

Unit I: Market Structures

Imperfect competition

Definition: Imperfect competition is a market situation where there are many sellers, but they are selling heterogeneous (dissimilar) goods as opposed to the perfect competitive market scenario. As the name suggests, competitive markets that are imperfect in nature.

Description: Imperfect competition is the real world competition. Today some of the industries and sellers follow it to earn surplus profits. In this market scenario, the seller enjoys the luxury of influencing the price in order to earn more profits.

If a seller is selling a non-identical good in the market, then he can raise the prices and earn profits. High profits attract other sellers to enter the market and sellers, who are incurring losses, can very easily exit the market.

Monopoly

A monopoly is a firm that is the only seller of a good or service in a market. In other words, a monopoly is the sole producer of a commodity that has no close substitutes. For the purposes of regulation, monopoly power exists when a single firm controls 25% or more of a particular market.

Where do monopolies come from?

Monopolies can form for a variety of reasons, including the following:

- If a firm has exclusive ownership of a scarce resource, such as Microsoft owning the Windows Operating System brand, it has

monopoly power over this resource and is the only firm that can exploit it.

- Governments may grant a firm monopoly status, such as with the Post Office, Railway etc.
- Patents , copy rights over creations of mind
- Costs of establishing an efficient plant, especially in relation to the market. This is the case of natural monopoly; examples are electric and gas utilities.
- A monopoly could be created following the merger of two or more firms. Given that this will reduce competition, such mergers are subject to close regulation and may be prevented if the two firms gain a combined market share of 25% or more.

Absence of Supply Curve Under Monopoly

It is generally accepted that, the monopolist does not face a supply curve and marks an important difference between the competitive market and monopoly. Equilibrium in the competitive market is struck at the intersection of the industry demand and supply curves. The monopolist, on the other hand, has a power either to set price or output determined on the demand curve simultaneously. It makes no sense to ask: given some price p , how much will the monopoly supply, therefore no supply curve can be derived. Supply curve becomes relevant, when the firm has no control over the price. According to Baumol: the supply curve is relevant only for the case of pure or perfect competition, the reason for this lies in the definition.... The supply curve is designed to answer the question, how much will a firm supply if it encounters a price and such a question is relevant to the behavior of firms that actually deal with prices over whose determination they exercise no control. The monopolist does not take the price as given and exercises control over the price as he is the sole producer. Monopolist maximizes profits by equating marginal revenue with marginal cost not with price as the competitive firm does.

Comparison of Perfect Competition and Monopoly

Perfect competition is the market in which there is a large number of buyers and sellers. The goods sold in this market are identical. A single price prevails in the market. On the other hand monopoly is a type of imperfect market. The number of sellers is one but the number of buyers is many. A monopolist is a price-maker. In fact monopoly is the opposite of perfect competition.

Firm under perfect competition and the firm under monopoly are similar as the aim of both the seller is to maximise profit and to minimise loss. The equilibrium position followed by both the monopoly and perfect competition is $MR = MC$. Despite these similarities, these two forms of market organization differ from each other in respect of price-cost-output. There are many points of difference which are noted below.

(1) Under perfect competition there are a large number of buyers and sellers in the market competing with each other. The price fixed by the industry is accepted by all the firms operating in the market. As against this under monopoly, there is only one single seller but a large number of buyers. The distinction between, firm and industry disappears under this type of market situation.

(2) The average revenue curves under competition and monopoly take different shapes. The average revenue (price) curve under perfect competition is a horizontal straight line parallel to OX-axis. The industry demand curve or revenue curve slopes downward from left to right. But under monopoly the firm is itself the industry.

There is only one demand curve common both to the monopoly firm and monopoly industry. The average revenue curve under monopoly slopes downward and its corresponding marginal revenue curve lie below the average revenue curve. Under perfect competition MR Curve is the same as AR Curve.

(3) Under perfect competition price equals marginal cost at the equilibrium output, but under monopoly equilibrium price is greater than marginal cost. Under perfect competition marginal revenue is the same as average revenue at all levels of output. Thus at the

equilibrium position under perfect competition marginal cost not only equals marginal revenue but also average revenue.

On the other hand under monopoly both the AR and MR curve slope downward and MR curve lies below AR curve. Thus average revenue is greater than marginal revenue at all levels of output. Hence at the equilibrium output of the monopolist price stands higher than marginal cost. Under competition price $MR=MC$. In monopoly equilibrium, $price > MC$.

(4) A competitive firm makes only normal profit in the long run. As against this a monopolist can make super normal profits even in the long run. In perfectly competitive market there is freedom of entry and exit. Attracted by the supernormal profit earned by the existing firms the new competitive firms enter the market to compete away the supernormal profit. Output rises and profit becomes minimum.

Thus in the long run a competitive firm earns only normal profit. But under monopoly the firm continues earning supernormal profits even in the long run since there are strong barriers to the entry of new firms in the monopolistic industry.

(5) Under monopoly price is higher and output smaller than under perfect competition. Price output equilibrium is graphically shown in the diagram given below.

AR = MR curve is the demand curve under perfect competition which is horizontal straight line. The downward sloping AR and MR curve are the average revenue and marginal revenue curves under monopoly. At equilibrium point E ($MR = MC$) a competitive firm produces 'OM' output at OP market price.

At point F a monopoly firm attains equilibrium producing OM, output at OP, price. OP competitive price is less than OP, ($OP < OP,$) and OM competitive output is greater than OM, output ($OM > OM,$).

(6) A monopolist can discriminate prices for his product, a firm working under perfect competition cannot. The monopolist will be increasing his total profit by price discrimination if he finds elasticities of demand are different in different markets.

As against his a competitive firm cannot charge different prices from different buyers since he faces a perfectly elastic demand at the going market price. If he increases a slight rise in price he will lose the sellers and makes loss. Thus a competitive firm can not discriminate prices which a monopolist can do.

Short Run Equilibrium Price and Output Under Monopoly:

Short Run Equilibrium of the Monopoly Firm:

In the short period, the monopolist behaves like any other firm. A monopolist will maximize profit or minimize losses by producing that output for which marginal cost (MC) equals marginal revenue (MR). Whether a profit or loss is made or not depends upon the relation between price and average total cost (ATC). It may be made clear here that a monopolist does not necessarily makes profit. He may earn super profit or normal profit or even produce at a loss in the short run.

Conditions for the Equilibrium of a Monopoly Firm:

There are two basic conditions for the equilibrium of the monopoly firm.

- First Order Condition: $MC = MR$.
- Second Order Condition: MC curve cuts MR curve from below.

Explanation:

(a) Short Run Monopoly Equilibrium with Positive Profit:

In the short period, if the demand for the product is high, a monopolist increases the price and the quantity of output. He can increase the, output by hiring more labor, using more raw materials, increasing working hours etc. However, he cannot change his fixed plant and

equipment. In case, the demand for the product falls, he then decreases the use of variable inputs, (like labor, material etc.).

As regards the price, the monopolist is a price maker. There is a greater tendency for the monopolist to have a price which earns positive profits. This can only be possible if the price (AR) is higher than average total cost (ATC). The short run profit earned by the monopolist is now explained with the help of following the diagram below:

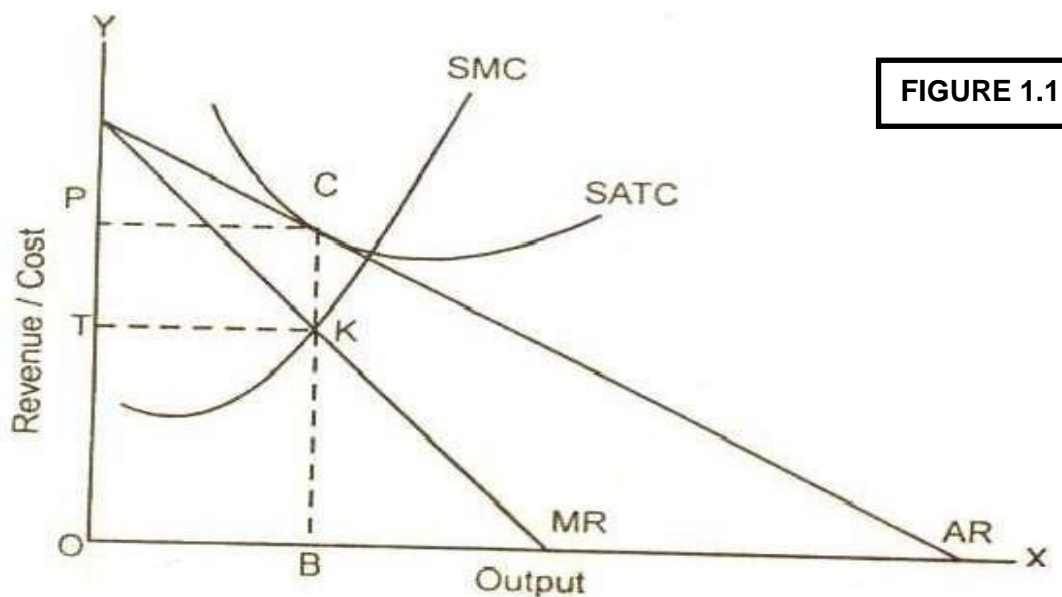
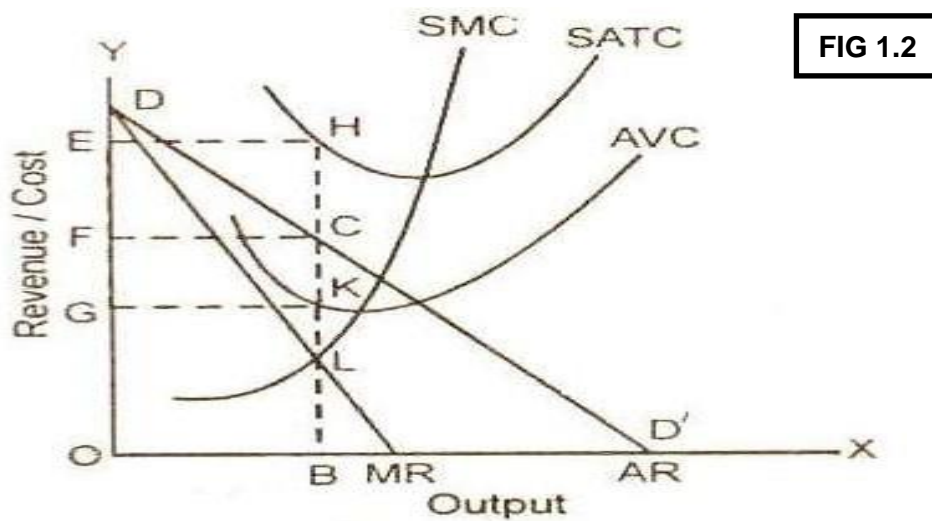


FIGURE 1.1

In figure (1.1), a firm is in the short run equilibrium at point K, where $SMC = MR$. The price line is tangent to SAC at point C. The firm charges CB price per unit for units of output OB. The total revenue of the firm is equal to the area OTCB. The total cost of the firm is also equal to the area OPCB. The firm earns only normal profits and continues operating

Short Run Equilibrium with Losses under Monopoly:

A monopolist also accepts short run losses provided the variable costs of the firm are fully covered. The loss minimizing short run equilibrium analysis is presented graphically.



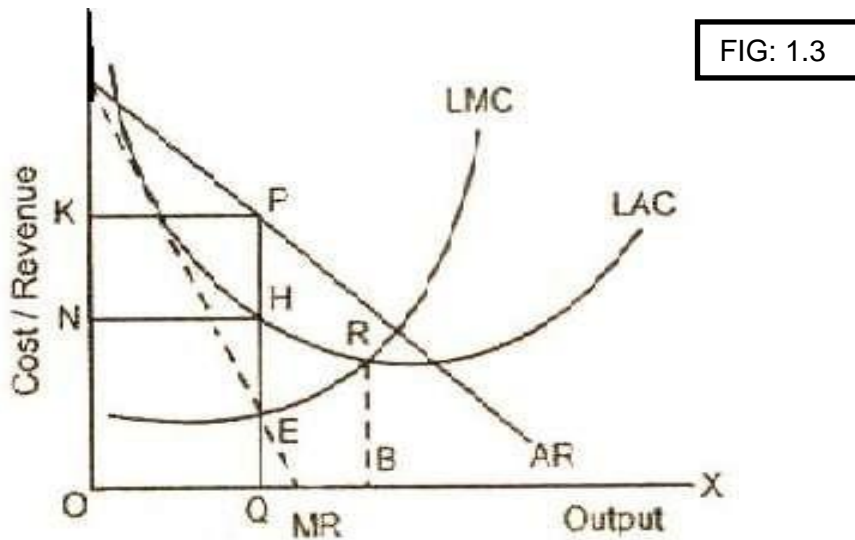
In this figure (1.2), the best short run level of output is OB units which is given by the point L where $MC = MR$. A monopolist sells OB units of output at price CB. The total revenue of the firm is equal to OBCF. The total cost of producing OB units is OBHE. The monopoly firm suffers a net loss equal to the area FCHE. If the firm ceases production, it then has to bear a total fixed cost equal to GKHE. The firm in the short run prefers to operate and reduces its losses to FCHE only. In the long, if the loss continues, the firm shall have to close down.

Long Run Equilibrium Under Monopoly:

The Monopolist blocks the entry of new firms into the industry by having control over the key materials needed for the production of goods or he may hold full rights to the production of a certain good (patent) or the market of the good may be limited. If new firms try to enter in the field, it lowers the price of the good to such extent, that it becomes unprofitable for new firms to continue production etc.

When there is no threat of the entry of new firms into the industry, the monopoly firm makes long run adjustments in the scale of plant. In case, the demand for the product is limited, the monopolist can afford to produce output at sub optimum scale. If the market size is large and permits to expand output, then the monopolist would build an optimum scale of plant and would produce goods at the minimum cost

per unit. However, the monopolist would not stay in the business, if he makes losses in the long period. The long run equilibrium of a monopoly firm is now explained with the help of the following diagram.

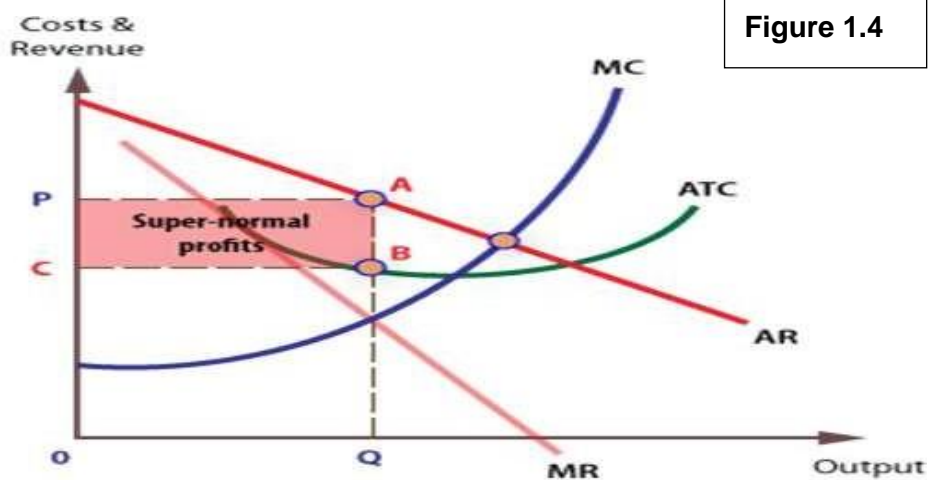


In the long run, all the factors of production including the size of the plant are variable. A monopoly firm will maximize profit at that level of output for which long run marginal cost (MC) is equal to marginal revenue (MR) and the LMC curve intersects the MR curve from below. In the figure (1.4), the monopoly firm is in equilibrium at point E where $LMC = MR$ and LMC cuts MR curve from below. QP is the equilibrium price and OQ is the equilibrium output.

At OQ level of output, the cost per unit is QH (LAC), whereas the price per unit of the good is QP. HP represents the per unit super normal profit. The total super normal profit is equal to KPHN. It may here be noted that at the equilibrium output OQ, the plant is not being fully utilized. The long run average cost (LAC) is not minimum at this level of output OQ. The firm will build an optimum scale of plant only if the demand for the product increases.

Key characteristics

1. Monopolies can maintain super-normal profits in the long run. As a rule, profits are maximized when $MC = MR$. In general, the level of profit depends upon the degree of competition in the market, which for a pure monopoly is zero. At profit maximization, $MC = MR$, and output is Q and price P . Given that price (AR) is above ATC at Q , supernormal profits are possible as shown in the figure (1.4) as area $(PABC)$.



2. With no close substitutes, the monopolist can derive super-normal profits, area $PABC$.
3. A monopolist with no substitutes would be able to derive the greatest monopoly power.

Evaluation of monopolies (Advantages and disadvantages)

- I. Monopolies can benefit from economies of scale, and may be Natural monopolies, so it may be argued that it is best for them to remain monopolies to avoid the wasteful duplication of infrastructure that would happen if new firms were encouraged to build their own infrastructure.
- II. Monopolies can become dominant in their own territory and then penetrate overseas markets, earning country valuable

revenue in the form of exports. This is certainly the case with Microsoft.

- III. According to Austrian economist, Joseph Schumpeter, inefficient firms, including monopolies, would eventually be replaced by more efficient and effective firms through a process called *creative destruction*.
- IV. It is argued by some economists that monopoly power is required to generate dynamic efficiency, that is, technological progressiveness. This is because:

- ❖ High profit levels boost investment in R&D.
- ❖ Innovation is more likely with large enterprises and this innovation can lead to lower costs than in competitive markets.
- ❖ A firm needs a dominant position to bear the risks associated with innovation.
- ❖ Firms need to be able to protect their intellectual property by establishing barriers to entry; otherwise, there will be a free rider problem.
- ❖ Why spend large sums on R&D if ideas or designs are instantly copied by rivals who have not allocated funds to R&D?
- ❖ However, monopolies are protected from competition by barriers to entry and this will generate high levels of supernormal profits.
- ❖ If some of these profits are invested in new technology, costs are reduced via process innovation. This makes the monopolist's supply curve to the right of the industry supply curve. The result is lower price and higher output in the long run.

Disadvantages of monopoly

Monopolies can be criticised because of their potential negative effects on the consumer, including:

- Restricting output onto the market.
- Charging a higher price than in a more competitive market.

- Reducing consumer surplus and economic welfare.
- Restricting choice for consumers.
- Reducing consumer sovereignty.

Welfare costs of monopoly

The traditional view of monopoly stresses the costs to society associated with higher prices because of the lack of competition and power of monopolist to influence price and output. The monopolist can charge a higher price (P_1) than in a more competitive market (at P) as shown in the figure (1.5). This monopoly power leads to loss of welfare in the form of loss of consumer's and producer's surplus. The area of economic welfare under perfect competition is EFB . The loss of consumer surplus if the market is taken over by a monopoly is PP_1AB . The new area of producer surplus, at the higher price P_1 , is EP_1AC . Thus, the overall (net) loss of economic welfare is area ABC . The area of deadweight loss for a monopolist can also be shown in a more simple form, comparing perfect competition with monopoly.

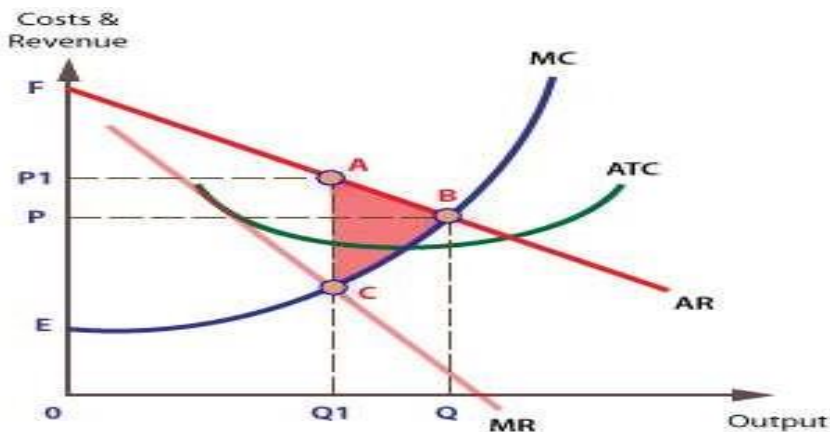


Figure 1.5

The diagram (1.6) assumes that average cost is constant, and equal to marginal cost ($ATC = MC$). Under perfect competition, equilibrium price and output is at P and Q . If the market is controlled by a single firm, equilibrium for the firm is where $MC = MR$, at P_1 and Q_1 . Under perfect competition, the area representing economic welfare is PFA but under monopoly the area of welfare is $PFCB$. Therefore, the deadweight loss is the area BCA .

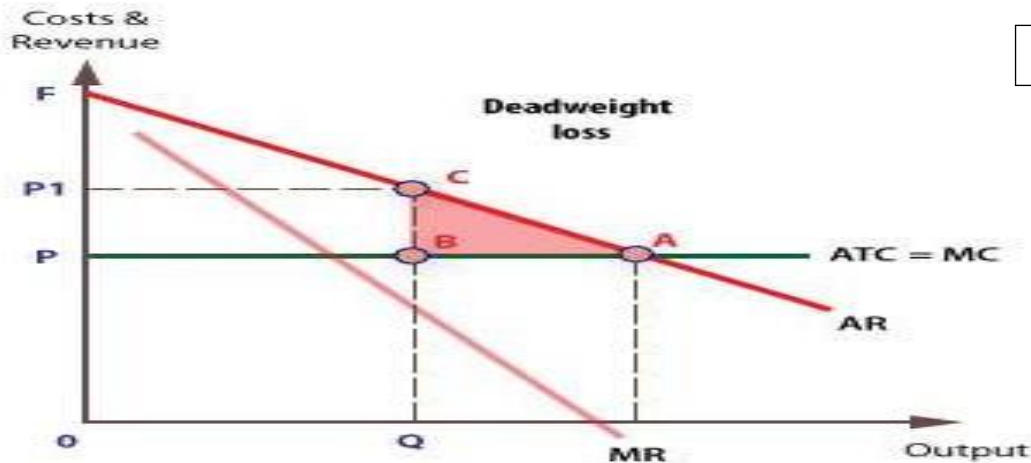


Figure 1.6

Note; Deadweight loss is the loss not compensated by any gain. It simply refers to economic waste. Under monopoly this waste occurs due to production less than social optimum.

Monopoly power

Economists generally consider any firm that can alter its price, through an adjustment in its output, to have some monopoly power. It also refers to the ability to charge price higher than MC. Many Economists have developed indexes to measure monopoly power among them the prominent indices are;

- Abba Lerner index. (Price- MC/Price) or $(1 - 1/n)$ where $-n$ is the elasticity of demand
- Herfindahl index. $HI = \sum v_i^2$ (n=no of firms, v= variance of the market share of a firm).

Price discrimination

Price discrimination is an act of selling the same product at different prices to different buyers. The costs of production is either same or differs, not as much as the difference in the charged prices (Stigler). This discrimination can occur between markets and individuals in the same market.

Price discrimination seems to be all pervasive. Some examples are here;

- Pricing of transport services by age—children and senior citizens are charged at lower rates for riding on buses or trains.
- Pricing of cinema hall tickets by time of day or day of the week.
- Pricing of books by different editions.
- Pricing of mobile services and internet services.
- Pricing according to frequency of purchase.

Price discrimination may be of various types. It may either be (i) personal (ii) trade discrimination (iii) local discrimination.

(1) Personal Price discrimination. It is personal, when separate price is charged from each buyer according to the intensity of his desire or according to the size of his pocket.

For instance, a doctor may charge Rs.20000 from a rich person for an eye operation and Rs.500 only from a poor man for the similar operation.

(2) Trade discrimination. It may take place when a monopolist charges different prices according to the uses to which the commodity is put. For example, an electricity company may charge low rate for electric current used in an industrial concern than for the electricity used for the domestic purpose.

(3) Place discrimination. It occurs when a monopolist charges different prices for the same commodity at different places. This type of discrimination is called dumping

Conditions for successful price discrimination.

Every firm would like to price discriminate, but may not be able to do so. Different conditions are required to discriminate.

- The firm must possess some monopoly power, that is, the ability to set price or output.
- Ability to separate customer's into two or more groups.
- Ability to prevent arbitrage by buyers.

Different Degrees of Price Discrimination.

Pigou (1920) has classified price discrimination into different types. The basis for classification is the amount of the information available to a seller about potential buyers. He distinguished between first, second and third degree price discrimination.

- First degree price discrimination also called ‘perfect price discrimination’ takes place when the seller has complete information about the demand curve of a buyer and appropriates the whole surplus. For example, two-part tariffs(membership fees for clubs plus the price of drinks and meals, monthly rentals for telephones plus call charges)
- The second degree price discrimination (non-linear pricing) occurs, when the seller knows the distribution of buyer types, but can’t recognize them individually. For example quantity discounts.
- Finally third degree discrimination occurs when the seller can classify buyers into observable categories and relevant information about each category is available. In this case higher price is charged to that group which has a more inelastic demand.

Monopolistic Competition

The two extreme limits of market structure are, monopoly and perfect competition, In between; there are some important forms depending on the degree of monopoly or competition or variation in some other characteristics monopolistic competition is one of them.

Monopolistic competition is a market situation where there are many sellers of differentiated products (Soaps, tooth pastes, electrical appliances, motor cycles etc.). In other words, it refers to competition among a large number of sellers producing close but not perfect substitute products. There are large numbers of small sellers, but no single

seller has perceptible influence on the price and output policies of other sellers.

Characteristics of Monopolistic Competition

➤ Product differentiation.

Product differentiation is the most important characteristic of the monopolistic competition and makes this market structure different from the perfect competition, this also causes its own consequences for the product and performance of the sellers. If we look at the consumer goods industry we find different varieties of goods or different brands which are close(not perfect) substitutes for each other but their prices will not be identical, yet people will be buying them according to their brand preferences.

This product differentiation can be *real*, when the inherent characteristics of a product are different, or *fancied*, when the consumer is persuaded, via advertising or other selling activities (packing, design) that products are different.

The effect of this differentiation and the brand preference

Preference of consumers gives the seller some degree of monopoly power in the determination of the price of his product for example the brand preference of consumers to Apple I Phones, Laptops, brand preference to Monty Carlo etc. the product differentiation also gives the rationale for selling activities.

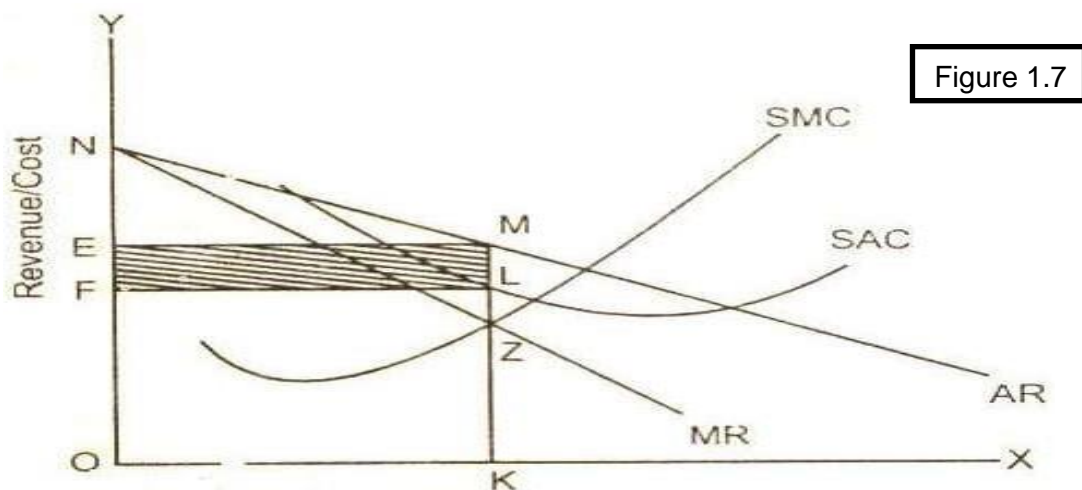
- Freedom of entry and exit of firms: The entry of new firms in the monopolistic competition is relatively easy. There are no barriers of the new firm to enter the product group or leave the industry in the long run.
- Non Price competition. Since the products are close substitutes each firm spends on advertising in order to create taste for his product among the consumers and increase the market share.

- Independent behavior. The economic impact of one firm's decision is spread sufficiently evenly across the entire group so that the effect of any single competitor goes unnoticed. This implies that competition is impersonal.
- The goal of the firm is profit maximization, both in the short run and long run

Firm's Equilibrium Price and Output:

The firm whether operating under perfect competition, or monopoly wants to maximize profits. In order to achieve this objective, it goes on producing a commodity so long as the marginal revenue is greater than marginal cost. When $MR = MC$, it is then in equilibrium and produces the best level of output. If a firm produces less than or more than the $MR = MC$ output, it will then not be making maximum of profits.

In the short-run, a monopolistically competitive firm may be realizing abnormal profits or suffering losses. If it is earning profits, no new firms can enter the industry in the short-run. In case, it is suffering losses but covering full variable cost, the firm will continue operating so that the losses are minimized. If the full variable cost is not met, the firm will close down in the short-run. The short-run equilibrium with profits and short run equilibrium with losses of a monopolistically competitive firm are explained with the help of two separate diagrams as under.



In the figure (1.7), the downward sloping demand curve (AR curve) is quite elastic. The MR curve lies below the average revenue curve except at point N. The SMC curve which includes advertising and sales promotional costs is drawn in the usual fashion. The SMC curve cuts the MR curve from below at point Z. The firm produces and sells an output OK, as at this level of output $MR = MC$. The firm sells output OK at OE/KM per unit price. The total revenue of the firm is equal to the area OEMK, whereas the total cost of producing output OK is OFLK. The total profits of the firm are equal to the shaded rectangle FEML. The firm earns abnormal profits in the short run.

Short run losses

If the demand and cost situations are not favourable in the market, a monopolistically competitive firm may incur losses in the short-run. The short-run equilibrium of the firm with losses is explained with the help of a diagram. The diagram shows that marginal cost (SMC) equates marginal revenue MR curve from below at point Z. The firm produces output OK and sells at OF/KT per unit-price. The total receipt of the firm is OFTK. The total cost of producing output OK is equal to OEMK. The firm suffers a net loss equal to the area FEMT on the sale of OK output.

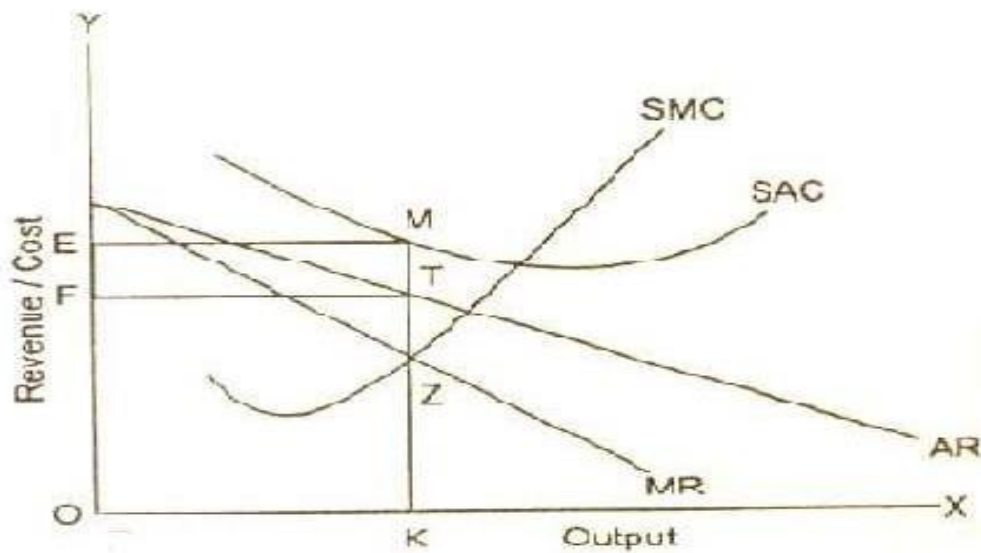


Fig.1.8

Equilibrium Price and Output in the Long Run Under Monopolistic Competition:

Long Run Zero Economic Profits:

In the long run, the firms are able to alter the scale of plant according to the changed conditions of demand for a product in the market. They can also leave or enter the industry. If the firms are earning abnormal profits in the short run, then new firm will enter the industry. The tendency of the new firms to enter the industry continues till the abnormal profits are competed away and the firms economic profits are zero. In case the monopolistically competitive firms realize losses in the short-run, then some of the firms will leave the industry. The exit of the firm continues till zero economic profits are restored with the operating firms. In the long-run, there are no entry barriers for the new firms. The incoming firms install latest machinery and try to differentiate their products from those of the established firms. The old firms operating with the used machinery try to match up with the new entrants by improved variety of products in their group. They increase expenditure on advertisement and on other sales promotional measures. They employ more qualified staff for making technical improvement in their products. Since all the firms for their existence incur additional expenditure for improving the quality of the products, the cost curves of all the firms move up.

Due to entry of new firms in the industry and higher costs of production, the output of each competing firm is reduced. There is, therefore, a waste in the economic resources of the country. The equilibrium price and output in the long-run is explained with the help of a diagram given below.

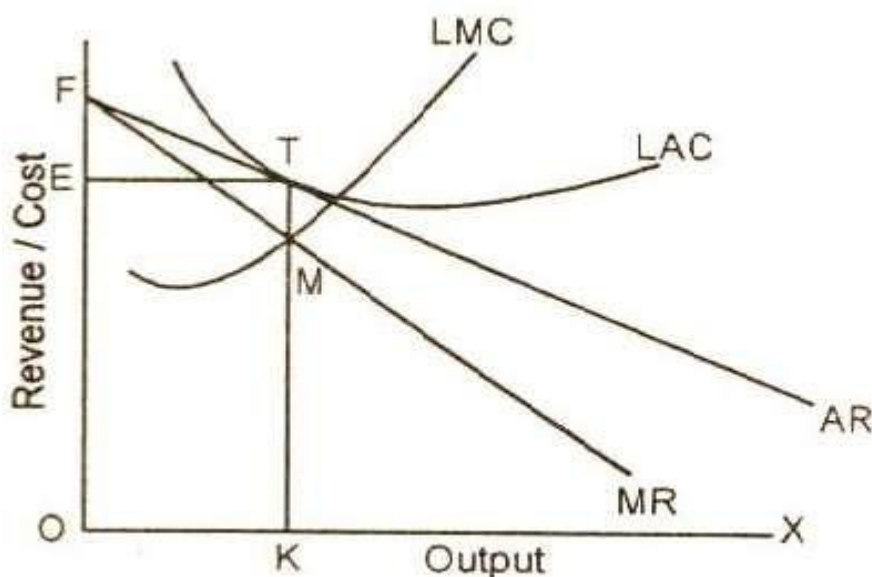


Fig.1.10

In the diagram, the higher shifted long-run marginal cost curve intersects the higher shifted marginal revenue curve at point M. The firm at this raised equilibrium point, produces the reduced level of output OK. It sells this output at price TK as at point T, LAC is a tangent to the demand or average revenue curve at its minimum point. The total revenue of the firm is equal to the area OETK. The total costs of the firm are also equal to the area OETK. The firm is earning only zero or normal economic profits. As the monopolistically competitive firm sets a price higher than that minimum average cost in the long-run, the firm therefore produces a smaller output. Since all the firms in the group produce less at higher price, there is, therefore, an apparent waste of resources and exploitation of the consumers.

Oligopoly Market

The term oligopoly means -few sellers. It is a market situation in which only few firms compete with one another. Few in this context,

can be a number as small as 2 or as large as 10 or 15 firms. Oligopoly is also known as competition among the few. When there are a few sellers, each seller produces a significant portion of the total output of the Industry and his policies with regard to prices and output causes considerable effect on market conditions. When the product of the firms is homogenous it is called —pure oligopoly and when the product is different, it is called differentiated oligopoly.

Examples of oligopolistic industries are;

Automobiles, Airlines, computers, petrochemicals, Electrical equipment's, etc.

Characteristics of oligopoly.

An oligopoly market has certain special characteristics which are not found in other forms of markets .these characteristics make it the most complicated form of market that is the reason that there is no generally accepted theory of pricing in this type of market.The important characteristics are briefly discussed below.

Mutual Interdependence of firms: Under oligopoly market firms are interdependent, that means a firms decision to set price or output is partly based on the strategic considerations regarding the behavior of its competitors. e.g. in the airline industry, the decision of a single airline to lower fares can set off a price war which brings down the fare charged by all its competitors.(provided that there is no collusion among the firms) a firm recognizes or has to recognize that the

policies of its rival firms in regard to price, output, product, selling outlays, etc. are considerably influenced by its own policies in these matters.

Importance of selling and advertising costs.

In order to enlarge the market share or to safeguard against a decline in the market share firms have to take aggressive and defensive measures and one of them is the expenditure on advertising and sales promotion.

Indeterminateness of Demand curve:

The demand curve facing an individual producer under oligopoly is indeterminate because of the interdependence, any move by the seller to influence the price or output will cause unpredictable reactions and repercussions. so mostly prices remain relatively rigid under this market situation.

Difficult entry for new firms

Under oligopoly entry of new firms is difficult, because of the strategic behavior by the existing firms, which is why the market is dominated by few players. There can be other reasons also, like high costs (production as well as selling)

Presence of competition: The feature of oligopolistic market is the presence of competition. There is life of constant struggle, rival against rival.

Group behavior: The theory of oligopoly is however is a theory of group behavior and not of a mass or individual. It does not appear to be valid to assume that it behaves in a manner so as to maximize profits. But how the group behaves and works are the questions to which economic theory have to settle the answers.

Oligopoly models

In order to explain the determination of price and output under oligopoly a large no of models have been formulated depending upon the varied assumptions made in regard to the behavior and the action-reaction pattern of rivals. Following may be mentioned among the important models. (1) Classical models by Cournot, Bertrand, and Edgeworth (2) kinked demand curve model by P.M Sweezy (3) Collusive oligopoly model (4) price leadership model. Here we will discuss the Cournot model of oligopoly.

Cournot's model of limiting case of oligopoly (Duopoly)

Augustin Cournot (core-no) was born in 1801. In his book, *Researches into the Mathematical Principles of the theory Wealth*, has given the earliest model known as duopoly model (1838), Duopoly is a limiting case of oligopoly. In duopoly only two firms operate in the market. He had made the following assumptions for developing his model of oligopoly.

1. Homogenous product (mineral water).
2. A Duopoly market (two firms only) and each firm taking the independent decision.
3. Large no of buyers.
4. Identical costs of production. Cournot has assumed zero costs of production for simplicity. But this assumption can be relaxed.
5. The goal of each duopolist is to maximize profit.
6. Both behave naively.

The model can be presented in many ways but the original version is quite limited in that it is based on the assumption of identical products and identical costs.

Cournot illustrates his model with the example of two firms each owning a spring of mineral water, produced at zero costs. The only decision each firm needs to make is how much to produce. The firms select their output simultaneously, non –

cooperatively and with no knowledge of each other's plan. Each firm assumes that the rival will keep its output fixed and decides its own profit maximizing level of output. We then seek the equilibrium in forecasts- a situation where each firm finds its beliefs about the other firm to be confirmed.

The model begins by assuming that firm 1 expects that firm 2 will produce y^* units of output (* refers to expected output). if firm 1 decides to produce y_1 units of output, it expects that the total output produced will be $Y = y_1 + y^*$ and the market price will be $p(Y) = p(y_1 + y^*)$. The profit maximization problem of firm 1 is then

$$\max p(y_1 + y_2^*)y_1 - c(y_1).$$

For any given belief about the output of firm 2, y_2^* there will be some optimal choice of output for firm 1, y_1 . Let us write this functional relationship b/w the expected output of firm 2 and the optimal choice of firm 1 as

$$Y_1 = f(y_2^*)$$

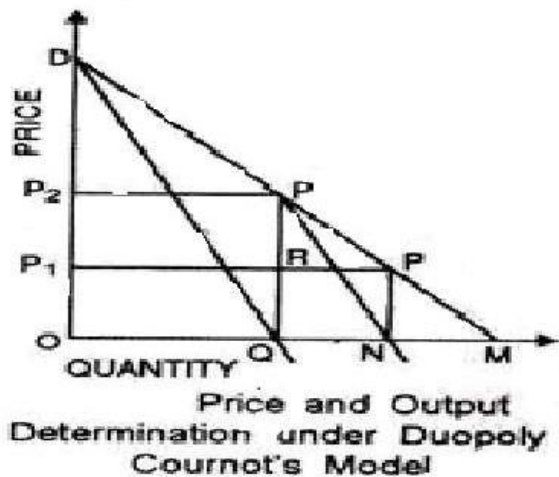
Similarly for the firm 2

$$Y_2 = f(y_1^*)$$

The optimal combination of output levels is known as Cournot equilibrium. In Cournot equilibrium, each firm is maximizing its profits, given its belief about the others output choice and those beliefs are confirmed in equilibrium.

Let us assume that firm 1 produces quantity OQ' (as shown in figure 1.1) with demand curve DM and sells it at a price where profits are at a maximum, at this point $MC = MR$, if costs are zero as assumed by Cournot then maximum revenue = max profit. The second firm assumes (expects) that firm 1 will keep its output fixed (OQ) and considers that his demand curve is PM and produces output $\frac{1}{2}$ of the quantity OQ . i.e. firm 2 produces half of the market not supplied by the firm 1 i.e. firm 2 output is $(\frac{1}{2} * \frac{1}{2}) = \frac{1}{4}$ of the total market.

Fig1.11



Now firm 1 will expect that firm 2 will keep its output fixed and will supply $\frac{1}{2}$ of the market not supplied by the firm 2. So the firm 2 will supply $\frac{1}{2}(1-1/4) = 3/8$ of the total market. In the same manner firm 2 expects that the rival will keep its output fixed and supplies $\frac{1}{2} (1-3/8) = 5/16$ of the total market. So the action reaction will continue till each firm produces $1/3$ of the total output and together they supply $2/3$ of the total market. If the two firms collude and form monopoly then they will supply $\frac{1}{2}$ of the total output and price will be higher and so the profit.

In Cournot model firms behave naively and never learn from their past mistakes. It leads to completion which drives the price down and low profits. Each firm supplies $1/3$ of the market at a price lower than monopoly but higher than competitive price.

At last, if there are n firms in the industry each firm will supply $1/(n+1)$ of the market, and the industry output supplied to the market will be $n/(n+1)=1/(n+1)$.

Criticism of model

Cournot's behavioral assumption is naïve to the extent that it implies that firms continue to make wrong calculations about the competitor's behavior.

The assumption of zero costs of production is also unrealistic.

Price rigidity and the kinked demand curve

The most popular view about the oligopolistic market situation is the price rigidity (particularly downwards) and many reasons have been put forward by the oligopoly theorists regarding the rigidity. First one being the avoidance of the disastrous consequences of price war. Secondly, the oligopolists may collude and fix the agreed price to deter the entry. Thirdly an oligopolistic firm may attempt to maintain sales by intensifying its sales promotion activities and lastly to abide by the ruling price agreed by the firm.

Kinked demand curve was first used by Hall and Hitch to explain the price rigidity under oligopoly. But Paul.M Sweezy in 1939 made it an operational tool for the determination of the equilibrium in oligopolistic markets. He states that the oligopolist demand curve has a kink reflecting the following pattern of behavior. If the firm reduces the price of his product the others will follow suit. If the firm increases the price the other firms will not follow and his market share will come down. So the equilibrium of the firm will be defined by the point of kink and it is known as the kinked demand curve solution of oligopolistic market. It assumes that the rival firms follow a price cut policy but not a price increase policy.

This can be illustrated through a diagram drawn below;

In the figure DD' is a kinked demand curve. It is made up of two segments, DB and BD' . The demand curve is kinked or has a bend at point B. The kink is formed at the prevailing market price level BM (10Rs per unit). The segment of the demand curve above the prevailing price level (10Rs) is highly elastic and the segment of the demand curve

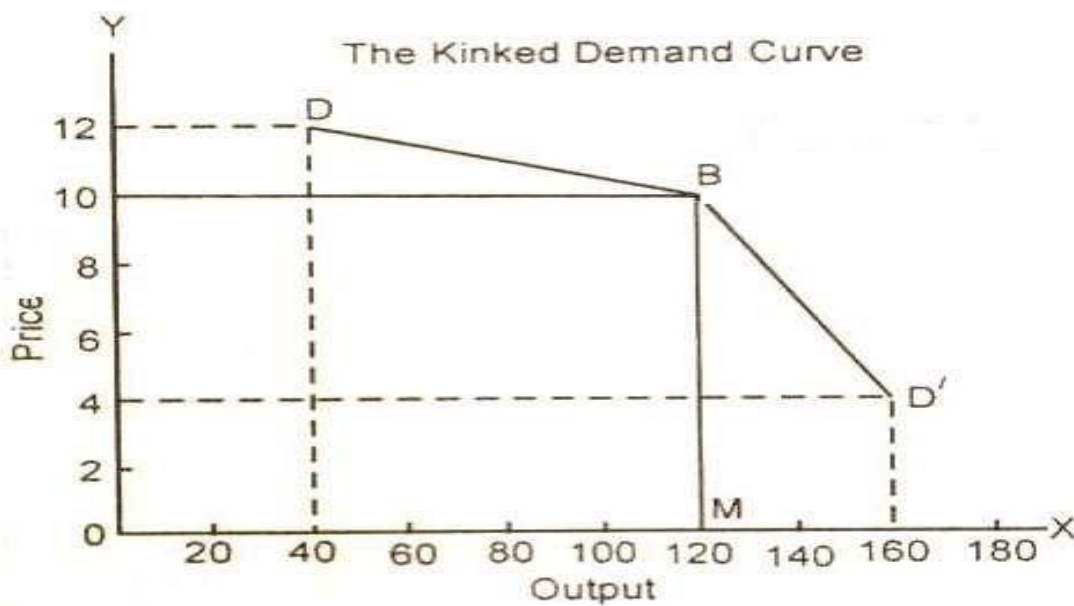


Fig.1.12

below the prevailing price level is fairly inelastic. This is explained in brief.

Explanation:

Price Increase: If an oligopolistic raises the price of his products from Rs10 per unit to 12 per unit, he loses a large part of the market and his sale comes down to 40 units from 120 units. There is a loss of 80 units in sale as most of his customers are now purchasing goods from his competitor firms who are selling the goods at Rs10 per units. So an increase in price above the prevailing level-shows that the demand curve to the left of and above point B is fairly elastic.

Price Reduction: If an oligopolistic reduces the prices of its goods below the prevailing price level BM (Rs10 per unit) for increasing his sales, his competitors will also match price changes so that their customers do not go away from them. Let us assume that Oligopolist has lowered the price to Rs4.0 per unit. Its competitors in the industry match the price cut. The sale of the oligopolist with a big price cut of Rs6.0 per unit has increased by only 40 units ($160 - 120 = 40$). The firm does not gain as the total revenue decreases with the price cut. The BD' portion of the demand curve which lies on the right side and below point B is fairly inelastic.

Rigid Prices. The firms in the oligopolist market 'have no incentive to raise or lower the prices of the goods. They prefer to sell the goods at the prevailing price level due to reaction function. The price BM (Rs10 per unit) will, therefore, tend to remain stable or rigid, as every member of the oligopoly does not see any gain by lowering or raising the price of his goods.

Chamberlin's Small- Group Model of Oligopoly

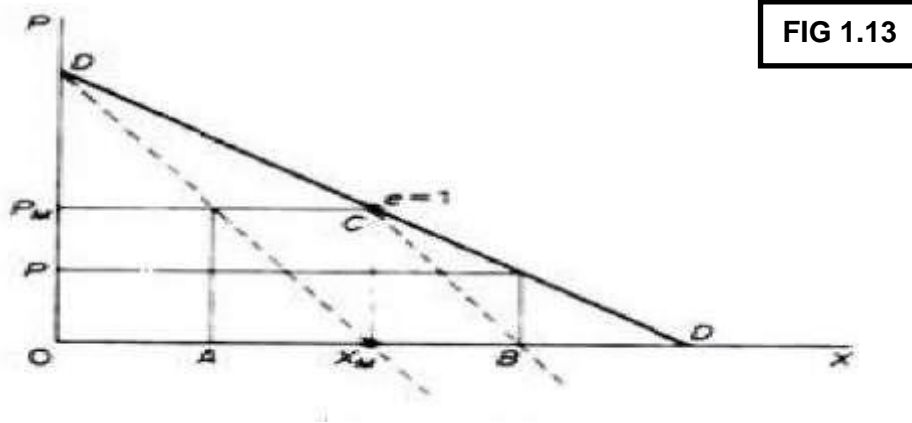
Chamberlin has contributed most to the theory of imperfect market studies, he has developed many models about the imperfect competition Chamberlin in his small group model suggests that a stable equilibrium can be reached if the firms in oligopoly recognize their interdependence and maximize the industry profit. Chamberlin accepts that if the oligopolists act independently, then their decisions will not materialize and they will reach Cournot solution.

Chamberlin further assumes that firms are not naïve as assumed by Cournot. When firms change their output or price they do recognize the consequences of their decisions. Recognition of interdependence of firms in an oligopolistic market gives a result quite different from Cournot. Chamberlin argues that firms are aware of the fact that their output or price decision will definitely invite reactions of other firms. He assumes no price war in oligopoly.

According to Chamberlin, recognition of possible aggressive reactions to firm's price or output manipulations would avert price or quantity competition amongst the firms and would lead to stable equilibrium with monopoly price and output.

Chamberlin's model can best be understood if presented in a duopoly market. Initially Chamberlin's model is the same as Cournot's. The market demand is a straight line with negative slope, and production is assumed costless for simplicity (figure 1.13). If firm A is the first to

start production it will produce the profit-maximizing output OX_M and sell it at the monopoly price PM



Firm B, under the Cournot assumption that the rival A will retain his quantity unchanged, considers that its demand curve is CD and will attempt to maximize its profit by producing one-half of this demand, that is, quantity $X_M B$ (at which B's $MR = MC = 0$). As a consequence the total industry output is OB and the price falls to P . Now firm A realizes that its rival does in fact react to its actions, and taking that into account decides to reduce its output to OA which is one-half of OX_M and equal to B's output.

The industry output is thus OX_M and price rises to the monopoly level OP_M . Firm B realizes that this is the best for both of them and so will keep its output the same at $X_M B = AX_M$. Thus, by recognizing their interdependence the firms reach the monopoly solution. Under the assumption of our example of equal costs (that is, costs = 0) the market will be shared equally between A and B (clearly $OA = AX_M$).

Chamberlin's model is an advance over the previous models in that it assumes that the firms are sophisticated enough to realize their interdependence, and that it leads to a stable equilibrium, which is the monopoly solution.

Chamberlain's model is criticised on the ground that it is a closed model and if entry is allowed then stability will be uncertain.

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