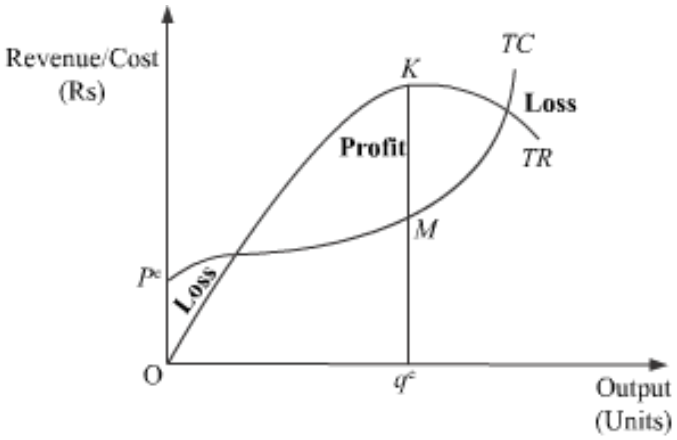
Let us now consider the short run equilibrium for a monopolist facing positive cost of production. This can be studied using the following two approaches:

a. Total Revenue Total Cost Approach

b. Marginal Revenue Marginal cost Approach

Short Run Monopolist Equilibrium- By Total Revenue Total Cost Approach (TR-TC approach)

According to this approach, a monopolist firm attains his equilibrium at the point where the difference between the Total Revenue (*TR*) and the Total Cost (*TC*) is maximum, i.e. where the profits are maximised. The short run equilibrium situation using the TR-TC approach is explained below diagrammatically.

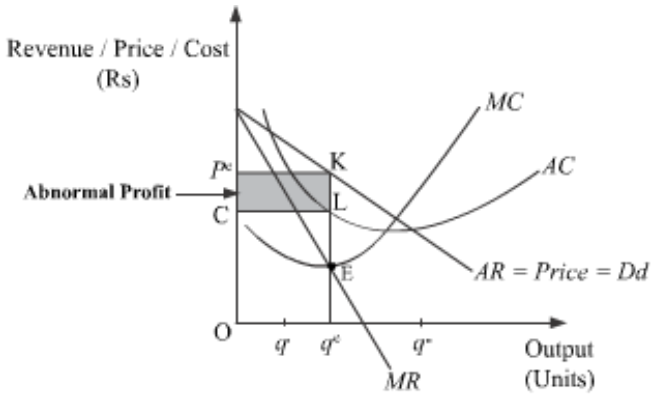


In the figure, the Total Revenue and the Total Cost curves of a monopolist firm are depicted by the *TR and TC* curves, respectively.

The profit for the firm, as given by the difference between the Total Revenue and Total Cost, is depicted by the vertical distance between the *TR* curve and the *TC* curve. We can find that this distance is maximum at point *K*. Thus, the firm attains equilibrium at point *K*. The profits earned by the monopolist at this point equals the vertical distance *KM* and the equilibrium level of output is Oq^e.

Short Run Monopolist Equilibrium- By Marginal Cost-Marginal Revenue Approach (MR-MC approach)

According to this approach, a monopolist firm attains equilibrium at that level of output where Marginal Cost (*MC*) faced by the firm is equal to the Marginal Revenue (*MR)* earned by the firm. The short run equilibrium situation using the MR-MC approach is explained below diagrammatically.



In the figure, *AR* and *MR* represent the Average Revenue (Demand) curve and Marginal Revenue curve, respectively. Observe that at point *E*, *MR* and *MC* curves intersect each other. In other words, at this point the Marginal Revenue equals Marginal Cost (i.e. *MC = MR*). Thus, the monopolist attains equilibrium at point *E.*

Accordingly, the equilibrium output level is Oq^e and the equilibrium price charged by the monopolist (as given by the AR curve) is OP^e. The monopolist by selling Oq^e units of output earns a total revenue equal to the area of the rectangle OP^eKq^e and the total cost of production incurred to produce Oq^e units of output is given by the area of rectangle $OCLq^e$. Thus, the profit earned by the monopolist by selling Oq^e units of output is ascertained as:

Profit (π) = *TR – TC*

i.e. π = area of the rectangle OP^eKq^e – area of rectangle $OCLq^e$

so, **π = area of the rectangle CP^ekL**

For any level of output below Oq^e (such as *Oq'), MR* exceeds *MC.* This implies that for each additional unit that the firm produces, the increase in *TR* (by selling the additional unit) will be greater than the increase in *TC* (due to the production of the additional unit). Thus, by producing

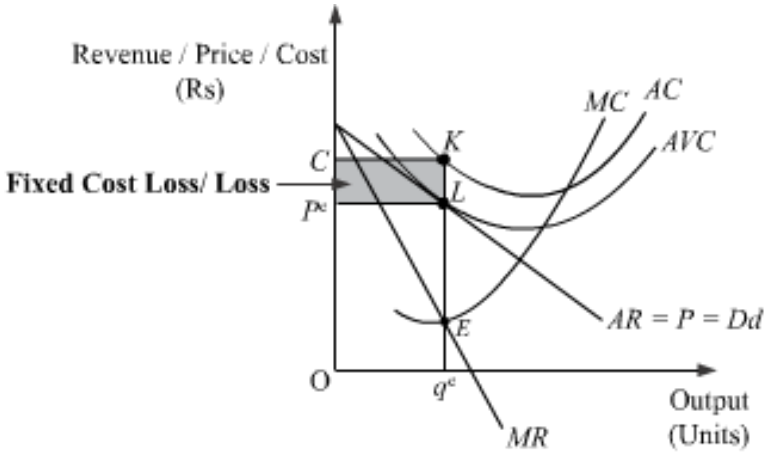
the additional units, the firm can increase the profit. Hence, the firm will go on increasing the output until it reaches level Oq^e, beyond which no additional units of output will be produced (as at Oq^e, $MR = MC$)

On the other hand, for any level of output above Oq^e (such as Oq''), *MR* falls short of *MC*. This implies that the firm can lower its total cost by reducing the production of output. The firm will continue to reduce production, till Oq^e level of output, where *MR* becomes equal to *MC.* Hence, no further reduction in the production is required.

Thus, the monopolist firm attains its equilibrium at point *E*, with the equilibrium level of output as Oq^e and equilibrium price as Op^e.

Can a Monopolist incur Losses?

Now, let us explore an interesting and important question- "Can a monopolist incur losses?" The answer is- ***yes,*** a monopolist can incur losses. Similar to a firm in perfect competition market, a monopolist firm can also incur losses <u>*but only in short run*</u>. This may be due to the fact that in short run, some factors of production (such as plant, machinery, etc.) remain fixed and the monopolist cannot vary the inputs of these factors. The figure below depicts the short run equilibrium of a monopolist, where he is incurring losses. Let us understand the concept with the help of the diagram.



As per the figure, the monopolist attains short run equilibrium at point *E*, producing Oq^e units of output and charging price as OP^e. Total Revenue (*TR*) as earned by the monopolist is given by the area of rectangle OP^eLq^e. On the other hand, the Total Cost (*TC*) incurred by him is given by the area of rectangle $OCKq^e$.

As, the area of rectangle OP^eLq^e *is less than* the area of rectangle $OCKq^e$. (i.e. $TR < TC$), so the monopolist is incurring loss. The loss incurred is ascertained by the difference of the Total Cost (*TC*) and the Total Revenue (*TR*) and is graphically represented by the area of rectangle (CP^e *LK),* i.e.

Loss= area of rectangle $OCKq^e$ – area of rectangle OP^eLq^e = area of rectangle CP^eLK

It should be noted that even if the monopolist is incurring losses, then also he will continue to produce in the short run as long as the price charged by him covers the Average Variable Cost (*AVC*). This is because, even if he stops production, then also he has to bear loss equal to the fixed costs incurred.

Hence, a monopolist can also incur loss but only in short run and not in long run. This is a unique feature of the monopoly market that in long run, a monopolist earns the maximum amount of profits compared to the producer under any other market structure such as perfect competition, monopolistic and oligopoly market.

Long Run Equilibrium in Monopoly Market

A monopolist firm ***cannot*** earn loss in long run. This is because in long run, as all factors are variables, so the monopolist can change the structure and size of the machines. Moreover, as there is no close substitutes available and the monopolist being the only seller exercises full control over the price, so the probability of monopolist earning profits in the long run is very high. The following are the long run equilibrium conditions for a monopolist:

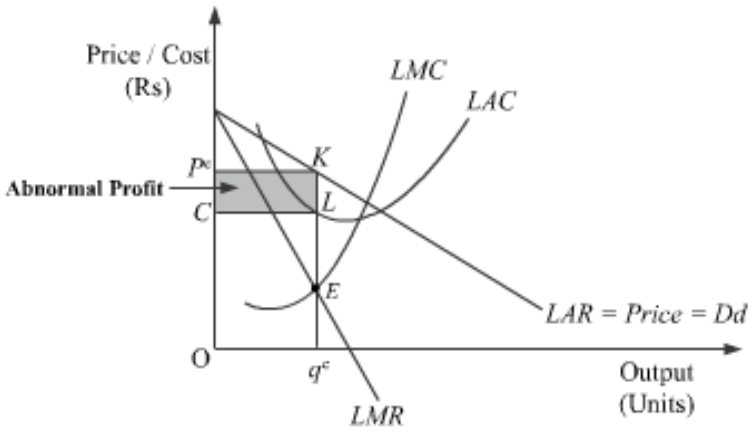
1. *LMC* = *LMR*
2. Slope of *LMC* > Slope of *LMR* at the point of intersection
3. Price > minimum of *LAC*

Important Note: It should be worth noting that the long run equilibrium price would not be equal to the minimum of LAC (as in perfect competition), in fact; a monopolist in long run will always charge a price which will be more than the long run average cost i.e. P > minimum of LAC.

The following are the two reasons because of which the equilibrium price is greater than the minimum of *LAC*.

1. Entry and exit in a monopoly market is restricted because of various legal rights.
2. If monopolist earns losses in the long run, then he will stop the production and exit the market

The implication of P > minimum of *LAC* is that in the long run, a monopolist earns supernormal/abnormal profits. The below figure depicts the long run equilibrium conditions of a monopolist firm.



In the figure, long run equilibrium is denoted by the point *E*, where *LMC* intersects *LMR.* The equilibrium output is Oq^e and the equilibrium price is OP^e. The monopolist is earning supernormal profit, which is represented by the area of the shaded rectangle P^eCLK.

Different views on Monopoly

1. It is generally argued that a monopolist earns profit at the cost of the consumers. The monopolist charges high prices and earn abnormal profits, but provide lesser quantities of output for sale.

2. Further, some economists argue that monopoly market structure cannot exists in real world, as there exists substitutes for each product in some or other sense.

3. Thirdly, pure monopolist does face competition of some sorts. This is due to the fact that the rapid technological advancements and ever changing scientific development always result in inventions of new methods, techniques and new products. These new products usually act as close or near substitutes, thereby posses competition to the monopolist.

4. Fourthly, some economists regard monopoly as a ***social evil***. This is because as monopolist earns large profits and despite this, they do not invest sufficiently in research and development work (R&D), which could have provided the society with superior quality products. Further, as the new technology lowers the cost of production, so the monopolist could have charged lower price for his output.

Monopolistic Competition and Short Run and Long Run Equilibrium

Objectives

After going through this chapter you shall be able to understand the following concepts

- Basic Features of Monopolistic Competition
- Short Run Equilibrium Conditions in Monopolistic Market
- Long Run Equilibrium Conditions in Monopolistic Market

Introduction

Monopolistic market structure is defined as the market structure in which there are different sellers selling ***differentiated*** products, which are close substitutes for each other. Differentiated product is one of the unique features of the monopolistic market structure. It is achieved through trademark or brand name.

A monopolistic firm incurs heavy selling costs such as advertisements expenses in order to distinguish the unique features of their product from the close substitutes available in the market. In the real world, we can easily find examples of monopolistic market.

For example, in the market of toilet soap, differentiated products are available under different brand names, which are close substitutes to each other but are unidentical products such as, Lux, Rexona, Cinthol, Lifebouy, Pears, etc.

** ***Differentiated Products*** imply that the products are similar to each other and perform the same basic function yet are different from each other in some or the other manner. The products are hypothetically differentiated from each other by the producers through advertisements. Take the example of shampoos. Although the basic function of a shampoo is to clean the scalp but the producers try to differentiate their respective brands by highlighting some unique features such as, anti-dandruff, anti-hairfall, protein-rich shampoos, hair root-strengtheners, etc.

Similarly, there is hardly any difference among the different soft drinks available in the market. All are carbonated water, yet each has their own customer base. This is mainly because of the heavy expenses incurred by them in advertising their products. Thus, the cause of differentiating the similar products can be attributed to the advertisement expenses incurred.

Features of Monopolistic Competition

1. ***Large Number of Buyers and Sellers***- Similar to a perfect competition market, in a monopolistic market also there are large number of buyers and large number of sellers.

2. ***Differentiated Product***- The product of a monopolistic firm is differentiated from the product of the other firm but both are close substitute for each other. In other words, the products of different firms are slightly different from that of the others, but nevertheless; they are close substitutes. The product differentiation is achieved through brand name and trade mark by the way of advertisements.

3. ***Selling Costs***- The need of the selling cost arises due to the sole aim of differentiating the products. The product differentiation may be true or artificial (hypothetical). It is through the help of an advertisement that a particular monopolistic firm tries to convince the consumers by distinguishing its product on qualitative basis from its substitutes.

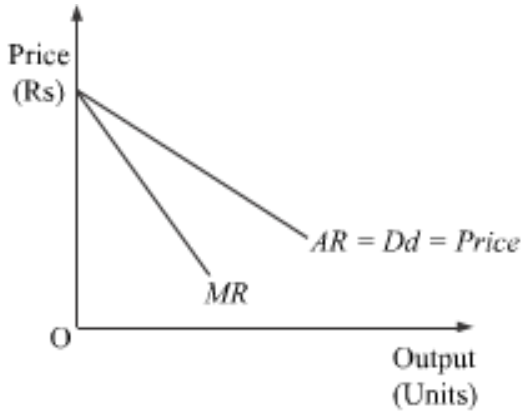
4. ***Free Entry and Exit of Firms***- The firms in the monopolistic market enjoy the freedom of entry and exit from the market. But at certain times, due to some legal barriers and patent rights, it is

not so free for the new firm to enter the market.

5. ***Imperfect Knowledge***- Both the buyers and the sellers do not have complete knowledge about the prevailing market conditions. Due to product differentiation, it is very difficult to acquire complete knowledge about prices and quantities of different products.

6. ***Lack of Mobility and High Transportation Costs***- There is imperfect mobility of factors of production (such as labour), products and services. As a result, high transportation costs are incurred for transporting goods and services from one place to another.

7. ***Price-maker and Downward Sloping Demand Curve***- As a monopolistic firm is a price maker, so it can design its own price policies. The firms are distinguished on the basis of their brand names, therefore each monopolistic firm enjoys a monopolist (or monopoly) position. This is because no other firm can produce and sell its products under the same brand name. Hence, a monopolistic firm enjoys a certain degree of monopoly due to the existence of the brand name. Due to this, the *AR* curve (or demand curve) and the *MR* curve faced by a monopolistic firm are downward sloping.



Important Note: Similar to a monopolist, a monopolistic firm also faces a downward sloping AR and MR curves, but for the latter (monopolistic firm) these curves are comparatively more flatter (more elastic).

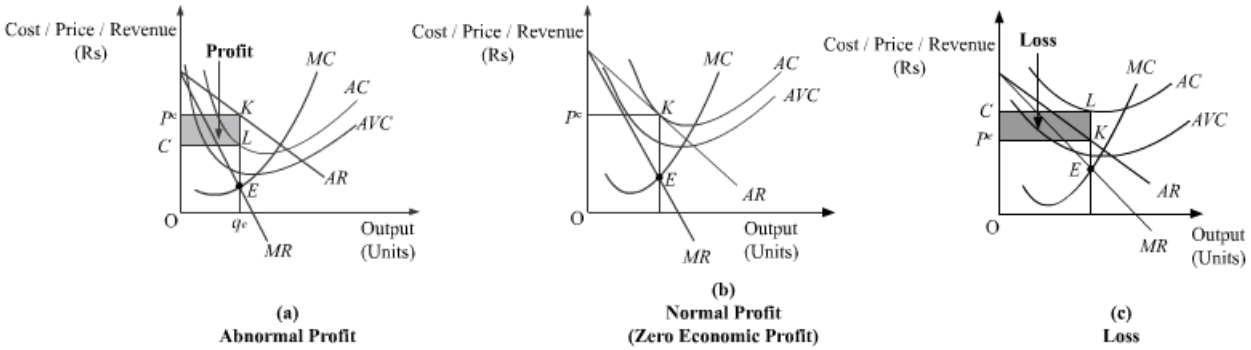
Short Run Equilibrium of Monopolist Firm

The short run equilibrium conditions for a monopolist firm are same as that of for a perfectly competitive and a monopoly firm i.e.

1. *MC* = *MR*
2. *MC* should be upward sloping at the equilibrium level of output (i.e. the slope of *MC* > the slope of *MR* at the equilibrium level of output)
3. Price should be greater than or equal to the minimum of *AVC* curve (i.e. $P \geq$ minimum of *AVC* curve)

There are following different short run equilibrium situations that may prevail in short run.

a. Abnormal Profits (when P > the minimum of AC curve)
b. Normal Profits (when P = the minimum of AC curve)
c. Losses (P < the minimum of AC curve but $P \geq$ the minimum of AVC curve)



The figures are similar to those for the short run equilibrium under monopolist (monopoly) firm. The only difference between these figures and those for monopoly firm is that in the former, the *AR* and the *MR* curve are more elastic (i.e. flatter) due to the presence of close substitutes, whereas, under monopoly, *AR* and *MR* curves are lesser elastic (i.e. steeper) due to the absence of substitutes.

In each of the figures, the equilibrium is at point '*E*' with equilibrium output and equilibrium price as Oq^e, and OP^e respectively.

In the **panel (a)**, the equilibrium is determined by the intersection of the *MR* curve and the *MC* curve i.e. the point *E*. Corresponding to the equilibrium point *E*, the equilibrium output is Oq^e .Corresponding to the equilibrium output, the equilibrium price is ascertained by the *AR* curve at OP^e.

The equilibrium price is greater than the minimum of the *AC* curve. This implies that the firm is earning abnormal profit, which is denoted by the area of rectangle P^eCLK.

In the **panel (b)**, the equilibrium is determined in the similar manner as in the panel (a) at point '*E*'. The equilibrium price is OP^e and the equilibrium output is Oq^e. Here, we can observe that the equilibrium price is equal to the minimum of the *AC* curve, hence the firm is earning normal profit i.e. zero economic profit in the short run.

On the other hand, in **panel (c)**, the equilibrium is determined at point '*E*', where the MR curve and the MC curve intersect each other. The equilibrium price is OP^e and the equilibrium output is Oq^e. It should be noted that although the equilibrium price is lesser than the minimum of the *AC* curve but is greater than the minimum of *AVC* curve.

This implies that the firm is incurring losses equivalent to the fixed costs incurred. The amount of loss is denoted by the area of the shaded rectangle P^eCLK. The firm continues its production until it is able to cover its variable costs. But, if the price falls below the minimum of *AVC*, then it implies that the firm is neither able to cover the fixed costs nor the variable costs, hence should

stop production. Such a point, where the price is lesser than the minimum of the *AVC* curve is regarded as ***shut-down point***.

Long Run Equilibrium of Monopolistic firm

We learnt that under perfect competition market no firm can earn positive profits (or abnormal profits), the same is the long run condition under the monopolistic competition. The following are the long run profit maximisation conditions (or long run equilibrium of monopolistic firm)

1. *LMC* = *LMR*
2. *LMC* should be rising, i.e. Slope of *LMC* > Slope of *LMR*
3. Price = minimum of the *LAC* curve

The analysis of the long run equilibrium depends on the two different short run situations.

When the firms in short run are earning abnormal profit

If in short run, the monopolistic firms are earning supernormal (or abnormal) profit, then this will attract new firms into the industry. Due to the entry of the new firms, the market supply of the product will increase, consequently the price will start falling. The price will continue to fall until it become equal to the minimum of the *LAC* curve.

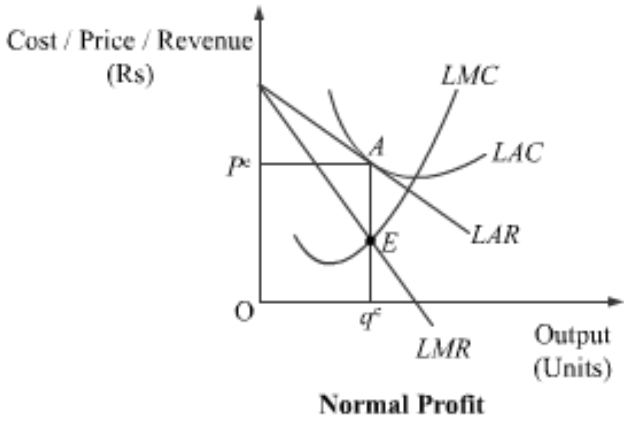
The equality between the price and the *LAC* curve implies that all abnormal profits are wiped out, hence, no new firm will enter the industry. In the figure, the long run equilibrium is determined by the intersection of *LMC* and *LMR* at point E. The equilibrium price is OP^e and the equilibrium output is Oq^e. At the long run equilibrium, the monopolistic firm is earning zero-economic profit (or normal profit).

When the firms in short run are earning abnormal loss

On the contrary, if in the short run, the firms are incurring abnormal loss, then some of the existing firms will start leaving the industry. This will lead to a fall in the market supply and in turn, the market price will rise. The price will continue to rise until it reaches price OP^e, where it becomes equal to the minimum of the *LAC* curve.

This ensures the disappearance of abnormal losses. The equilibrium is determined at point '*E*', and the equilibrium price and equilibrium output as OP^e and Oq^e respectively. It should be noted here that similar to the above situation, the monopolistic firm earns zero economic profit.

Hence, we can conclude that irrespective of the fact that in the short run whether the firms are earning abnormal profit or abnormal loss, in the long run they will earn zero-economic profit (or normal profit).



Normal Profit

Oligopoly Market and its Features

Objectives

After going through this chapter you shall be able to understand the following concepts

- Basic Features of Oligopoly Competition
- Behaviour of Firms in Oligopoly Market
- Concept of Price Rigidity

Introduction

Till now, we have discussed about the market structures which consists of either very large number of sellers (in Perfect Competition Market and Monopolistic Market) or a single seller in the whole market (Monopoly). Now, in this lesson, we will study about another market structure called Oligopoly Market Structure.

Have you ever noticed, why shops/showrooms of two big brands of apparels, shoes, sweets and banks prefer to locate near-by each other? More often, in the shopping complexes and malls we can easily find that the showrooms of two or more big brands are located in the same section or floor.

The rationale behind such move is that these big brands are mutually dependent on each other for their price and output decisions. Such type of market structure is regarded as oligopoly market structure. In this form of market, very few big firms (giants) own the major control over the whole market by producing significant portion of market demand.

Although these firms are mutually dependent on each other yet there exists a very high degree of competition among them. It should be noted that when there exists only two sellers in the whole market, it is called duopoly. Let us now quickly discuss the features of oligopoly.

Features of Oligopoly

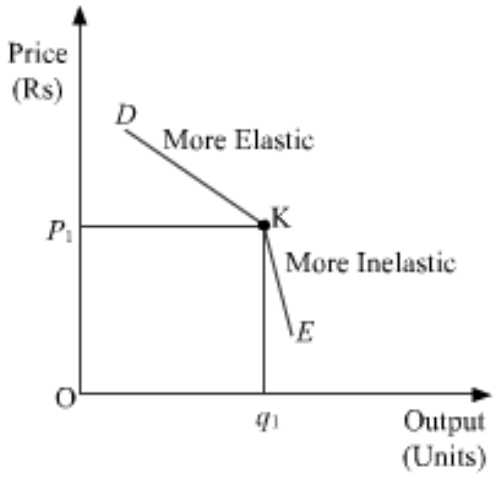
1. ***Few Large Firms***- There exists few but large and dominating firms. These firms account for majority of market supply, thereby control the market price and quantity of the output.

2. ***Mutual Dependence***- There exists a very high degree of mutual interdependence between the firms in an oligopoly market. The price and the quality decisions of a particular firm are dependent on the price and the quality decisions of the rival (other) firms. Hence, a firm must take into consideration the probable rival reactions, while formulating its own price and output decisions.

3. ***Restricted Entry***- As there exists a cut-throat competition among the firms, so it is very difficult for any new firm to enter into the industry. Moreover, as the existing firms are the only giants in the market, so it narrows the scope for a new entrant to enter the industry due to high cost associated with the entry.

4. ***Indeterminate Demand Curve***- The demand curve faced by an oligopolistic firm cannot be determined as it is uncertain to forecasts its sales. This is because any change in the price or output decisions by a firm sets in a series of reaction of the rival firms. That is why; the demand curve is indeterminate and indefinite.

The great economist Paul Sweezy, in fact suggested that an oligopolistic firm faces a kinked demand curve at any given price. The following figure shows the demand curve faced by an oligopolistic firm. In the figure, as there is a kink or bend in the demand curve at point '*K*', so it is known as ***Kinked-shaped Demand Curve***.



The upper portion of the demand curve, i.e. *DK* is comparatively more *elastic*. This is because if the firm raises its price above OP_1, then this action will not be followed by the rival firms (as doing this will reduce their customer base). Consequently, for any increase in the price above OP_1, the firm will lose its customers; hence this portion of the demand curve is more elastic.

On the other hand, the lower portion of the demand curve, i.e. *KE* is comparatively more *inelastic*. This is because if the firm lowers its price below OP_1, then the rival firms will

also follow the price reduction strategy, else the rival firms will lose their customers, thereby, profits. Consequently, the firm which initiated price reduction is not fully benefited due to the price reduction, as all the rival firms have also followed the same strategy. Hence, the lower portion of the demand curve is more inelastic.

5. ***Product***- The products of any two oligopolistic firms can either be homogeneous such as in a steel industry or can be differentiated such as in an automobile industry.

6. ***Rigid Prices***- Rigid prices (or sticky prices) imply that prices do not move freely as per the changes in demand. This is due to the counter decisions of the rival firms. For instance, if a firm wants to increase its price in order to earn higher profits, then the rival firms may not follow the price hike, as a result the firm (which initiated price rise) may lose its customers, thereby, incurs loss of revenues and profits. Thus, an oligopolistic firm fears loss of profits associated with the rise in its price.

On the other hand, if any firm aims to generate more profits by lowering its price and selling larger quantities, then the rival firms will also lower their prices, else they will lose their customers. Hence, the firm which initiated price reduction will not be fully benefited, as the increase in the market sales and revenues associated with lowering price will be shared by all the firms in the market. Hence, there do not exist enough incentive for the oligopolistic firms to lower or raise their prices. That is *why; the prices in an oligopolistic market appear to be rigid or sticky.*

7. ***Profits***- An oligopolistic firm earns abnormal profits in long run due to preventive entry barriers to the new firms. That is, in other words, due to restricted entry for the new firms into the industry, the existing firms earn abnormal or supernormal profits in the long run.

8. ***Selling Costs***- An oligopolistic firm incurs heavy selling costs such as, advertisement expenditures to convince and attract the consumers to buy the products. This is due to existence of cut-throat competitions in an oligopolistic market.

Behaviour of Firms in an Oligopoly Market

We know that in an oligopoly market there exists a very high degree of mutual interdependence between the firms. The price and quantity decisions of a particular firm are dependent on the price and quantity decisions of the rival firms. Thus, a firm takes into consideration the probable rival reactions, while formulating its price and output decisions. This mutual dependence of the firms can be explained in the following two ways.

1. ***Collusive Oligopoly***- The firms might decide to collude together and not to compete with each other. Thus, in such a case the firms would behave as a single monopoly and aim at maximising their collective profits rather than their individual profits. Such a move is known as collusive oligopoly.

2. ***Non-collusive Oligopoly***- The second case is where each firm aims at maximising its own profits and decides how much quantity to produce assuming that the other firms would not change their quantity supplied. Such a move is known as non-collusive oligopoly.

Numerical Example of Non-collusive Oligopoly

Let us understand the behaviour of an oligopolistic firm under the non-collusive oligopoly.

Suppose that there are exists only two firms (namely, Firm A and Firm B) in the market producing toothpastes under two different brand names. Also, assume that the firms have zero cost of production and the market demand for toothpaste is represented as:

$Q_d = 600 - P$

Initially, let assume that Firm B supplies zero units of toothpaste, then Firm A faces a maximum demand of 600 units, i.e.

Quantity demanded at price zero, at price = Rs 0 is:

$$Q_d = 600 - P$$
$$Q_d\}_{P=Rs\,0} = 600 - 0 = 600 \text{ units}$$

The Firm A finds it most profitable to supply half of the maximum demand of the toothpastes, so Firm A will supply only 300 units of toothpaste, assuming that Firm B will not supply anything. Thus, output supplied by Firm A in the first round is:

$$\text{Supplied by Firm A} = \frac{600}{2} = 300 \text{ units}$$

In the second round, Firm B realises that out of the total market demand, half of the demand still exists. Therefore, the Firm B would decide to supply half of the remaining portion of the market demand.

$$\text{Supplied by Firm B} = \frac{1}{2} \times [600 - \text{Supplied by Firm A}]$$
$$= \frac{1}{2} \times \left[600 - \frac{600}{2}\right] = \frac{600}{2} - \frac{600}{4} = 150 \text{ units}$$

Thus, the supply of Firm B changes from zero to 150 units from the first round to the second round.

In the third round, Firm A realises that due to supply by Firm B, the maximum demand it can face has changed to 450 units [i.e., 600 – 150 = 450 units] and decides to supply half of this.

That is, 225 units.

$$\text{Supplied by Firm A} = \frac{1}{2}\times[600 - \text{Supplied by Firm B}]$$

$$= \frac{1}{2}\times\left[600 - \frac{1}{2}\times\left(600 - \frac{600}{2}\right)\right] = \frac{600}{2} - \frac{600}{4} + \frac{600}{8} = 225 \text{ units}$$

This process continues and leads to an equilibrium position, where each firm supplies $\frac{1}{(n+1)}$ of the total market demand.

n = number of firms in the oligopoly market
In the example considered above, as there are only two firms, so $n = 2$. Therefore, each firm would supply $\frac{1}{2+1} = \frac{1}{3}^{rd}$ of the total market demand.

Therefore, total market demand is 600 units and each firm would supply $\frac{1}{3}\times 600 = 200 \text{ Units}$

The quantity supplied by Firm A and Firm B is represented in the table below.

Round	Firm	Quantity Supplied
1	A	$\frac{1}{2}\times 600 = 300$
2	B	$\frac{1}{2}\left[600 - \left[\frac{1}{2}\times 600\right] = \frac{600}{2} - \frac{600}{4}\right]$
3	A	$\frac{1}{2}\left[600 - \left(\frac{600}{2} - \frac{600}{4}\right) = \frac{600}{2} - \frac{600}{4} + \frac{600}{8}\right]$
4	B	$\frac{1}{2}\left[600 - \left(\frac{600}{2} - \frac{600}{4} + \frac{600}{8}\right)\right] = \frac{600}{2} - \frac{600}{4} + \frac{600}{8} - \frac{600}{16}$

Therefore, each firm would supply an output equal to

$$= \frac{600}{2} - \frac{600}{4} + \frac{600}{8} - \frac{600}{16} + \frac{600}{32} - \frac{600}{64} + \ldots$$

This expression is an infinite geometric progression with $r = -\frac{1}{2}$

The summation formula for infinite geometric series $= \frac{a}{1-r}$

Here, $a = \frac{600}{2}$ and $r = -\frac{1}{2}$

$$\therefore \frac{a}{1-r} = \frac{\frac{600}{2}}{1-\left(-\frac{1}{2}\right)} = \frac{\frac{600}{2}}{1+\frac{1}{2}} = \frac{600}{3} = 200 \text{ Units}$$

Thus, the equilibrium quantity supplied by Firm A = 200 units

And, the equilibrium quantity supplied by Firm B = 200 units

Total quantity supplied in the market = 200 + 200 = 400 units.

From the equilibrium quantity supplied, equilibrium price can be evaluated.

$Q_d = 600 - P$

$P = 600 - Q_d$

$P = 600 - 400 = \text{Rs } 200$

Therefore, at equilibrium the total market supply of toothpastes is 400 units and the equilibrium price is Rs 200

Price and Output Indeterminateness

We know that in a oligopoly form of market, there exists a very high degree of mutual interdependency among the firms. The high degree of interdependency leads to indeterminateness of prices and output. This is because due to interdependency a firm needs to take into account the probable rival reactions while formulating its price and output decisions.

Since, there can be various reaction patterns of the rival firms, the market outcome becomes indeterminate and thus remains ambiguous. Hence, it can be said that no specific theory for explaining the concept of market equilibrium under oligopoly market structure, rather there are different models explaining oligopoly based on different behaviour assumptions.

Comparison of the Market Forms

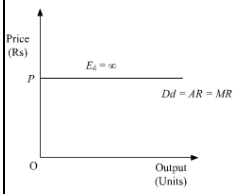
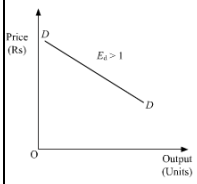
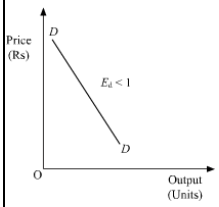
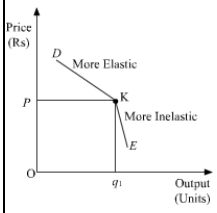
Objectives

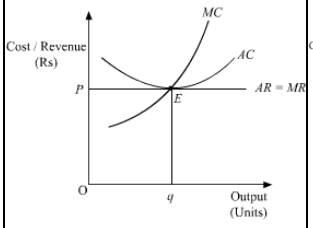
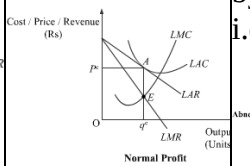
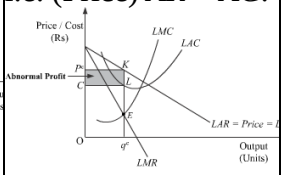
After going through this chapter you shall be able to understand the basic points of difference among the four types of market structures namely, Perfect Competition, Monopolistic Competition, Monopoly and Oligopoly.

Introduction

The four market structures can be distinguished on the basis of the following factors.

Characteristic	Perfect Competition	Monopolistic Competition	Monopoly	Oligopoly
Number of Buyers and Sellers	Under Perfect Competition market, there exist a large number of buyers and sellers for a particular commodity.	Under Monopolistic Competition market, there exist a large number of buyers and sellers for a commodity.	Under Monopoly, there is only a single seller catering to the demand of large number buyers.	Under Oligopoly market, there are few sellers but a large number of buyers.
Nature of Product	Firms under Perfect Competition, sell homogeneous products that are perfect substitutes of each other.	Firms under this market structure produce similar yet differentiated products that are 'close' substitutes of each other.	As the Monopoly firm is the sole producer of the commodity in the market, so the commodity produced by it has no close substitutes.	Similar to the firms under monopolistic competition market, the firms under oligopoly market also generally produce differentiated products.
Price	The firms under this market are regarded as the price takers, while, the industry is the price maker. Hence, all the firms in the market charge a uniform price for their products.	The firms under this market structure produce differentiated products and follow their own price and output policies. Hence, each firm in the market charges a different price for their products. In other words, the price of the product in the market is not uniform.	A monopoly firm practices price discrimination. That is, it can sell the same product at different prices to different customers in the same or different segments of the market.	The firms under the oligopoly market structure are mutually dependent on each other for their price and output decisions. Hence, the price and output decisions o f the firms under this market structure remain indeterminate.
Free Entry and Exit	Under Perfect Competition, new firms can freely entry into the industry as well as the old firms are free to exit the	Similar to the Prefect Competition, the firms under Monopolistic Competition also	Under Monopoly market structure, the entry of the new entrants is restricted through various legal	Under this market structure, the entry of new firms is highly restrictive.

	industry at any point of time.	enjoy the freedom of entry and exit.	barriers and patent rights.	
Knowledge of Market Conditions	Firms under this market structure have perfect knowledge about the prevailing market conditions.	Under this market structure, there is lack of perfect knowledge about the market conditions among the sellers and the buyers.	There is lack of perfect knowledge of the market conditions.	Due to mutual interdependence, the firms under oligopoly market face lack of perfect knowledge about the market conditions.
Mobility of Factors of Production	Factors of production are perfectly mobile in such a market structure.	Factors of production are immobile and cannot move from one industry another.	In this market structure also the factors of production lack the freedom of mobility.	Factors of production are immobile in this market structure.
Firm's Demand Curve	Firms under perfect competition market, face a perfectly elastic demand curve due to the homogeneity of the product. 	Demand curve faced by a monopolistic firm is relatively more elastic. 	Demand curve faced by a monopolist is relatively more inelastic. 	Demand curve faced by an oligopolistic firm is indeterminate.  But as suggested by Paul Sweezy, it is kinked-shaped demand curve.
Slope of the Demand Curve	The demand curve faced by perfectly competitive firms is a horizontal straight line, i.e. the slope of demand curve is zero. Also, the *AR* curve is the same as the *MR* curve.	The demand curve faced by a monopolistic firm is downward sloping with a high degree of elasticity. Accordingly, the slope of *AR* curve is greater than that of the *MR* curve.	The demand curve faced by a monopoly firm is also downward sloping. However; the elasticity of demand is comparatively lower than that of the demand curve under monopolistic market. The AR and the MR curves are relatively steeper than the AR	The demand curve faced by the oligopolistic firms is downward sloping. The upper portion of the demand curve is more elastic, while, the lower portion is lesser elastic (i.e. more inelastic).

			and the MR curves under the monopolistic market structure.	
Price Control	As a firm under perfect competition market is only a price taker, hence, it has no control over the market price. That is, no single firm can influence the market price.	Due to the product differentiation, a monopolistic firm enjoys some control over the price that it can charge for its product.	A monopolist owns a full control over the market price that he can charge for his product.	Prices under Oligopoly market appear to be rigid (or sticky). This is because of the existence of very high degree of mutual interdependence among the firms.
Level of Profit	A perfectly competitive firm earns only normal profits (or zero economic profits) in the long run. At this equilibrium price level, (Price) *AR = MR = MC* . 	A monopolistic also firm earns normal profits in the long run. Accordingly, the price corresponds to the level where (Price) *AR* is equal to *AC*. 	A monopolist firm earns supernormal (abnormal) profits in the long run. The price charged by the firm is in accordance with the demand curve (*AR* curve), which is greater than the *AC* curve faced by the firm i.e. (Price) *AR > AC*. 	An oligopolistic firm earns supernormal profits, where, (Price) *AR > AC*.