MICRO ECONOMICS II

III Semester

CORE COURSE

BA ECONOMICS

(2013 Admission)

UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

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SCHOOL OF DISTANCE EDUCATION

STUDY MATERIAL

Core Course for

BA – Economics

III Semester

MICRO ECONOMICS II

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CONTENTS

SERIAL NO.	MODULE TITLES	PAGES
MODULE 1	PERFECT COMPETITION	5
MODULE 2	MONOPOLY	15
MODULE 3	MONOPOLISTIC COMPETITION	30
MODULE 4	OLIGOPOLY	38
MODULE 5	FACTOR PRICING	45

MODULE 1

PERFECT COMPETITION

Meaning of Market

Market refers to any place or location where a product, be it a tangible commodity or intangible service, is exchanged for money between sellers and buyers. Or market is a place where goods and services are exchanged for money. It is a place of exchange, be it a household, a roadside, a pavement or even a street corner that may fit in to the descriptions of a market. The essential feature is the presence of buyers and sellers with intent of exchange. Markets known for sale and purchase of particular commodities or services are generally named or known after them. Capital market, money market, stock market, car market, spare parts market, fruit market, vegetable market etc…..are few examples. There are markets in which prices are fixed and uniform throughout and there are markets in which such certainties do not exist. The former is called a perfect market, while the latter, an imperfect market. In other words, a market with least or no price distortions is a perfect or a competitive market while one, in which the price distortions are common, is an imperfect market.

Perfect Competition

Perfect competition is a phrase used often in every day discussions, and many people have an intuitive and vague understanding of what it means. The concept of Perfect competition is very old and was discussed in a casual way by Adam smith in his wealth of nations. Edge worth was the first to attempt a systematic and rigorous definition of perfect competition. The concept received its complete formulation in Frank Knight's book, Risk, Uncertainty and profit (1921). Perfect competition is a market structure characterized by a complete absence of rivalry among the individual firms. Thus Perfect Competition in economic theory has a meaning diametrically opposite to the everyday use of this term. In practice businessmen use the word competition as synonymous to rivalry. In theory, Perfect competition implies no rivalry among firms.

Features of Perfect Competition

1 Large number of buyers and sellers.

The industry or market includes a large number of firms (and buyers), so that each individual firm, however large, supplies only a small part of the total quantity offered in the market. So each firm alone can't affect the price in the market by changing its output.

2 Product Homogeneity

The industry is defined as a group of firms producing a homogeneous product. There is no way in which a buyer could differentiate among the products of different firms. So that price may not be distorted on the grounds of visible differences among the units of the same product.

3 Free entry and exit of firms

There is no barrier to entry or exit from the industry. Entry or exit may take time, but firms have freedom of movement in and out of the Industry.

4 Perfect mobility of factors of production

The factors of production are free to move from one firm to another throughout the economy. It is also assumed that workers can move between different a job, which implies that skills can be learned easily.

5 Perfect Knowledge

It is assumed that all sellers and buyers have complete knowledge of the conditions of the market. This knowledge refers not only to the prevailing conditions in the current period but in all future periods as well. Information is free and costless. Under these conditions uncertainty about future development in the market is ruled out.

6 No government regulation

There is no government intervention in the market (tariffs, subsidies, rationing of production or demand and so on are ruled out). Most of the regulations are highly distortionary.

7 Absence of Transportation costs

So that price may not get distorted by them in distant markets

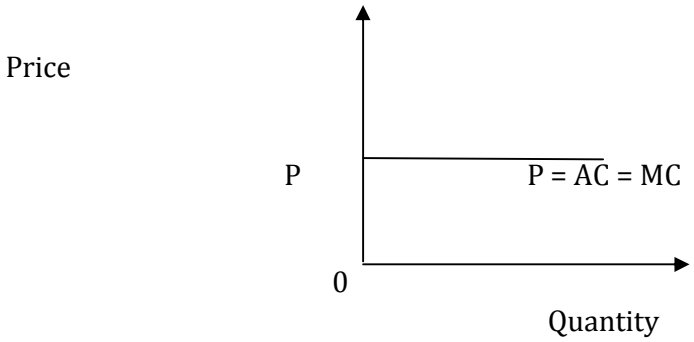
8 Profit maximization

The goal of all firms is profit maximization. No other goals are pursued.

9 Absence of Collusion and independent decision-making by firms

Perfect competition assumes that there is no collusion between the firms; they are not in league between themselves in the form of guide or cartel. Nor are the buyers in any kind of collusion between themselves. There is no consumer's association. This condition implies that buyers and sellers take their decisions independently and they act independently.

The assumption of large numbers of sellers and of product homogeneity implies that the individual firm in a pure competition is ***price taker***. The price taker is a firm which adopts price fixed by market forces of demand and supply. Its demand curve is ***infinitely elastic***, indicating that the firm can sell any amount of output at the prevailing market price. The demand curve of the individual firm is also its Average cost and Marginal cost.



It is not very difficult to see that a perfect competition is a myth. In real world, it is difficult to realize it.

Pure competition

A form of perfect market which has only first three features of it, namely large number of buyers and sellers, homogeneous product and free entry and exit. It is a realistic form of perfect competition.

Meaning of Firm and Industry

It is essential to know the meaning of firm and industry before analyzing the two.

According to R.L.Miller, *"firm is an organization that buys and hires resources and sells goods and services."*

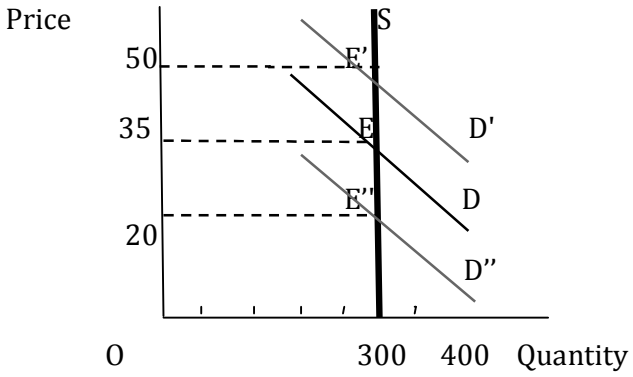
According to Lipsey, *"firm is a unit that employs factors of production to produce commodities that it sells to other firms, to households, or to the government."*

According to Lipsey, *"Industry is a group of firms that sells a well-defined product or closely related set of products."*

Industry is a group of firms producing homogeneous products in a market.

Price determination in the market period

The market period, or the very short run, refers to the time period during which no input can be varied (i.e., all costs are fixed) and so the market supply of a commodity is also fixed. The market period may be a day, a week, a month, or longer, depending on the industry. During the market period, costs of production are irrelevant in the determination of price, and the entire stock of a perishable commodity is put up for sale at whatever price it can fetch. Thus, with perfect competition among buyers and sellers, demand alone determines price, while supply alone determines quantity. This is shown in figure below.



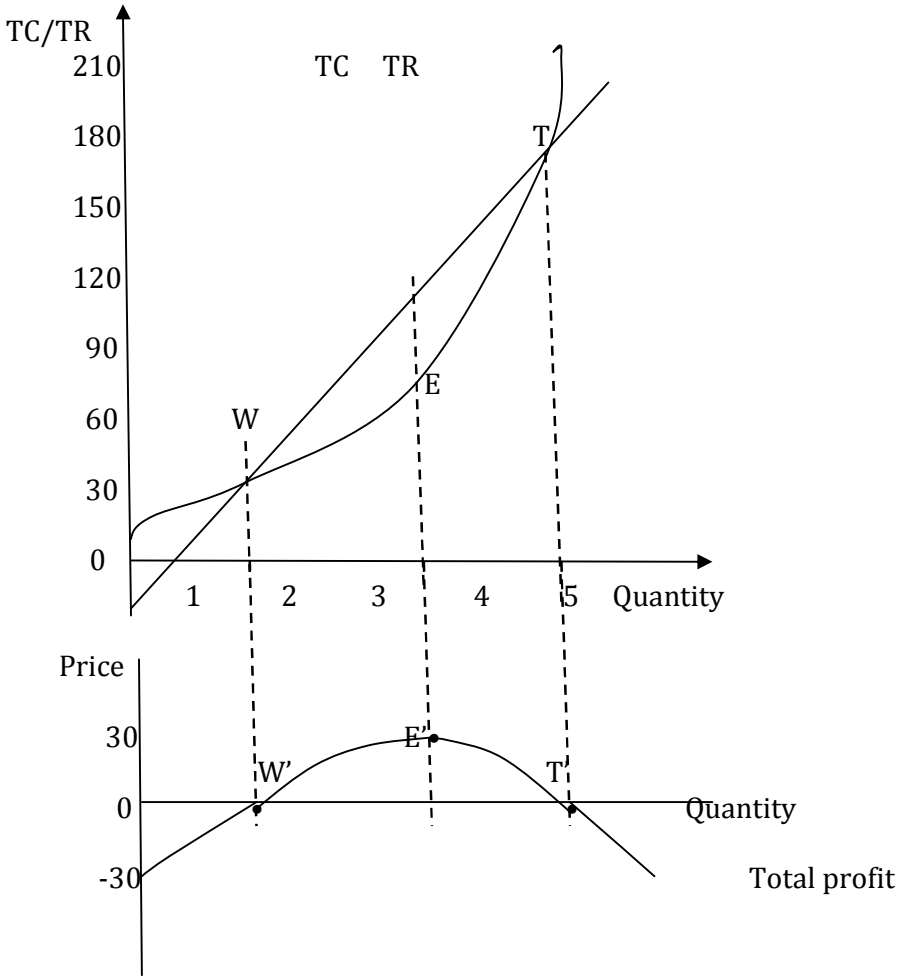
In the figure, S is the fixed or zero-elastic market supply curve for 350 units of the commodity. With D as the market demand curve, the equilibrium price is Rs. 35. Only at the price does the quantity demanded equal the quantity supplied, and the market clears. At higher prices, there will be unsold quantities, and this will cause the price to fall to the equilibrium level. At lower than equilibrium price, the quantity demanded exceeds the quantity supplied, and the price will be bid up to Rs.35.

Short run equilibrium of the firm

A firm is in equilibrium in the short run when it has no tendency to expand or contract its output and wants to earn maximum profit or to incur minimum losses. The short run is a period of time in which the firm can vary its output by changing the variable factors of production. The number of firms in the industry is fixed because neither the existing firms can leave nor new firms can enter it. The short run equilibrium of the firm can be explained with the help of total cost – total revenue and marginal analysis.

Total approach: The positive difference between Total Revenue and Total Costs

The equilibrium output of the firm is the output that maximizes the total profits of the firm. Total profits equal total revenue minus total costs. Thus, total profits are maximizing when the positive difference between total revenue and total costs is largest. This is shown in figure below.



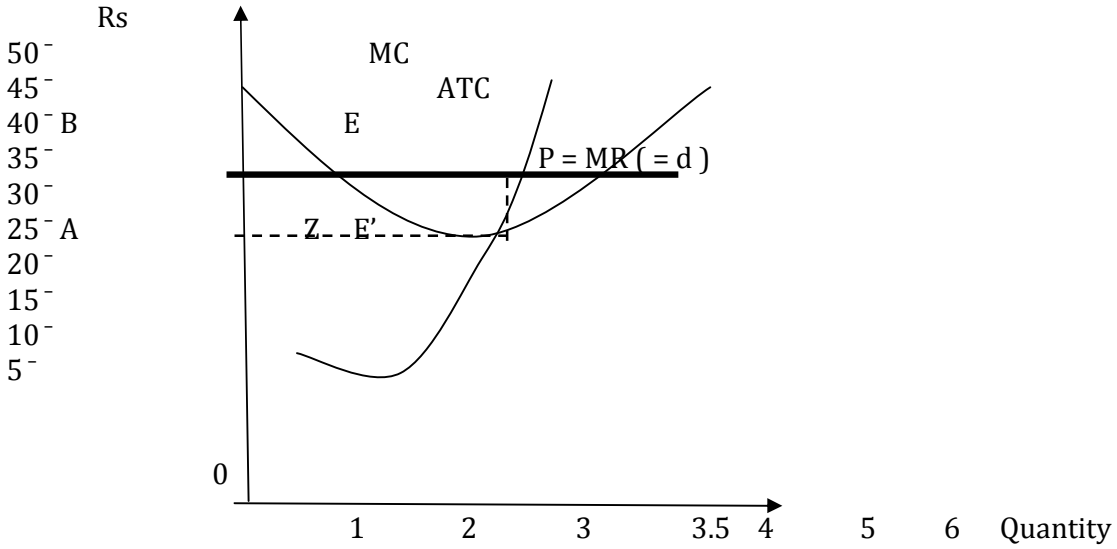
The short-run total cost (STC) curve in the top panel of the above figure. The vertical intercept (Rs. 30) gives the fixed costs of the firm. Within the limits imposed by the given plant, the firm can vary its output by varying the quantity of the variable inputs it uses. This generates the STC curve of the firm. The STC curve shows the minimum total costs of producing the various levels of output in the short run. The point W, the law of diminishing returns begins to operate and the STC curve faces upward or rises at an increasing rate.

The total revenue curve is a straight line through the origin because the firm can sell any quantity of the commodity at the given price (determined at the intersection of the market demand and supply curve of the commodity). With p = Rs. 35, the total revenue (TR) of the firm is Rs. 35 if the sells one unit of output. The TR = Rs.70 if the firm sells two units of output, TR = Rs. 105 with Q = 3, TR = Rs.140 with Q = 4, and so on. Put more succinctly, TR = (Rs. 35) (Q). Thus, the TR of the firm is a straight line through the origin with slope equal to the commodity price of Rs. 35.

At zero output, TR = 0 while STC = Rs. 30. Thus, the firm incurs a total loss of Rs. 30 equal to its fixed costs. This gives the negative intercept of Rs.30 of the total profit curve in the bottom panel. At Q = 1, TR = Rs. 35 and STC = Rs. 50, so that total profits are – Rs.15. at Q = 1.5, TR = STC = Rs. 52.50 (point W in the top panel), and total profits are zero (point W' in the bottom panel). This is called the break – even point. Between Q = 1.5 and Q = 5, TR exceeds TC and the firm earns a profit. Total profits equal the positive difference between TR and TC. At Q greater than 5, TR is smaller than TC and the firm incurs a loss. Thus, the level of output at which the firm maximizes total profits is Q = 3.5 (point E and E' in the top and bottom panels respectively).

Marginal Approach: Equating Marginal Revenue and Marginal Cost

Although the total approach to determine the equilibrium output of the firm is useful, the marginal approach is even more valuable and more widely used. This is shown in the below figure.



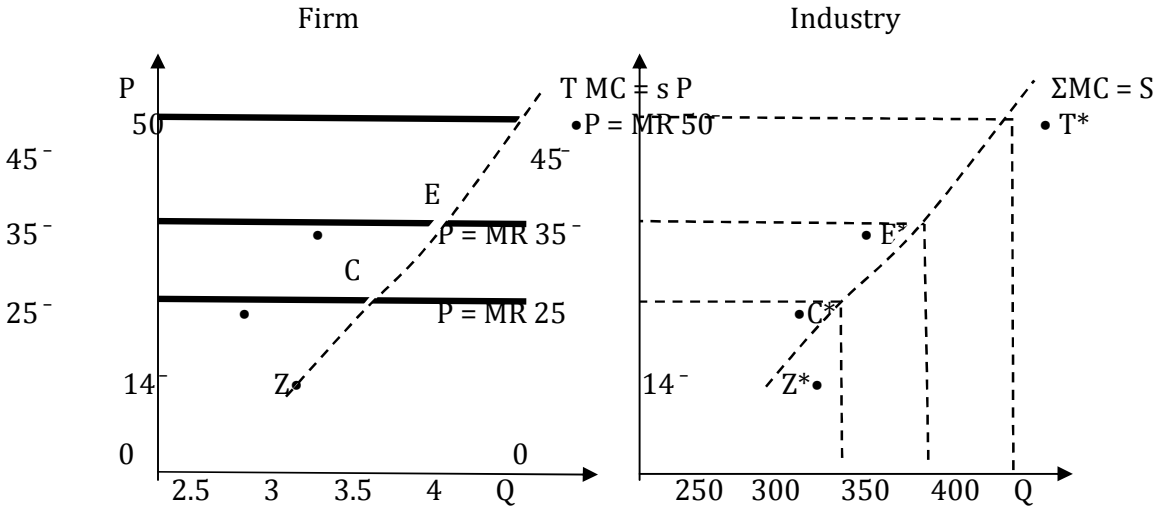
In the above figure, the demand curve facing the firm (d) is horizontal or infinitely elastic at the given price of P = Rs. 35. That is, the perfectly competitive firm is a price taker and can sell any quantity of the commodity at P = Rs.35. since marginal revenue (MR) is the change in total revenue per-unit change in output, and price (P) is constant, then P = MR.

The short –run marginal cost (MC) and the average total cost (ATC) curves of the firm in above figure. The best level of output for the firm in the above figure, At Q = 3.5 (point E), and this is the same result as with the total approach. At Q = 3.5, P = Rs. 35 and ATC = Rs. 26. Therefore, profit per unit is Rs. 9 (EE' in the figure), and total profits are (Rs.3.5) is the area of ABEE'. Until point E, MR exceeds MC and so the firm earns higher profits by expanding output. On the other hand, past point E, MC exceeds MR and the firm earns higher profits by reducing output. This leaves point E as the profit maximizing level of output. Note that a point E, P or MR = MC and MC is rising so that the conditions for profit maximization are fulfilled.

The rule that a firm maximizes profits at the output level at which the marginal revenue to the firm equals its marginal cost is a specific application of the general concept that any activity should be pursued until the marginal benefit from the activity equals the marginal cost.

Short –run supply curve of the firm and industry

The short-run supply curve of a perfectly competitive firm and industry, examine the equilibrium price of the commodity is determined at the intersection of the market demand and supply curve for the commodity. This is the price at which the perfectly competitive firm can sell any quantity of the commodity. This is explained in the given figure.

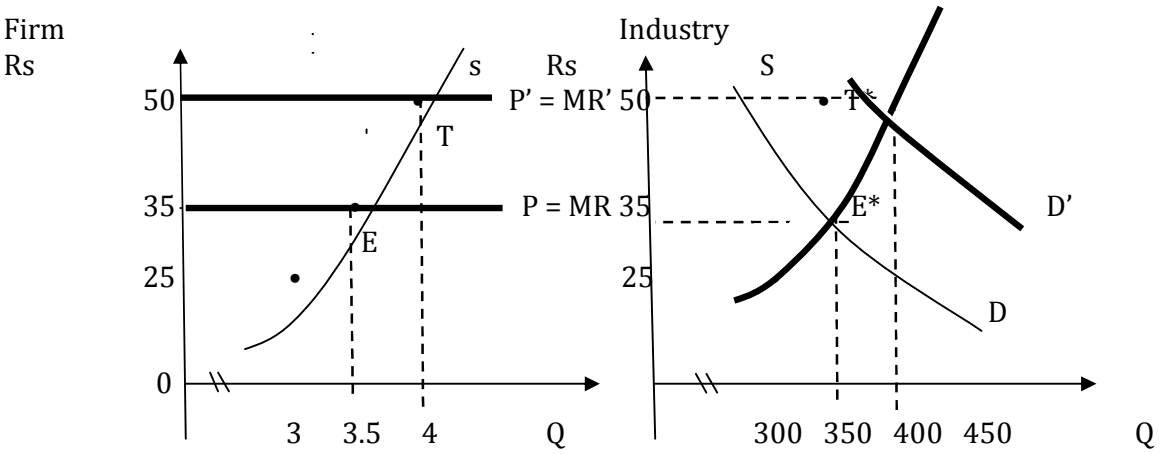


The above figures shows the perfectly competitive firm and industry's short run supply curve because it shows the quantity of the commodity that the firm would supply in the short run at various prices. For example, the firm supplies 3 units of the commodity at the price of Rs. 25 (point C in the left panel). The reason is that at P = Rs.25, P = MR = MC = Rs.25, and MC is rising. At P = Rs.35, the firm supplies 3.5 units of the commodity (point E), while at P = Rs.50, it supplies 4 units (point T). The firm will supply no output at prices below the shutdown point (point Z in the figure). Thus, the rising portion of the firm's MC curve above the shutdown point is the firm's short run supply curve of the commodity(s in the left panel of the figure). It shows the quantity of the commodity that the firm would supply in the short run at various prices. The firm's short run supply curve is positively sloped because the MC curve is positively sloped, and the MC curve is positively sloped because of diminishing returns. The horizontal summation of the supply curves of all firms in the industry then gives the industry short-run supply curve for the commodity. This is given by the ΣMC = S curve in the right panel of the above figure, where the symbol Σ refers to the "summation of". The perfectly competitive industry's short run supply curve in the right panel is based on the assumption that there are 100 identical firms in the industry (and input prices do not vary with industry output). For example, at P = Rs.25 ,each firm supplies 3 units of the commodity (point C in the left panel) and the entire industry supplies 300 units (point C* in the right panel). At P = Rs.35, each firm supplies 3.5 units (point E and

the industry supplies 350 units (point E*). At P = Rs. 50, Q = 4 for the firm (point T) and Q = 400 for the industry (point T*). Note that no output of the commodity is produced at prices below P = Rs. 14(point Z and Z* in the figure).

Short –Run Equilibrium of the industry and Firm

The market demand curve for a commodity was derived from the horizontal summation of the demand curve curves of all the individual consumers of the commodity in the market. In a perfectly competitive market, the equilibrium price of the commodity is determined at the intersection of the market demand curve and the market supply curve of the commodity. Given the price of the commodity, the perfectly competitive firm can sell any quantity of the commodity at that price. As noted earlier, the firm will produce at the point where P or MR = MC, provided that MC is rising, is shown in the below figures

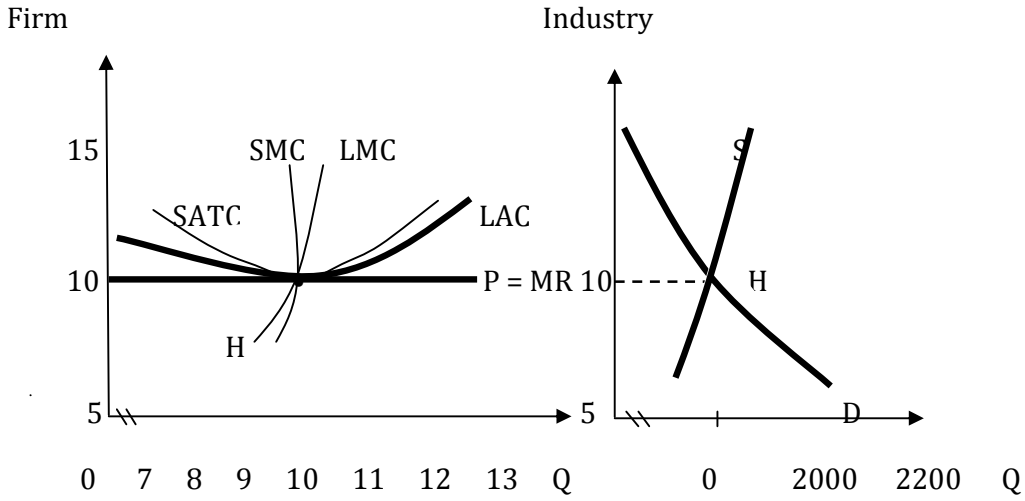


The right panel of the above figure shows the short –run market supply curve S and hypothetical market demand curve D for the commodity. These curves intersect at point E*, and result in the equilibrium price of Rs. 35 and the equilibrium quantity of 350 units. At P = Rs.25, the quantity demanded (400 units) exceeds the quantity supplied (300 units), and the resulting shortage will drive the commodity price up to P = Rs.35. on the other hand, at P = Rs.50, the quantity supplied (400 units) exceeds the quantity demanded (300 units), and the resulting surplus will drive the price down to P = Rs.35. The left panel shows that at P = Rs.35, the perfectly competitive firm will produce 3.5 units (point E as in above figure). Note that each firm produces 1/100 of the total industry or market output.

If the market demand curve then shifted up to D' (for example, as a result of an increase in consumer's incomes) there would be a shortage of 100 units of the commodity price at p = Rs.35 (E* E' in the above figure). This would cause the equilibrium price to rise to Rs. 50 and the equilibrium quantity to 400 units (point T*). Then, at P = Rs.50, the perfectly competitive firm maximizes profits at point T by producing 4 units of output. This is based on the assumption that there are 100 identical forms in the perfectly competitive industry and that input prices remain constant.

Long –run Equilibrium of the Firm and industry

As new firms enter the industry (entry is free and resources are mobile), aggregate output expands. This will shift the short –run industry supply curve to the right until it intersects the market demand curve at the commodity price at which all firms make zero economic profits (i.e., they earn only a normal return) in the long run. Then, and only then, will the industry (and the firm) be in equilibrium.



In the above figure, the industry (in the right panel) and the firm (in the left panel) are in long –run equilibrium at point H, where P = MR = LMC = LAC = SATC = Rs.10. the firm produces at the lowest point on its LAC curve and earns zero economic profit means that the owner of the firm receives only a normal return on investment when the industry and firm are in long run equilibrium. That is, the owner receives a return on the capital invested in the firm equal only to the amount that he or she would earn by investing the capital in a similarly risky venture.

If the owner managers the firm, zero economic profits also includes what he or she would earn in the best alternative occupation. Thus, zero profit in economics means that the total revenues of the firm just cover all costs.

Efficiency implications of perfect competition

When the perfectly competitive industry is in long-run equilibrium, the firm not only earns zero profits but produces at the lowest point on its LAC curve (point H in the left panel of figure A). Thus, resources are used most efficiently to produce the goods and services most desired by the society at the minimum cost. Since firms also earn zero profits, consumers purchase the commodity at the lowest possible price (Rs.10 at the point H in the figure A). In this sense, perfect competition is the most efficient form of market organization. To summarize, when a perfectly competitive industry is in equilibrium, P = LAC = LMC for each firm in the industry. Since P = LAC, the perfectly competitive firm earn zero economic profits, and so there is distributional efficiency. Since P = LMC, each firm produces at lowest point on its Lac curve, and so there is production efficiency. Finally, since P = LMC, there is allocate efficiency in the sense that the amount of the commodity supplied represents the best use of the economy's resources.

When a perfectly competitive firm earns (economic) profits, more firm will enter the industry in the long run and this will lower the commodity price until all firms just break even (earn zero economic profits). On the other hand, if the perfectly competitive firm incurs a loss in the short run and would continue to incur a loss in the long run even by constructing the best plant, some firms would leave the industry. This would shift the industry supply curve to the left until it intersected the industry demand curve at the (higher) commodity price at which the remaining firms made zero economic profits but incurred no loss.

Perfectly competitive firms need not have identical cost curve, but the minimum point on their LAC curves must occur at the same cost per unit. If some firms had more productive inputs and, thus, lower average costs than other firms in the industry, the more productive inputs would be able to extract from their employer higher rewards (payments) commensurate to their higher productivity, under the threat of leaving to work for others. As a result, their LAC curves would shift upward until the lowest point on the LAC curve of all firms is the same.

Reference

1. Modern micro economics – A. Koutsoyiannis – Mac million press Ltd

2. Micro economics – B. Douglas Bernheim – Tata McGraw hill

3. Micro economics – Dominic Salvatore

MODULE 2
MONOPOLY

Nature of Monopoly

A firm is a monopoly if it is the sole seller of its product and it its product does not have close substitutes. Literally monopoly means one seller. 'Mono' means one and 'poly' means seller. Monopoly is said to exist when one firm is the sole producer or seller of a product which has no close substitutes. Thus monopoly is negation of competition. The following are important features of monopoly.

1. There is a single producer or seller of the product. Entire supply of the product comes from this single seller. There is no distinction between a firm and an industry in a monopoly. The firm and industry are identical in monopoly.
2. There is no close substitute for the product. If there are some other firms which are producing close substitutes for the product in question there will be competition between them. In the presence of competition a firm cannot be said to have monopoly. Monopoly implies absence of all competition.
3. There is no freedom of entry. The monopolist erects strong barriers to prevent the entry of new firms. The barriers which prevent the firms to enter the industry may be economic or institutional or artificial in nature. In the case of monopoly, the barriers are so strong that prevent entry of all firms except the one which is already in the field. In fact, the fundamental cause of monopoly is barriers to entry. A monopolist remains the only seller in its market because other firms cannot enter the market and compete with it. Barriers to entry, in turn, have three sources;
    a) A key resource is owned by a single firm
    b) The government gives a single firm the exclusive right to produce some good
    c) The costs of production make a single producer more efficient than a large number of producers.
4. The monopolist is a price maker. But in order to sell more a monopolist had to reduce the price. He cannot sell more units at the existing price.
5. The monopolist aims at maximisation of his profit

Source and Types of Monopoly

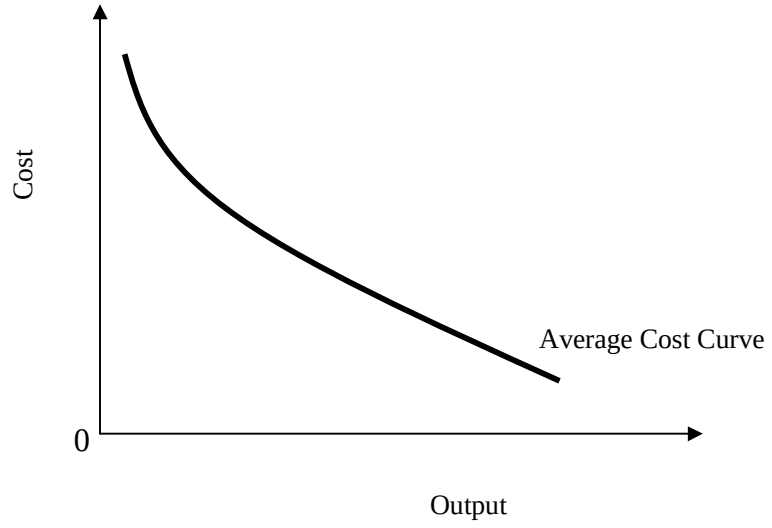
The most important reason the economists generally find the source of monopoly is barriers to entry. Barriers to entry are legal or technical conditions that make it impossible or prohibitively costly for a new firm to enter a given market. The following five types of entry barriers have historically been associated with the presence of monopoly.

1) Monopoly Resources or Control of inputs

The simplest way for a monopoly to arise is for a single firm to own a key resource. Some firms acquire monopoly power from their overtime control over certain scarce inputs or raw materials that are essential for the production of certain other goods, e.g. bauxite, graphite, diamonds etc. such monopolies are often called raw material monopolies. The monopolies of this kind may also emerge because of monopoly over certain specific technical knowledge or technique of production. Not surprisingly the monopolist has much greater market power than any single firm in a competitive market. In the case of necessaries like water, the monopolist could command quite a high price, even if the marginal cost is low.

2) Natural Monopoly

An industry is natural monopoly when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms. The technology of production for a product may be such that one large producer can supply the entire market at a lower per-unit cost than can several firms sharing the same market. In other words, the long run average cost curve for a single firm slopes downwards over the entire range of market output. A natural monopoly arises when there are economies of scale over the certain range of output. The following figure shows the average cost curve of a firm with economies of scale.



When a firm's average cost curve continually declines, the firm has what is called natural monopoly. In this case, when production is divided among more firms, each firm produces less, and average cost rises. As a result, a single firm can produce any given amount at the smallest cost. Consequently to have more than one firm operating in such a market would be wasteful since production costs are lowest if one firm supplies the entire output. In this situation the industry is natural monopoly.

3) Government Created Monopolies

In many cases, monopolies arise because the government has given one person or firm the exclusive right to sell some good or service. Patent and copy right laws are one example of how government creates a monopoly to serve public interest. Thus, another source of monopoly power is the patent rights of the firm for a product or the production process. The exclusive right to use the productive technique or to produce a certain product granted by the government is called patents. Patents are granted to the inventor for a technique or product, and they amount to the legal right to a temporary monopoly. Such monopolies are called patent monopolies. The laws governing patents and copy rights have both benefits and costs. The benefits of patents and copy rights are the increased incentive for creative activity. These benefits are offset, to some extent, by the costs of monopoly pricing.

4) Legal Restrictions

Some monopolies are created by law in public interests. Most of the state monopolies in the public utility sector, including postal, telegraph, generation and distribution of electricity, railways etc are public monopolies. The state may create monopolies in the private sector through license or patents. Such monopolies are called franchise monopolies. That is government grants a monopoly power because doing so is in the public interest.

5) Entry Lags

The time needed to enter the market can act temporarily to shield an existing producer from competition. Thus, the first firm to market some product will usually enjoy some monopoly position. If the product turns out to profitable, entry is likely to occur as rapidly as technological conditions permit.

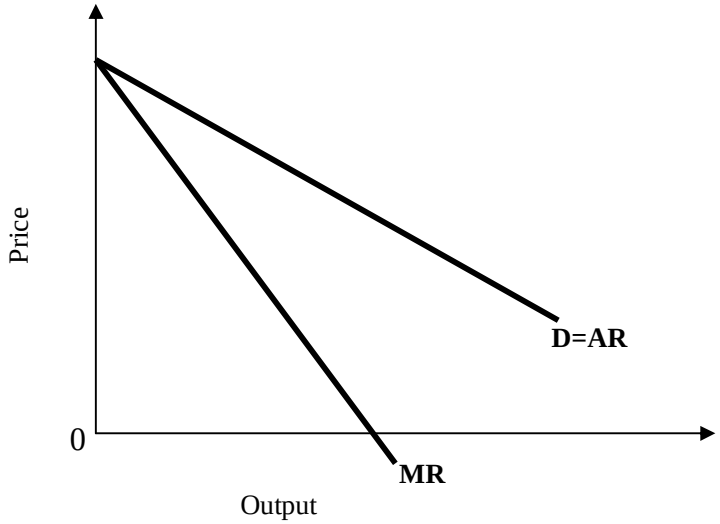
Market Demand and Revenue Curves under Monopoly

A monopoly firm faces the market demand curve for the product it produces since it is the only seller of the product. Thus the monopolist demand curve will slope downwards. This situation is different from the horizontal demand curve facing the competitive firm. While the competitive firm is the price taker, monopoly firm is the price maker. The monopoly firm supplies the total market and can set any price it wants. Since the monopoly firm faces a downward slopping market demand curve, if it raises price, the amount it cal sell will fall. Much of the analysis of monopoly and the differences in output and pricing decisions between a monopoly and competitive industry stems from this difference in the demand curves.

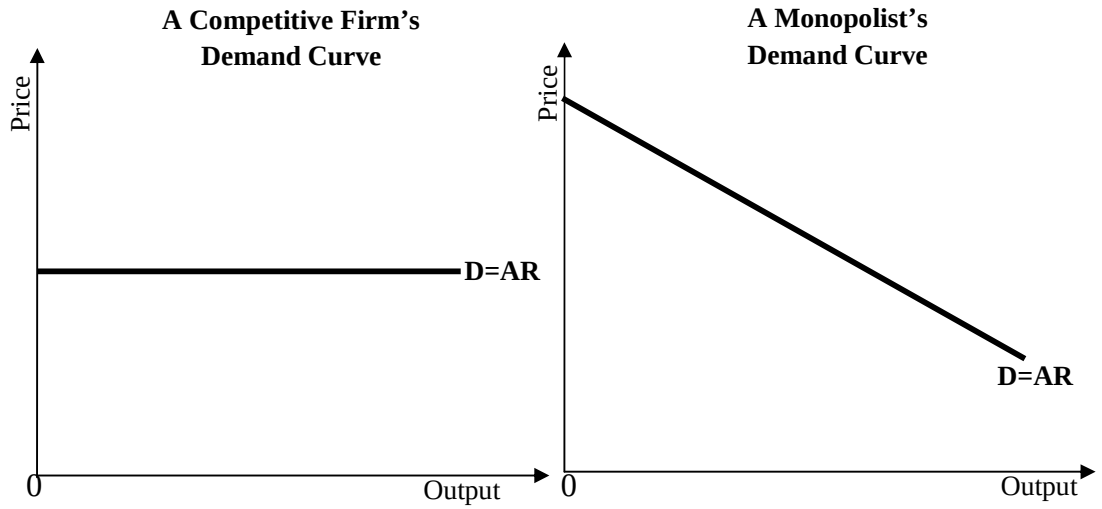
It is important to note that, given the demand curve, a monopoly firm has the option to choose between the price to be charged or output to be sold. Once it chooses the price, the demand for its output is fixed. Similarly, if the firm decides to sell a certain quantity of output, then its price is fixed- it cannot charge any other price inconsistent with the demand curve. Since the monopoly firm faces a downward slopping market demand curve, in order to sell more units of the commodity, the monopoly firm must lower the price. As a result, the marginal revenue is smaller than the price and the monopolist marginal revenue curve lies below his demand curve. This is shown in the following table

Units Sold	Price	TR	AR	MR
1	10	10	10	10
2	9	18	9	8
3	8	245	8	6
4	7	28	7	4
5	6	30	6	2
6	5	30	5	0
7	4	28	4	-2

It can be noted that the monopolist faces a downward sloping AR curve (demand curve) and MR is less than AR. The implication of MR is less than AR (or price) is that when the monopolist sells more the price of the product falls. The demand curve and MR curve facing the monopolist is shown below.



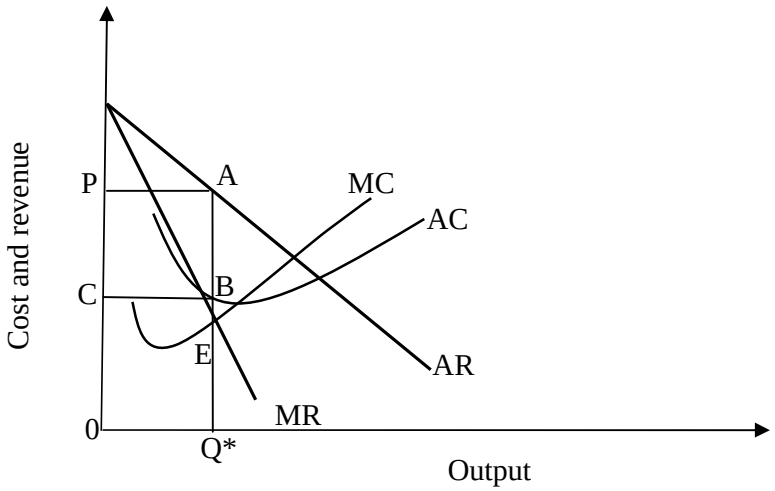
Thus, the key difference between a competitive firm and a monopoly is the monopoly's ability to influence the price of its output. A competitive firm is small relative to the market in which it operates. Therefore, it takes the price of its output as given by market conditions. By contrast, because a monopolist is the sole producer in its market, it can alter the price of its good by adjusting the quantity it supplies to the market. One way to view this difference between competitive firm and a monopoly is to consider the demand curve that each firm faces. This is shown below.



Because a competitive firm can sell as much or as little as it wants at given price, the competitive firm faces a horizontal demand curve. In effect, because the competitive firm sells a product with many perfect substitutes, the demand curve that any one firm faces is perfectly elastic. By contrast, because the monopolist is the sole producer in the market, its demand curve is the market demand curve. The monopolist demand curve slope downwards. If the monopolist raises the price of its good, consumers buy less of it. The market demand curve provides a constraint on monopolist ability to profit from his market power. By adjusting the quantity producer or price charged, the monopolist can choose any point on the demand curve, but it cannot choose a point off the demand curve.

Short run Equilibrium of the Monopolist

The monopolist aims at profit maximisation. He will maximize his profit when his MC is equal to the MR and MC must be rising at the point of intersection. In other words, the slope of MC must be greater than slope of MR at the point of intersection This is shown below.

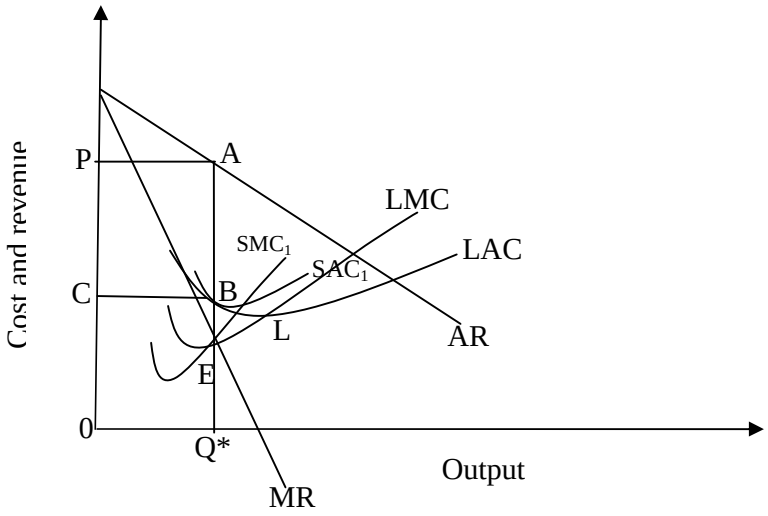


The monopolist will go on producing additional units of output so long as MR exceeds MC. His profit will be maximum and he will attain equilibrium at the level of output at which MR equals MC. MC intersects MR at point E and equilibrium output is OQ*. The price charged by the monopolist is shown by the point on the demand curve directly above point E and the price charged by the monopolist is OP. to identify the amount of profit explicitly we draw the average cost curve (AR). The difference between price (average revenue per unit) and average cost at 0Q* is the average profit of sales. The total profit earned by the firm is equal to the area ABCP.

Long run Equilibrium of the Monopolist

In long run the monopolist has the time to expand his plant or to use his existing plant at any level which will maximize his profit. With entry is blocked, it is not necessary for the monopolist to reach an optimum scale of output, that is, to nail up hid plant until he reach the minimum point of long run average cost (LAC). Neither is there is any guarantee that he will use his plant at optimum capacity. What is certain is that the monopolist will not stay in business if he makes loss. He will most probably continue to earn supernormal profit even in the long run, given that the entry is barred.

In the long run, the monopolist will be in equilibrium at the level of output where given the marginal revue curve cuts the long run marginal cost curve. In long run, marginal revenue is also equal to short rum marginal cost. That is, in long run MR=LMC=SMC. The following figure depicts the long run equilibrium of the monopolist.

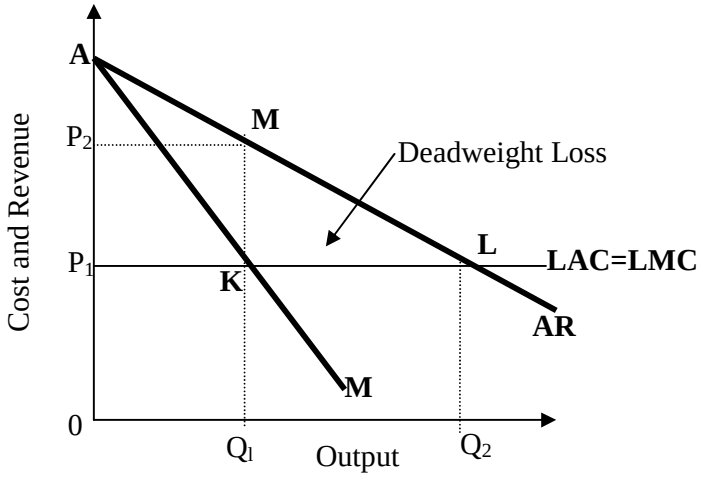


The monopolist is in equilibrium at the output 0Q* at which the long run marginal cost (LMC) intersects the marginal revenue curve (MR). given the level of demand as indicated by the position of AR and MR curves, the monopolist would choose the plant size whose short run average and marginal cost curves are SAC_1 and SMC_1. The monopolist will be charging price equal to 0P and will be making profit equal to the area of rectangle ABCP. It can be noted that the firm is operating at sub optimal size. That is, monopolist is not producing at the minimum point of his long run average cost curve (point L) and there is excess capacity.

Social Costs of Monopoly

Perfect competition is a market structure which ensures efficient allocation of resources, prevents redistribution of income and keeps pressure on producers to keep production costs down. In contrast, monopoly results in restriction of output, redistribution of income in favour of monopolist, higher production costs and unproductive expenses which a monopolist often incurs to ensure continuation of his monopoly power.

Economists generally measure welfare costs of monopoly in terms of higher prices and restriction of output which results in loss of consumer's surplus often referred to as dead weight loss. That is, if both monopoly and competitive industries are faced with identical cost conditions, the output under perfect competitive conditions is higher than under monopoly and price in the competitive industry is lower than in monopoly. Thus it is argued that monopoly firm is less efficient than perfectly competitive firms. Monopoly causes loss of social welfare and distortions in resource allocation. The suboptimal allocation of resources and loss of social welfare are illustrated below



Assuming a constant cost industry which has LAC=LMC, the revenue conditions are shown by AR and MR curves. Given the cost and revenue conditions, a perfectly competitive firm will produce OQ_2 at which LAC=LMC=AR. Its price will be OP_1. On the other hand, the monopoly firm produces an output equalizes its LMC and MR. thus the monopoly firm produces OQ_1 and charges OP_2 price.

The loss of social welfare is measured in terms of loss of consumer surplus. The total consumer surplus equals the difference between the total utility which a society derives from the consumption of a commodity and the price that it pays for that commodity. If an industry is perfectly competitive, the total output available to the society will be OQ_2. The price which the society pays for OQ_2 is given by the area OP_1LQ_2. The total utility which the society gains from the output is given by the area $OALQ_2$. Thus the consumer surplus will be $OALQ_2$-OP_1LQ_2, which is the area ALP_1. If the industry is monopolized, the equilibrium output is set at OQ_1 and the price is OP_2. This leads to a loss of a part of consumer surplus, which will be ALP_1-AMP_2=P_2MLP_1. Of this loss of consumer surplus, P_2MKP_1 goes to the monopolist as profit. The remainder MKL goes to none, therefore it is termed as dead weight loss to the society.

Price Discrimination

Sometimes, a monopoly firm might charge different prices to different groups of buyers. This pricing technique is called price discrimination. The price discrimination exists when the same product is sold at different prices to different buyers. A monopolist, simply by virtue of its monopoly position, is capable of charging different prices from different consumers or different groups of consumers .The product is basically same, but it may have slight differences (slightly differentiated). Thus, price discrimination is the practice of charging different prices to different buyers for similar goods. When a monopolist sells similar products at different prices to different buyers, it is called a discriminating monopoly. The pricing technique is called price discrimination as the differing prices do not correspond to different costs associated with serving the various groups of buyers.

According to Stigler "price discrimination is the sale of technically similar products at prices which are not proportional to marginal cost". In the words of Joan Robinson "the act of selling the same article, produced under single control at different prices to different buyers is known as price discrimination".

Price discrimination is possible when the monopolist sells in different markets in such a way that it is not possible to transfer any unit of the commodity from the cheap market to the dearer market. Although price discrimination is a common practice under monopoly, it should not mean that this practice exists only under monopoly. Price discrimination is quite common also in other kinds of market structures, particularly when market imperfections exist. Most business firms discriminate between their customers on the basis of personal relationship, quantity purchased, duration of their association with the firm as buyers and so on. However, price discrimination is not possible under perfect competition. Since market demand in each market is perfectly elastic, every seller would try to sell in that market in which he could get the highest price. Competition would make the price equal in both the markets. Thus price discrimination is possible only when markets are imperfect.

Conditions for Price Discrimination

There are three conditions that must be satisfied before price discrimination is to be expected. Firstly, the seller of the product must possess some degree of monopoly power. In the absence of monopoly power, a seller is not able to charge some customers higher prices than others. The seller must possess some monopoly power over the supply of the product to be able to distinguish between different classes of customers and to charge different prices. Under competitive conditions, a single price tends to prevail regardless of whether some sellers wish to charge a higher price to individuals or groups. To practice price discrimination, therefore, seller must have some degree of monopoly power. Secondly, the seller must be able to separate buyers into two or more groups or markets and prevent resale of the product amoung the groups. That is, the markets are so separated that resale is not profitable. The market for different classes of consumers are so separated that buyers of low- priced market do no find it profitable to resell the commodity in high-priced market. This can be because of factors like geographical distance involving high cost of

transportation, exclusive use of the commodity, lack of distribution channels etc. if resale of the product is easy, price discrimination can't be very effective. Thirdly, the price elasticity of demand must differ amoung the different groups of buyers or sub markets. That is, if the market is divided into different sub markets, the elasticity of demand must be different in each sub market. It is the difference in price elasticities that provides opportunity for price discrimination. Low price are charged when demand is more elastic and high price in the market with a less elastic demand. If the price elasticities are the same, price discrimination would not be gainful.

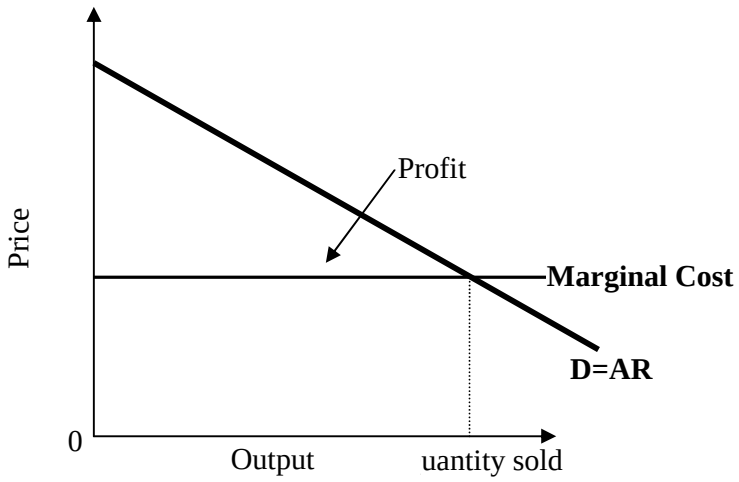
The first two conditions are necessary conditions which must be fulfilled for the implementation of price discrimination. The third condition is necessary condition to make price discrimination profitable.

Degrees of Price Discrimination

Prof. A C Pigou has distinguished between three forms of price discrimination, namely

1. First degree price discrimination
2. Second degree price discrimination
3. Third degree price discrimination

First degree price discrimination is the limiting case in which the monopoly firm charges a different price to each of its customers. It charges each customer the maximum price the customer is willing to pay for each unit bought rather than go without it. It is take it or leave it price discrimination. Thus, 'perfect' first degree price discrimination involves maximum possible exploitation of each customer in the interest of seller's profit. The monopolist would be able to extract the entire consumer's surplus from consumers. That is, the monopolist charges each customer exactly his willingness to pay and the monopolist gets the entire consumer surplus in every transaction. The following figure shows a monopolist that can perfectly price discriminate.



When a firm can perfectly price discriminate, each customer who values the good at more than marginal cost buys the good and is charged his willingness to pay. All mutually beneficial trade takes place, there is no deadweight loss and entire surplus derived from market goes to the monopoly producer in the form of profits. That is, because consumer surplus is zero, total surplus now equals the firm's profit. First degree price discrimination is possible only when the monopolist is in a position to know the price each buyer is willing to pay. That is, he must know the exact shape of each consumer's demand curve and be able to charge the highest price that each and every consumer would pay for each unit of the commodity. Even if it is possible, it would be probable be prohibitively expensive to carry out. Thus first degree price discrimination is not very common in the real world.

More practical and common is second degree price discrimination. In the second degree price discrimination, the monopoly firm discriminate its customers according to quantities consumed. It works by charging different prices for different quantities of the same commodity or service .It is a situation of the firm charges customers' different prices according to how much they purchase. Thus, the second degree price discrimination is the practice of charging different prices per unit of the different quantities of the same good or service. By doing so, the monopolist will be able to extract part, but not all, of the consumer's surplus. The second degree price discrimination is also called 'block pricing system'.

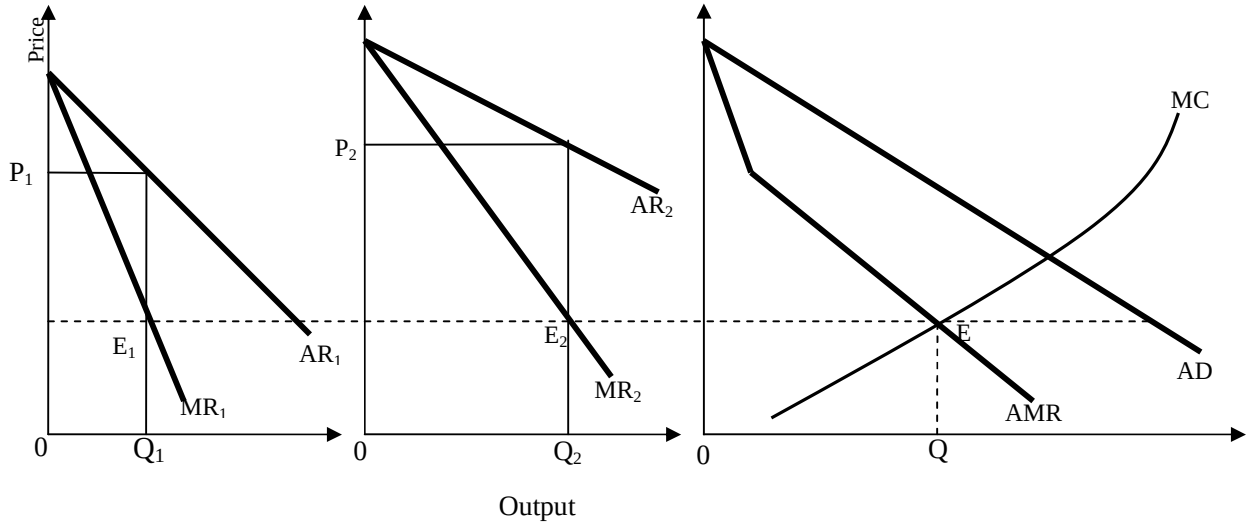
Third degree price discrimination is the practice of dividing customers into two or more groups and charging different prices to each group. Monopolist divides his customers into two more independent submarkets or groups and the price charged in each submarket depend upon the output sold in that market and demand conditions of that market. For simplicity assume that there are only two markets. To maximize profits, the monopolist must produce the best level of output and sell that output in the two markets in such a way that marginal revenue of the last unit sold in each market is the same. This will require the monopolist to sell the commodity at a higher price in the market with the less elastic demand. Third degree price discrimination is the most common. Some of the examples are the lower fees that doctors charge low-income people than high-income for basically identical services, lower prices that airlines, trains, buses usually charge children and the elderly than other adults, the lower prices that producers usually charge abroad than at home for the same commodity, and so on.

Equilibrium of Discriminating Monopolist

Under simple monopoly, a single price is charged for the whole output, but under price discrimination the monopolist will charge different prices in different sub markets. Therefore, the monopolist has to divide his total market in to various sub markets on the basis of differences in the price elasticity of demand in them. Whenever the monopolist finds that it is not only possible to separate markets for his product, but also the elasticity of demand in these markets are different, he indulges in price discrimination.

For the sake of convenience, les us explain the case when the total market is divided into two sub markets. In order to reach the equilibrium position, the discriminating monopolist has to take two decisions. Firstly how much total output should be produced and secondly, how the total output should be distributed between the two submarkets and what

prices he should charge in two submarkets. The same marginal principle will guide the decision of the discriminating monopolist to produce to produce total output as that which guides a perfect competitor or a simple monopolist. Thus, if the monopolist is able to sell his product in two separate markets, the condition for equilibrium implies that marginal revenue in the first and second market, that is, MR_1 and MR_2 should each be equal to the marginal cost ($MR_1=MR_2=MC$). The general condition of equilibrium will also be satisfied in this case as aggregate marginal revenue (AMR) will be equal to marginal cost. AMR is obtained by summing up laterally the marginal revenue curves of the sub markets. Consider the following figure.



The discriminating monopolist will maximize his profits by producing the level of output at which the marginal cost (MC) curve intersects the aggregate marginal revenue (AMR) curve. Profit maximizing output is 0Q where AMR equal to MC. The discriminating monopolist will distribute the total output 0Q in such a way that the marginal revenues in the two submarkets are same to maximize his profit. Again, to be in equilibrium it is essential not only that marginal revenues in the two sub markets are same but that they should also be equal to the marginal cost of the whole output.

International Price Discrimination: The Concept of Dumping

Price discrimination can also be practiced between the domestic and the foreign market. International price discrimination is called dumping. This refers to the charging of a lower price abroad than at home for the same commodity because of the greater price elasticity of demand in the foreign market. By doing so the monopolist earns higher profits than by selling the best level of output at the same price in the both markets. The price elasticity of demand for the monopolist's product abroad is higher than at home because of the competition from producers from other countries in the foreign market, foreign competition is usually restricted at home by import tariffs or other trade barriers. These import restrictions serve to segment the market, that is, keep the domestic market separate

from foreign market and prevent the re-export of the commodity back to the monopolist's home country, which would undermine the monopolist's ability to sell the commodity at higher price at home than abroad.

Dumping is classified as persistent, predatory and sporadic. Persistent dumping is the continuous tendency of a domestic monopolist to maximize total profit by selling the commodity at a higher price in the domestic market than internationally, where it meet competition of foreign producers (international price discrimination). Predatory dumping is the temporary sale of the commodity at below cost or at the lower price abroad in order to drive foreign producers out of business, after which prices are raised to take advantage of newly acquired monopoly power abroad. Sporadic dumping is the occasional sale of a commodity at below cost or at lower price abroad than domestically in order to unload an unforeseen and temporary surplus of a commodity without having to reduce domestic prices.

Trade restrictions to counteract predatory dumping are justified and allowed to protect domestic industries from unfair competition from abroad. These restrictions usually take the form of antidumping duties to offset price differentials. However, it is often difficult to determine the type of dumping, and domestic producers invariably demand protection against any form of dumping. Persistent and sporadic dumping benefit domestic consumers by allowing them to purchase the commodity at lower price and these benefits may exceed the possible losses of domestic producers.

Regulation of Monopoly

The regulation of monopoly is an important subject in theoretical and applied economic analysis. There are some undesirable aspects of the monopoly market which pave the way for its regulation. We already found that monopolist restrict output and raise price of their products. In this way the monopolist not only able to make supernormal profit and increase inequalities in distribution of income but also cause inefficiency in the allocation of resources of the society. The arguments which go against a private monopoly and hence its regulation are as follows.

a) Private monopolization of industries means concentration of economic power which is against the spirit of equity and equality in the society. Concentration of economic power is a source of feudalism and political dictatorship. So from the point of creation and distribution of wealth, a private monopoly is certainly evil.

b) A private monopoly often charges discriminatory prices and this way extracts major portion of consumer surplus from the consumers and thus reduces their welfare

c) A private monopolist pursues the objective of profit maximisation. For this, he charges high price for his products and produces less output as compared to a competitive producer. There is wastage of economic resources from the social point of view by not utilizing the production capacity fully.

d) Monopoly is inefficient type of market structure. There is a deadweight loss and transfer of consumer surplus from consumers to the monopolist. Due to this, monopoly market is inefficient from the point of view of society as a whole.

e) Monopoly firm may not bother for improvement of the technology and hence in the productivity. Even if it does so the benefits of such changes will not be passed to the consumers.

On account of all the above reasons, a private monopoly is an undesirable economic entity and hence should be regulated. There are several measures; some of which are listed below.

i. Regulation of prices and output levels by the government

ii. Creating antimonopoly legislations

iii. Putting taxes on monopolies

iv. Through nationalization of monopoly firms

Suppose in order to improve the allocation of resources or distribution of income, the government decides to regulate the price charges by the monopolist. That is, the government deals with the problem of monopoly by regulating the behavior of the monopolist. This solution is common in the case of natural monopolies, such as water and electricity companies. These companies are not allowed to charge any price they want. Instead government agencies regulate their prices. The government can impose a price ceiling at a level below the profit maximizing price. There are two types of pricing rules often proposed for price regulation of monopoly. Firstly, monopolist can be asked to operate a level of output for which marginal cost is equal to the price. This is known as Marginal cost pricing. If price equals marginal cost, customers will buy the quantity of the monopolist's output that maximizes total surplus, and the allocation of resources will be efficient. But the problem with marginal cost pricing is that the monopolist may still earn abnormal profit if his average revenue exceeds average cost of production. Secondly, those who want to regulate the monopoly to improve the distribution of income or to ensure that lowest possible price be charged from the consumers, they propose to adopt average cost pricing principle. According to average cost pricing, the maximum price should be fixed at which AR curve cuts AC curve. Thus the monopolist will be just covering his average cost of production. It should be noted that average cost includes normal profit or fair return on monopolist's capital investment.

Monopolies can also be regulated by using the instrument of taxation. If lump sum tax is imposed; it leads to an increase in fixed cost. But MC curve of the monopolist does not change. Hence the output and price remains unchanged. At the same time equilibrium level of profit of the monopolist will fall with the imposition of lump sum tax. The case of per unit tax is different. This causes an upward shift in the MC curve by an amount equal to the tax. The effect is that quantity produced declines and price increases.

Another policy used by the government to deal with monopoly is public ownership. That is, rather than regulating a natural monopoly that is run by a private firm, the government can run the monopoly itself. This solution is common in many countries where government owns and operates utilities such as telephone, water, electricity and postal service.

Monopoly and Perfect Competition: A Comparison

When comparing any two market structures, one has to analyse the following aspects:

A. Goals of the firm

B. Assumptions

C. Behavioral rules of the firm

D. Comparison of long run equilibrium

E. Comparison of predictions

Comparison of perfect competition and monopoly in the light of above method is summarised below.

A. Goals of the firm

In both market structures, the firm has a single goal, that of profit maximisation. The firm is rational when its behavior aims at the maximisation of profit.

B. Assumptions

The product is homogeneous in perfect competition. In monopoly, the product may or may not be homogeneous. The main feature of monopoly is that the total supply of the product is concentrated in a single firm. In perfect competition, there are a large number of sellers, so that each one cannot affect the market price by changing the supply. In monopoly, there is a single seller in the market. In perfect competition, entry and exit is free in the sense that there are no barriers to entry. In monopoly, entry is blockaded by definition. In both markets, cost conditions are such as to give rise to U shaped cost curves, both in the short run and in the long run. Perfect knowledge is assumed in both the markets.

C. Behavioral rules of the firm

The demand curve in perfect competition is perfectly elastic, showing that the firm is a price taker. In monopoly, the demand of the firm is also the demand of the industry and hence is negatively sloping. The only decision and policy variable of the firm in perfect competition is the determination of its output. There is no room for selling activities, since the firm can sell any amount it can produce. The monopolist can determine either his output or his price, but not both, since once one of these policy variables is decided, the other is simultaneously determined. The monopolist may change the style of his product and/or indulge in research and development activities. In both the market, the firm takes its decisions which will maximize its profit, applying the marginalistic rule MC=MR.

D. Comparison of long run equilibrium

Given the cost conditions, in monopoly, the level of output will be generally be lower and price higher as compared with perfect competition. This is due to the fact that in perfect competition, the firm produces at the minimum cost (minimum point of LAC curve) and earns just normal profit, while the monopolist usually earns abnormal profits even in the long run. Under such conditions, price will be higher in monopoly as compared with perfect competition. In monopoly abnormal profits are usually earned both in the short run and in the long run.

E. Comparison of Predictions

In perfect competition, an increase in market demand will lead to an increase in price and in output in the short run. In the long run, the output will be larger, but price may return to the initial level, remains above the original level or fall below the original level. A shift in demand above the original level in monopoly will result in an increase in output, which may be sold at the same or a higher or lower price, depending on the extent of the shift in the demand and the change in elasticity. The imposition of lump sum tax in perfect competition will not lead to a change in output and price in long run, but output will decline and price will rise in the long run. In monopoly a lump sum tax will not affect the market equilibrium in the short run or in the long run, so long as the monopolist continues to earn some abnormal profit. The effects of a profit tax are the same in both the markets as in the case of the imposition of the lump sum tax.

References

1. Dominick Salvatore: Micro Economics, Harper Collins Publishers.
2. Dominick Salvatore: Micro Economic Theory- Third Edition, Schaum's Outline Series
3. Koutsoyiannis: Modern Micro Economics – Second Edition, McMillan Press Ltd.
4. AnindyaSen : Micro Economics; Theory and Applications, Oxford University Press.
5. Richard G Lipsey and Alec Chrystal : Principles of Economics – Ninth Edition, Oxford University Press.
6. Ahuja: Modern Micro Economics – Third Edition, S Chand and Company Ltd.
7. Edgar K Browning and Jacquelene M Browning – Micron Economic Theory and Applications, Kalyani Publishers.
8. Jhingan: Micro Economic Theory- Seventh Edition, Vrinda Publications
9. Gregory Mankiw: Principles of Micro Economics, The Dryden Press, Harcourt Brace College Publishers.

MODULE 3
MONOPOLISTIC COMPETITION

Monopolistic competition is market structure that lies between the extreme cases of competition and monopoly. Competition and monopoly lie at opposite ends of the market spectrum. Perfect competition and monopoly are rarely found in the real world and thus they do not represent the actual market situation. Still for many years economist believed that either the competitive or the monopoly model could be used to analyse most markets. In 1933, Edward Chamberlin challenged this belief when he published *The Theory of Monopolistic Competition*. Because his model of monopolistic competition seemed to describe many real world markets better than the competitive model did, it was enthusiastically received by most economists. In the same year, Joan Robinson published *The Economics of Imperfect Competition*. The similarity in the subject matter and in some of the techniques led to the judgments that the analyses in the two books were the same.

The Nature of Monopolistic Competition

As the name implies, monopolistic competition contains the element of both pure competition and monopoly. The competitive element arises from the fact that there are many sellers of the differentiated product, each of which is too small to affect other sellers. Firms can also enter and leave the monopolistically competitive industry rather easily in the long run. The monopolistic element arises from product differentiation. That is, since the product of each seller is similar but not identical, each seller has a monopoly power over the specific product it sales. Thus, monopolistic competition may be defined as a market structure where there are many sellers who sell differentiated products which are close substitutes of one another. Each producer under monopolistic competition enjoys some degree of monopoly and at the same time faces competition. Chamberlin coined the term monopolistic competition to cover all market situations lying between perfectly competitive markets and monopoly. Within this wide range, he further distinguished between markets where there are large numbers of sellers of a differentiated product (the large group) and small numbers (the small group). The term monopolistic competition now generally used to refer to Chamberlin's 'large group', with the small group being referred to as oligopoly. The following are important features of monopolistic competition.

1. Large number of sellers

The market consists of relatively large number of sellers or firms each satisfying a small share of the market demand for the commodity. Unlike perfect competition, these large numbers of firms do not produce homogeneous products. Instead they produce and sell differentiated products which are close substitutes of each other. Thus there is stiff competition between them. Under perfect competition, the number of sellers is so

large that a firm becomes a price taker. In contrast under monopolistic competition, the number of firms is only so large that a firm retains its power to be a price maker.

2. Product Differentiation

Product differentiation is a key feature of monopolistic competition. Product differentiation is a situation in which firms use number of devices to distinguish their products from those of other firms in the same industry. Products produced by the firms are close substitutes of each other. Products are not identical but are slightly different from each other. In case of monopoly, there is only one product and only one seller, and under perfect competition, a large number of sellers sell homogeneous product. But under monopolistic competition, the firms can differentiate their products from one another in respect of their shape, size, color, design, packaging, etc. products of individual firms are generally identifiable, even though they may be very similar to the products of other firms. Product differentiation may be real or it may be based on perceived differences by consumers.

3. Non price competition: Selling cost

Firms incur considerable expenditure on advertisement and other selling costs to promote the sales of their products. Promoting sales of their products through advertisement is an important example of non-price competition. The expenditure incurred on advertisement is prominent amoung the various types of selling costs. But Chamberlin defines selling costs as "cost incurred in order to alter the position or the shape of the demand curve for a product". Thus his concept of selling cost is not exactly the same as advertisement cost. Selling cost is the advertisement cost plus expenditure on sales promotion schemes, salary and commission paid to sales personal, allowance to retailers for displays and cost of after-sale-services.

4. Freedom of entry and exit

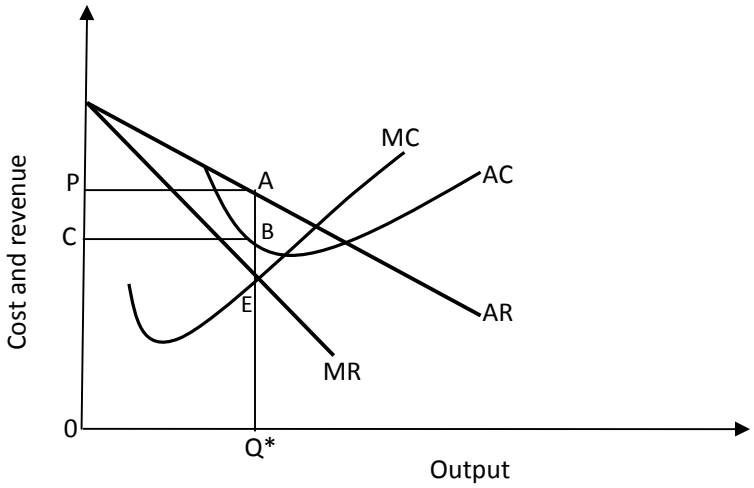
In a monopolistically competitive industry, it is easy for new firms to enter and the existing firms to leave it. As in the case of perfect competition, there is no barrier on the entry of new firms and exit of old ones from the industry. Firms will enter in to the industry attracted by super normal profit of existing firms and existing firms will leave industry if they are making losses. Entry of new firms reduces the market share of the existing ones and exit of firms does the opposite. These consequences of free entry and exit lead to intensive competition amoung the firms for both retaining and increasing their market share. However entry may not be as easy as in perfect competition because of the need to differentiate one's product in a monopolistically competitive market. Sometimes, it is possible for companies to create barriers to entry for potential rivals by using advertising and product differentiation. Advertising can create product awareness and loyalty to well known brands. Product differentiation can impose barriers to entry and increase the market power of producers.

5. There is absence of perfect knowledge. That is buyers and sellers do not have perfect knowledge about market conditions

6. There is no uniform price. Different producers charge different prices for their products because products are differentiated in some way.

Short Run Equilibrium of the Firm

A firm under monopolistic competition enjoys some control over price of its product since its product is somewhat differentiated from others. Yet, if the firm wants to increase the sales of its product, it must lower the price. Thus the AR curve of the monopolistically competitive firm slopes downward and MR curve lies below it (MR<P). The choice of the most profitable output and price parallels that of monopoly. Price and output determination under monopolistic competition in the short run is shown below.



Since close substitutes of the product are available in the market the demand curve (AR curve) is fairly elastic. Given the demand and cost condition, firm reaches its equilibrium when it maximizes its profit. In order to maximize profit the form should equate MC with MR. MC intersects MR at point E. the equilibrium quantity is Q* and equilibrium price is OP. The firm is making a super normal profit indicated by the area ABCP. It should be noted that in the monopolistic market, a firm can make super normal profit but it may make losses as well in short run. Chamberlin does not rule out the possibility of some firms making losses.

In terms of diagram the position of the monopolistically competitive firm resembles that of a monopoly. However, there are two important differences. Firstly, this firm is only one amoung many firms producing a similar product and so the demand of AR curve is not the market demand curve for the type of the product. Secondly, under monopolistic competition entry into the market is unrestricted. When existing firms are making profits, other firms will be attracted into the market. Thus, the equilibrium in the above figure cannot be a long run equilibrium since there are super normal profits being realized.

Long run Group Equilibrium under the Monopolistic Competition

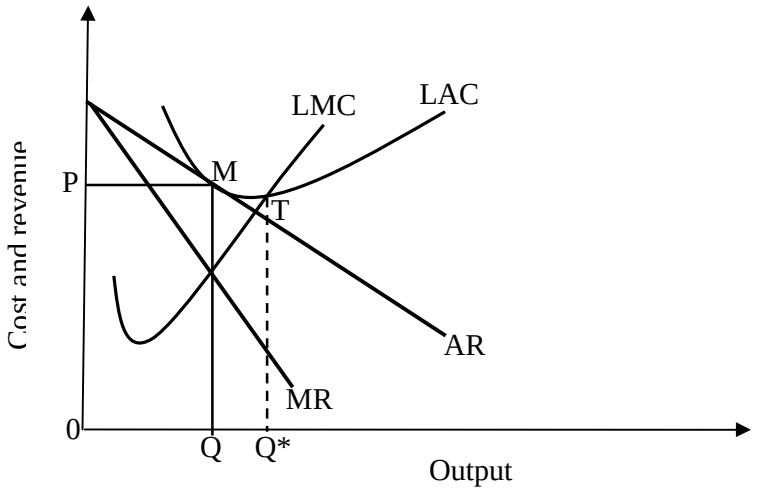
Now let us explain how equilibrium adjustment of prices and outputs of a number of firms as a group comes about. Each firm within the group has monopoly of its own particular product, yet its market is interwoven with those of his competitors, who produce closely related products. The price and output decisions of a firm will affect his rival firm who may in turn revise their price and output policies. This interdependence of the various producers upon each other is an important feature of monopolistic competition. Chamberlin calls them as constituting a group rather than as industry. Firms' falling in a group indulges in product differentiation.

The task of deciding the equilibrium of a group is more difficult and complex than that of deciding the equilibrium of an industry. Demand for goods for produced by different firms had to be different as regards to quantity and elasticity due to product differentiation. Again, cost curves of the firm would also be different from one another due to their different levels of efficiency. In order to simplify the analysis of equilibrium, Chamberlin ignores these diverse conditions surrounding each firms and made the following "heroic" assumptions.

1) Firms falling under the group produce very close substitutes
2) Demand curves of all the firms have the same nature and elasticity.
3) All the firms possess the same level of skill and efficiency and therefore their cost curves are sillier in nature
4) The number of firms in the group is so large that each firm regards itself as independent from behavoiur of other firms. This implies that price and output decisions of a particular firms affect other firms in an insignificant manner and thus it pays no attention to them

The first three assumptions are known as uniformity assumption, while the last one is known as the symmetry assumption. It is on the basis of these assumptions that Chamberlin carries out the analysis of long run group equilibrium under monopolistic competition.

Under monopolistic competition, there are no barriers to entry or exit in the long run. Thus, if the firms under monopolistic competition are able to earn abnormal profit in the short run, new firms will be attracted to the market. The market would be shared between more firms and as a result the demand curve or average revenue curve for the product of each firm will shift downward. This process of entry of new firms and the resultant shift in demand curve to the left will continue until average revenue curve becomes tangent to the average cost curve and the abnormal profits are completely wiped out. Thus, a firm in long run equilibrium under monopolistic competition makes only normal profit. Long run equilibrium of firms constituting the group is shown in the following figure.



The long run average revenue curve is tangent to average cost curve at the point M. marginal cost and marginal revenue curves intersect each other exactly vertically below point M. thus the firm is in equilibrium at price 0P and producing 0Q level of output. Because average revenue equals average cost, the firms makes only normal profit. Since all firms are alike in respect to demand and cost curves (due to heroic assumption), the average revenue of all will be tangent to their average cost curves and therefore, all firms will be earning only normal profit. Since there is no abnormal profit, there will not be any tendency for new firms to enter the market and firm and group as a whole will be in equilibrium.

It can be noted that the firm will be in long run equilibrium under monopolistic competition making only normal profit; but its price is higher and output is smaller that under perfect competition. A firm under perfect competition reaches long run equilibrium when pit produces at the minimum point of long run average cost curve. That is, perfectly competitive firms tend to be of the optimum size and produces ideal output. Ideal output is that output which is associated with the minimum point of long run average cost curve. But a firm under monopolistic competition stops short of optimum point and operates at the point at which average cost is still falling. Thus, unlike the perfect competition, the firm's equilibrium will never be at the minimum point of long run average cost curve. Hence, it is argued that the firm's output under monopolistic competition is not ideal output and there is "*excess capacity*" and wasteful use of society's resources. Production costs are higher than necessary. Excess capacity is the difference between ideal output and output actually attained by the firm in long run equilibrium.

In the earlier figure, the firm under perfect competition would have produced 0Q* output at which average cost is minimum. But by producing 0Q instead of 0Q*, the firm under monopolistic competition does not use the capacity fully. Thus, capacity equal to QQ* is lying unused in the firm's long run equilibrium under monopolistic competition. This unused capacity is the excess capacity which is a prominent feature of long run equilibrium under monopolistic competition. The concept of excess capacity is explained below

Excess Capacity in Monopolistic Competition

As explained in the case of long run equilibrium, a monopolistically competitive industry has excess capacity because each firm does not produce at the minimum point of its long run average cost curve. Notice that in the above figure the firm operates to the left of minimum point T, on its long run average cost curve and this outcome will be true so long as the firm's demand curve (average revenue) has a negative slope. Thus the firm's per unit production cost are higher than the minimum cost possible. So in a monopolistically competitive industry there are many firms, each with excess capacity.

As said above, the excess capacity of a firm is defined as the difference between the ideal output and the actual output attained in the long run. Ideal output is the output that can be produced at the minimum long run average cost. The concept of ideal output is linked to social optimality of production. Excess capacity is also called as idle capacity and unused capacity. However, Chamberlin argues that the ideal output, conforming to the minimum of long run average cost is not an attainable output in monopolistic competition. This is because of the fact that product distinctiveness is a necessity and it affects both the demand and cost conditions. Under monopolistic competition, the demand curve facing the individual firm is not horizontal, but it is downward sloping, owing to distinctiveness of the product. A downward sloping demand curve cannot be tangent to the long run average cost curve at its minimum point. The conditions for equilibrium LMC=MR and AR= minimum point of LAC will not be fulfilled. The firms, will therefore be of less than optimum size even when they are earning only normal profit. No firm will have the incentive to produce the ideal output, since any effort to produce more than the equilibrium output would involve a higher long run marginal cost than marginal revenue. Thus each firm in the monopolistic competition will be of less than the optimum size and work under excess capacity.

Under perfect competition, each firm produces at the minimum point of its long run average cost curve and its horizontal demand curve (AR) is tangent to it at that point. The output is ideal and there is no excess capacity in the long run. Since under monopolistic competition, the demand curve of the firm is downward sloping due to product differentiation, the long run equilibrium of the firm is to the left of the minimum point of the long run average cost curve. According to Chamberlin, so long as there is freedom of entry and price competition in the product group in the market, the tangency point between the firm's demand curve and the long run average cost curve would lead to the ideal output and there will be no excess capacity. But in monopolistic competition, there is non-price competition and consumers want product differentiation and they are willing to accept increased production cost in return for choice and variety of products that are available. Thus, Chamberlin view that excess capacity is the result of non-price competition prevalent in the monopolistically competitive market. He attributed the excess capacity to the absence of active price competition. Firm's may abstain from active price competition for such policy reasons as formal or tacit agreements, open price association, trade association activities and so on.

Some economist do believe that the excess capacity is bad pointing out that the same level of total output would be possible with fewer firms, each producing larger output. This would lower the unit cost of production since each firm would produce at point T rather

than point M. At the same time, in the long run equilibrium, the monopolistic competitor produces at the point where long run marginal cost equals marginal revenue. However, it can be noted that price and marginal cost are not equal. Price is greater than the marginal cost, indicating that additional units of output are worth more to consumers than it cost firms to produce them. In contrast, the competitive firm in long run equilibrium produces the efficient output where price equals long run marginal cost. However, the level of output produced by the monopolistic competitor may not differ a great deal from the efficient output. The more elastic the demand curve, the closer price will be to the marginal cost and smaller the restriction in output will be.

Non-price Competition in Monopolistic Competition

Firms can attempt to attract customers by varying the quality of the product, the location at which it is sold, servicing, packaging and so on. Competition of this sort is referred to as non-price competition. Advertisement is the most important form of non-price competition. Firms incur advertising costs because they believe that by using advertising, revenues will increase more than costs and so profits will be higher. Advertising is supposed to increase revenues by shifting the demand curve facing the firm outward. So consumers will buy more at each price than before, or by making the demand curve more inelastic creating brand loyalty so that consumers will pay slightly higher prices for the product.

Under perfect competition, firms selling homogeneous products are given a price at which they can sell any quantity they desire. Advertising by the individual firm is of no consequence; rather it is a waste. A monopoly firm, facing a downward slopping demand curve, has the power of discretion in respect of price and quantity to be sold. However, given the demand curve, it can choose either price or output, not both. Advertising by a pure monopoly is of little consequence. However, under the monopolistic competition, a firm can alter its sales by the following three methods. They are (a) by changing the price of its product (b) by changing the nature of the product and (c) by incurring the advertisement outlays.

With regard to the price, since a firm under monopolistic competition faces a downward sloping demand curve with elasticity less than infinity, it has the option to change the price. With regard to changing the nature of the product, a firm can do it by changing the quality of its product by making technical changes, introducing a new design, use of superior material, by a new style of packaging, by establishing a close link with the buyers and so on. Besides, a firm can increase its sales by prompt and courteous service, credit facilities and by enhancing expenditure on advertisement. While making changes in price and output is a short run phenomenon, changing the quality of the product and attracting larger number of buyers are long run phenomenon.

Criticism of the theory of Monopolistic Competition

The model of monopolistic competition was received very enthusiastically in the 1930s, and many economists talked of the “chamberlainian revolution”. Yet, despite its almost instant success, it later generated a lot of criticism and controversy. Some of them are mentioned below.

The downward slopping demand curves are derived from the assumption of product heterogeneity. This is inconsistent with the assumption that the most cost curves or demand conditions are the same for all firms. If outputs of the two firms are genuinely different, then the costs per unit are not comparable. Further, the long run equilibrium of the firm with only normal profits is also logically incorrect. If the firm is providing a unique product and making supernormal profit as a consequence, other firms can compete away these profits by providing the same product.

Another problem created by the introduction of the product heterogeneity is that it is difficult to define an industry or competing group. For example, tea, coffee, soft drinks etc could form a chain of competing products. Under perfect competition or monopoly these would be considered as different homogeneous products. Under monopolistic competition it is not clear where we draw the line. Further, the differentiated products are not necessarily produced by different firms. For instance, the fact that there are different brands of soaps and detergents does not mean that the market is monopolistic. All the brands might be produced by a single firm. What we have is an oligopoly of multiproduct firms.

Another important criticism of the theory of monopolistic competition is that it is not useful for making any prediction. Unlike the theories of perfect competition and monopoly, the theory of monopolistic competition does not provide unambiguous predictions of the effect of changes in costs or demand on the price of the product, the size of the plant or the number of the firms in the industry. One prediction of the monopolistic competition model, that of long run excess capacity and unexploited economies of scale does not appear to be agree with the empirical evidence.

To sum up, all these criticisms of monopolistic competition model does not mean that it has been useless. In fact, the enormous literature criticizing it implies that it did raise a lot of issues that were not considered in earlier models of perfect competition and monopoly. It has encouraged economists to think of the problems of selling costs, advertising, non-price competition and so on.

References

1. Dominick Salvatore: Micro Economics, Harper Collins Publishers.
2. Dominick Salvatore: Micro Economic Theory- Third Edition, Schaum's Outline Series.
3. Koutsoyiannis: Modern Micro Economics – Second Edition, McMillan Press Ltd.
4. Edgar K Browning and Jacquelene M Browning – Micron Economic Theory and Applications, Kalyani Publishers.
5. Jhingan: Micro Economic Theory- Seventh Edition, Vrinda Publications
6. Ahuja: Modern Micro Economics – Third Edition, S Chand and Company Ltd.
7. Gregory Mankiw: Principles of Micro Economics, The Dryden Press, Harcourt Brace College Publishers.
8. Paul A Samuelson and William D Nordhaus: Micro Economics – Eighteenth Edition, McGraw Hill.
9. A Asimakopulos: An Introduction to Economic Theory : Micro Economics, Oxford University Press.
10. Maddala G S and Ellen Miller: Micro Economics – Theory and Application, Tata McGraw Hill

MODULE 4

OLIGOPOLY

Oligopoly is prevalent form of market structure. **It** is an important form of imperfect competition. Oligopoly is said to prevail when there are a few sellers or firms in the market producing or selling either homogeneous or differentiated products. In other words, when there are two or more than two, but not many, producers or sellers of a product, oligopoly is said to exist. Oligopoly is often referred to as "competition among the few". If there are only two sellers, we have a '**duopoly**'. If the product is homogeneous, we have a '**pure oligopoly'.** If the product is differentiated, we have a '**differentiated oligopoly'**. In some oligopolistic markets, some or all firms earn substantial profits over the long run because barriers to entry make it difficult or impossible for new form of market structure. Examples of Oligopolistic industries include automobiles, steel, aluminum, petrochemicals, electrical equipment, and computers.

Managing an oligopolistic firm is complicated because pricing, output, advertising and investment decisions involve important strategic considerations. Because only a few firms are competing, each firm must carefully consider how its actions will affect its rivals, and how its rivals are likely to react.

Example: Suppose that because of sluggish car sales, Ford is considering a 10 percent price cut to stimulate demand. It must think carefully about how Maruthi and Tata will react. They might not react at all, or they might cut their price only slightly, in which case Ford could enjoy a substantial increase in sales, largely at the expense of its competitors. Or they might match Fords' price cut in which case all three automakers will sell more cars but might make much lower profits because of lower prices. Another possibility is that Maruthi and Tata will cut their prices even more than Ford. They might cut prices by 15 percent. to punish Ford for rocking the boat, and this in turn might lead to a price war and to a drastic fall in profits for all three firms. Ford must carefully weigh all three possibilities. In fact, for almost any major economic decision a firm makes – setting price, determining production levels, under taking a major promotion campaign or investing in new production capacity – it must try to determine the most likely response of its competitors.

Characteristic of Oligopoly

In oligopoly, some special characteristics are found which are not present in other market forms. We discuss some of these characteristics below:-

1. Interdependence
   An important feature of oligopoly is the interdependence in decision-making of the few firms which comprise the industry. This is because when the number of competitors is few, any change in price or output by a firm will have a direct effect on the fortune of its rivals, which will then retaliate in changing their own prices and output as the case may be. Thus it is clear that the oligopolistic firm must consider not only the market demand for the industry's product but also the reactions of the other firms in the industry to any action it may take.

2. Importance of advertising and selling costs

   A direct effect of interdependence of oligopolists is that the various firms have to employ various aggressive and defensive marketing weapons to gain a greater share in the market or to prevent a fall in the share. For this various firms have to incur a good deal of costs on advertising and on other measures of sales promotion. Under perfect competition, advertising by an individual firm is unnecessary in view of the fact that he can sell any amount of his product at the going price. A monopolist may perhaps advertise when he has to inform the public about his introduction of a new model of his product or he may advertise in order to attract the potential consumers who have not yet tried his product. Under monopolistic competition, advertising may play an important role because of the product differentiation that exists under it, but not as much important as under oligopoly. Under oligopoly, advertising can become a life-and-death matter where a firm which fails to keep up with advertising budget of its competitors may find its consumers drifting off to rival products.

3. Group behavior

   Group behavior is another important feature of an oligopolistic market. In case of perfect competition, monopoly and monopolistic competition, it is assumed that firms behave in such a way as to maximize their profits. But, the firms under oligopoly are interdependent with regard to price and output determination, they behave as a group. Given the present state of our economic and social science, there is no generally accepted theory of group behavior. Do the members of a group agree to pull together in promotion of common interests? Does the group present any leader? If so, how does he get the others to follow him? These are some of the questions that need to be answered by the theory of group behavior.

4. Indeterminateness of demand curve facing an oligopolist

   The demand curve shows what amounts of his product a firm will be able to sell at various prices. Now, under perfect competition, an individual firm's demand curve is given and definite. Since a perfectly competitive firm is one among a large number of firms producing an identical product, it is incapable of influencing the price of the product by its own individual action. Therefore, a firm under perfect competition faces a perfectly elastic demand curve at the existing price. On the other hand, a monopolist produces a product which has only remote substitutes. Therefore, a monopolist can safely ignore the effect of its own price changes on his distant rivals and he faces a definite demand curve depending up on the consumer's demand for his product. Under monopolistic competition, where there are large number of firms producing products which are close substitutes of each other, changes in price by an individual firm will have a negligible effect on each of its many rivals. Therefore, a firm under monopolistic competition can validly assume the prices of its rivals to remain unchanged when it makes changes in the price of its product. And the demand curve for a firm under monopolistic competition can be taken as definite and is given by the buyer's preferences for its product.

But the situation under oligopoly is quite different because of the interdependence of the firms. Under oligopoly, a firm cannot assume that its rivals will keep their prices unchanged when it makes changes in its own price. As a result of this, the demand curve facing an oligopolistic firm loses its definiteness and determinateness since it goes on constantly shifting as the rivals change their prices in reaction to price changes by a firm.

Types of Oligopoly

Since the oligopolistic firms are interdependent and the uncertainty about the reaction patterns of the rivals, the easy and determinate solution to the oligopoly problems is not possible. Therefore, economists have developed a large number of models by taking different assumptions regarding the behavior of the oligopolistic group(that is, when they will co-operate together or fight with each other)regarding the objective they seek to achieve (that is, whether they are assumed to maximize individual or joint profits or they are assumed to maximize security of sales) and regarding the different reaction patterns of rival firms to price and output changes by one firm. Some of the famous models advanced by economists are as follows.

1. Classical Oligopoly models which have been put forward by Cournot, Bertrant and Edgeworth. (Non-collusive model)
2. Price leadership model
3. Collusive oligopoly model
4. Kinked demand curve oligopoly model which has been put forward by P M Sweezy.
5. Application of the Theory of Games to Oligopoly
6. Average cost Pricing Theory of Oligopoly
7. Sales maximizing model of Oligopoly
8. Managerial and Behavioral theories of firm
9. Limit Pricing theory

COLLUSIVE OLIGOPOLY: CARTELS

Setting prices independently is rare in oligopolistic markets. There exists usually some form of understanding among the oligopolists in a particular industry. This understanding or agreement among the oligopolists may be either tacit or formal. A formal agreement is one when the oligopolists after consultation and discussion agree to observe certain common rules of conduct in regard to price, output, etc. Under this they may make a written agreement which may also provide for penalties to those who violate the agreement reached.

But more often we find that there is a tacit agreement among the oligopolists. Under tacit agreement without any face to face contact, consultation or discussion, they come to have some understanding between themselves and pursue a uniform policy with regard to price, output, etc. In order to avoid uncertainty arising out of interdependence and to avoid price wars and cut throat competition firms working under oligopolistic conditions often enter into agreement regarding a uniform price output policy to be pursued by them. This agreement may be either formal (open) or tacit (secret). But since formal or open agreements to form monopolies are illegal in most countries, agreements reached between oligopolists are generally tacit or secret. When the firms enter into such collusive agreements formally or secretly, collusive oligopoly prevails. But collusions are of two main types: (i**) Cartels** and (ii)**Price leadership**.

In **cartel** type of collusive oligopoly, firms jointly fix a price and output policy through agreements. Originally, the term 'cartel' was used for the agreement in which there existed a common sales agency which alone undertook the selling operations of all the firms that were partly to the agreement. But now-a-days *all types of formal or informal and tacit agreements reached among the oligopolistic firms of an industry are known as 'cartels'*. Since these cartels restrain competition among the member firms, their formations have been made illegal in some countries. In spite of such laws cartels are still formed.

But under **price leadership** one firm set the price and others follow it. The one which sets the price is a price leader and the others who follow it are his followers. The follower firms adopt the price of the leader, even though they have to depart from their profit-maximising position, as they think that it is to their advantage not to compete with their leader and between themselves.

Price leadership is of various types. They are;

a) Price leadership by a low cost firm – in order to maximize profits the low cost firm sets a lower price than the profit maximizing price of the high cost firms. Here the low-cost price leader has to ensure that the price which he sets must yields some profits to the high-cost firms-their followers.

b) Price leadership by a dominant firm – Under this one of the few firms in the industry may be producing a very large proportion of the total production of the industry and may therefore dominate the market of the product. Since other firms which are small having no individual influence on the price, the dominant firm estimates its own demand curve and fixes a price which maximizes its own profit and the others will follow him.

c) A barometric price leadership under which an old, experienced, largest or most respected firm assumes the role of a custodian who protects the interest of all.

d) An exploitative or aggressive price leadership under which a very large or dominant firm establishes its leadership by following aggressive price policies and thus compel the other firms in the industry to follow him in respect of price.

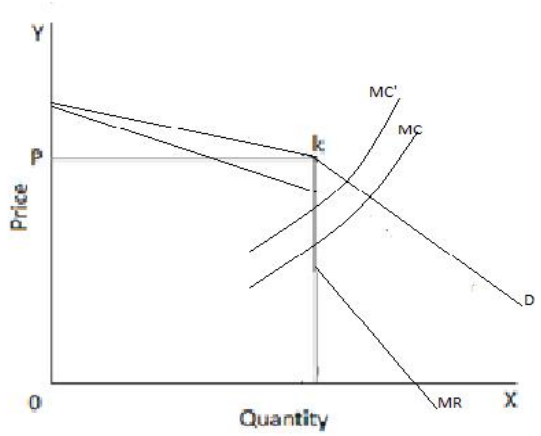
THE KINKED DEMAND THEORY OF OLIGOPOLY

It has been observed that many oligopolistic industries exhibit an appreciable degree of *price rigidity or stability*. That is, in many oligopolistic industries prices remain sticky or inflexible, and there is no tendency on the part of the oligopolists to change price of the commodity by them even if the economic conditions undergo a change. Many explanations have been given for this price rigidity under oligopoly and most popular explanation is the so-called kinked demand curve hypothesis. The kinked demand curve hypothesis was put forward independently by *Paul M Sweezy*, an American economist, and by *Hall and Hitch*, Oxford economists.

In explaining price and output especially under *oligopoly with product differentiation* economists often use *the kinked demand hypothesis*. This is because in case of oligopoly with product differentiation, when a firm raises its price, all customers would leave it because some customers are intimately attached to it due to product differentiation. As a result, the demand curve facing a firm under differentiated oligopoly is not perfectly elastic. On the other hand, under oligopoly without product differentiation, when a firm raises its price, all its customers would leave it so that demand curve facing an oligopolist producing homogeneous product may be perfectly elastic. Further, under oligopoly without product differentiation, there is a greater tendency on the part of the firms to join together and form a collusion, formal or tacit, and alternatively to accept one of them as their leader in selling their price. No doubt, kinked demand curve has a special relevance for differentiated oligopoly, it has also been applied for explaining price and output under oligopoly without product differentiation.

The demand curve facing an oligopolist, according to the kinked demand curve hypothesis, has a 'kink' at the level of prevailing price. It is because the segment of the demand curve above the prevailing price is highly elastic and the segment of the demand curve below the prevailing price is less elastic. Thus, according to Sweezy, if an oligopolist raised its price, it would lose most of its customers because the other firms in the industry would not match the price increase. On the other hand, an oligopolist could not increase its share of the market by lowering its price, since its competitors would immediately match the price reduction. As a result, according to Sweezy, Oligopolists face a demand curve that is highly elastic for price increases and less elastic for price reductions.

Because of the firm's demand curve is kinked, the marginal revenue curve is discontinuous (the bottom part of the marginal revenue curve corresponds to the less elastic part of the demand curve as shown by the solid portions of each curve). As a result, the firm's cost can change without resulting in a change in price. As shown in the following figure marginal cost could increase but still equal marginal revenue at the same output level, so that price stays the same.



The two different types of reaction of the competitors to a change in price can be explained from the above figure;

(a) Price reduction

If the oligopolist reduces its price level OP in order to increase his sales, the competitors will follow the same from the fear of a loss in the sales. Since the competitors quickly follow the reduction in price by an oligopolist, he will gain in sales only very little. His sales will increase not at the expense of his competitors but because of the rise in total quantity demanded due to the reduction in price of the good. In fact each will gain in sales to the extent of a proportionate share in the increase in total quantity demanded. Very small increase in sales of an oligopolist following his reduction in price below the prevailing level means that the demand for him is inelastic below the prevailing market price. Thus the segment kD of the demand curve which lies below the prevailing price OP is inelastic. It shows that very little increase in sales can be obtained by a reduction in price by an oligopolist.

(b) Price increase

If an oligopolist raises his price above the prevailing level, there will be substantial reduction in his sales. This is because, as a result of the rise in his price, many of his customers will withdraw from him and will go to his competitors who will welcome them and will gain in sales. These happy competitors will have therefore no motivation to match the price rise. The oligopolist who raises his price will be able to retain only those customers, who either have a strong preference for his product (if the products are differentiated) or who cannot obtain the desired quantity of the product from the competitors because of their limited productive capacity. Large reduction in sales following an increase in price above the prevailing level by an oligopolist means that demand for increases in price above the existing one is highly elastic. In the figure the segment 'dk' of the demand curve which lies above the current price level 'OP' is elastic showing a large fall in sales if a producer raises his price.

Price Rigidity

From the above explanation we can conclude that an oligopolist confronting a kinked demand curve will have no incentive to raise its price or to lower it. Since the oligopolist will not gain any larger share of the market by reducing his price below the prevailing level, and there will be substantial reduction in sales if he increases his price above the prevailing level, he will be extremely reluctant to change the prevailing price. Thus price rigidity can be explained with the help of the kinked demand curve theory.

Although the kinked demand curve model is attractively simple, it does not really explain oligopolistic pricing. It says nothing about how firms arrived at price P and why they didn't arrive at some different price. It is useful mainly as a description of price rigidity rather than as an explanation of it.

MODULE 5

FACTOR PRICING

Input pricing and employment under perfect competition

In many ways the determination of input prices and employemt is similar to the pricing and output of commodities. That is, the price and employment of an input is generally determined by the interaction of the forces of market demand and supply for the input.

There are several important qualifications and features related to the employment of inputs.

Firstly, whereas consumers demand commodities because of the utility or satisfaction they receive in consuming the commodities, firms demand inputs in order to produce the goods and services demanded by the society. That is, demand for commodities is 'direct demand' while demand for an input is 'derived demand'; it is derived from the final commodities that the input is used in producing.

Secondly, while consumers demand commodities, firms demand the services of inputs.

Thirdly, this chapter deals with inputs in general, that is , it refers to all types of labour, capital, raw materials, and land inputs.

Profit maximisation and optimal input employment

One of the major objective of the firm is profit maximisation. To maximise the profit a firm combines various inputs in a least cost manner. The least-cost input combination of a firm can be given by;

$$MP_L/w = MP_K/r \quad -(1)$$

where,MP refers to the marginal physical product.

L-refers to labour

K- capital

w – wages or the price of the labour time

r – interest rate or the rental price of capital

The above equation indicates that to minimise production costs, the extra output or marginal product per rupee spent on labour must be equal to the marginal product per rupee spent on capital. If MP_L =5, and MP_K = 4, and w = r, then the firm would not be minimising costs, because it is getting more extra output for a rupee spent on labour than on capital. To minimise costs, the firm would have to hire more labour and rent less capital. As the firm does this, the MP_L declines and MP_K increases(because of the operation of diminishing returns). The same general condition would have to hold to

minimise production costs. That is, the MP per rupee spent on each input would have to be the same for all inputs.

We can show that, the reciprocal of each term (ratio) in equation –(1) equals the marginal cost (MC) of the firm to produce an additional unit of output.

That is,

$$w/MP_L = r/MP_K \qquad -(2)$$

Consider labour first. The wage rate (w) is the addition to the total costs of the firm from hiring one additional unit of labour, while MPL is the resulting increase in the total output of the commodity of the firm. Thus w/MP_L gives the change in total cost (in terms of labour) per unit increase in output. This is the 'marginal cost'.

That is, $w/MP_L = MC$

For example, if the hourly wage is Rs.10 and the firm produces 5 additional units of the commodity with an additional hour of labour time. Then the marginal cost per unit of output is-?

$$MC = w/MP_L$$

$$= RS.10/5 \qquad = Rs.2$$

The same of true for capital also. ie $r/MP_K = MC$

To maximise profits, the firm must use the optimal or least cost input combination to produce the best level of output. *The best level of output for a perfectly competitive firm is the output at which marginal cost equals marginal revenue or price. ie. MC = MR = P*

Thus it follows that to maximise profits

$$w/MP_L = r/MP_K = MC = MR = P \qquad -(3)$$

By cross multiplication and rearrangement of the terms, we get equations

$$MP_L \times MR = w \quad \text{or} \quad MP_L \times P = w \qquad -(4)$$

$$MP_K \times MR = r \quad \text{or} \quad MP_K \times P = r \qquad -(5)$$

Thus the profit maximising rule is that the firm should hire labour until the MP_L times the firm's MR or price of the commodity equals the wage rate.

Similarly, the firm should rent capital until the MP_K times the firm's MR or price of the commodity is equal to the interest rate. To maximise profit, the same rule would have to hold for all inputs that the firm uses.

The Demand Curve of a Firm for an Input

The demand curve of a girm for an input can be explained under two cases;

(i) When the input is the only variable input and

(ii) When the input is one of two or more variable inputs.

The Demand Curve of a Firm for One Variable Input

A firm demands an input in order to produce a commodity demanded by consumers. Thus the demand for an input is a derived demand- it is derived from the demand for the final commodities that the input is used in producing. The demand for and input by a firm shows the quantities of the input that the firm would hire at various alternative input prices. We begin by assuming that only one input is variable(ie. the amount used by the other inputs is fixed).

According to the marginal concept, a profit-maximising firm will hire an input as long as the extra income from the sale of the output produced by the input is larger than the extra cost of hiring the input. The extra income is given by the marginal product (MP)of the input times the marginal revenue(MR) of the firm. This is called the **marginal revenue product MRP**).That is,

$$MRP = MP \cdot MR$$

When the firm is a perfect competitor in the product market, its marginal revenue is equal to the commodity price (P). In this case, the marginal revenue product is called the **value of the marginal product(VMP)**.

That is, when the firm is a perfect competitor in the product market (so that MR=P);

$$MRP = MP \cdot MR = MP \cdot P = VMP$$

If the variable input is labour, we have

$$MRP_L = MP_L \cdot MR = MP_L \cdot P = VMP_L$$

The extra cost of hiring an input or **marginal expenditure (ME**) is equal to the price of the input if the firm is a perfect competitor in the input market. Perfect competition in the input market means that the firm demanding the input is too small, by itself, to affect the price of the input. In other words, the firm can demand any amount of input at the given market price for the input. Thus the firm faces a horizontal or infinitely elastic supply curve for the input. For example, it the input is labour, this means that the firm can hire any quantity of labour time at the given wage rate. Thus a profit maximising firm should hire labour as long as the marginal revenue product of labour exceeds the marginal expenditure on labour or wage rate and until $MRP_L = ME_L = w$. It is to be noted that MRP = ME rule is entirely analogous to the MR = MC, profit maximising rule employed throughout our discussion of price and output determination.

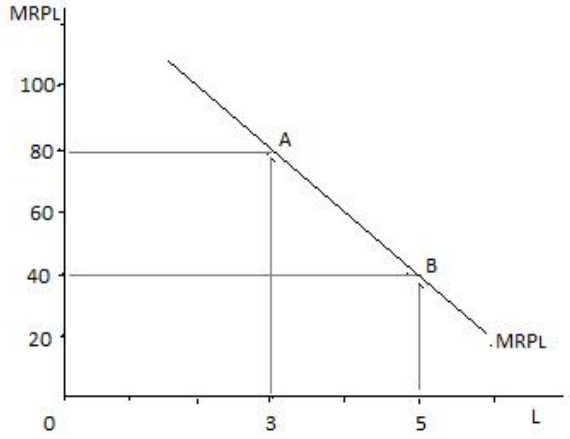
The actual derivation of a firm's demand schedule for labour, when labour is the only variable input (ie. when capital and other inputs are fixed), is shown in the table given below.

L	Qx	MP_L	Px (in Rs)	$MRP_L = VMP_L$ (in Rs)	$ME_L = w$ (in Rs)
0	0	-	10	-	-
1	12	12	10	120	40
2	22	10	10	100	40
3	30	8	10	80	40
4	36	6	10	60	40
5	40	4	10	40	40
6	42	2	10	20	40

In the table 'L' refers to the number of workers hired by the firm per day. Qx is the total output of commodity 'x' produced by the firm by hiring various numbers of workers. The MP_L is the marginal or extra output generated by each additional worker hired. The MPL is obtained by the change in Qx per unit change in L (ie. MPL = $\Delta Qx/\Delta L$). It is to be noted that law of diminishing returns begin to operate with the hiring of the second worker. Px refers to the price of the final commodity, which is constant at Rs.10 because the firm is a perfect competitor in the product market. The marginal revenue product of labour (MRP_L) is obtained by multiplying MP_L by MRx (the marginal revenue from the sale of commodity 'x') and is equal to the value of the marginal product of labour (VMP_L)becausePx = MRx. The last column gives the marginal expenditure on labour (ME_L) which is equal to the constant wage rate (w) of Rs.40 per day that the firm must pay to hire each additional worker.

From the table we can see that the first worker contributes an extra Rs.120 to the firm's revenue(MRP_L = Rs.120). The firm incurs an extra expenditure of only Rs 40 to hire the second worker. Then the MRP_L falls to Rs.100 (because of the diminishing returns). Under perfectly competitive market, the profit maximizing firm will hire workers until the MRP_L = ME_L = w. Thus this firm should hire five workers, at which VMP_L = w = Rs 40. The firm will not hire the sixth worker since VMPL <Rs 40 (that is VMPL = Rs 20 which is less than wage rate R.40).

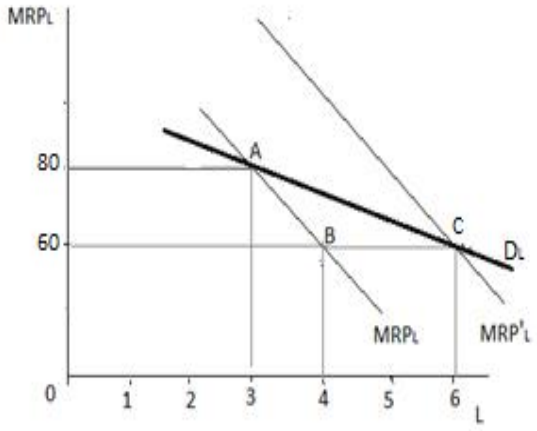
Thus the MRP_L schedule gives the firm's demand schedule for labour. It indicates the number of workers that the firm should hire at various wage rates. If we plot the MRPL values of the demand schedule on a graph we get a negatively sloped demand curve for labour when labour is the only variable input. That is shown in the following diagram.



From the above figure we can see that the demand curve for labour or MRP_L is a negatively sloped curve, where the firm will hire 3 workers when the wage rate is Rs 80 (at point A) and 5 workers when the wage rate is Rs 40 (at point B).

The Demand Curve of a Firm for One of Several Variable Inputs

When labour is not the only variable input (ie., when the firm can also change the quantities of capital and other inputs), the firms demand curve for labour can be derived from the MRP_L curve, but it is not the MRP_L curve itself. The derivation is basically same as explained above. That is, as the wage rate falls and the firm hires more labour, the MRP curve of other inputs that are complements to labour shifts to the right, and the MRP curve of the inputs that are substitutes for labour shifts to left. Both of these shifts cause the MRP_L to shift to the right, say from MRP_L to MRP'_L in the following figure.



From the above figure, we can see that, when the daily wage falls from Rs.80 to Rs.60 the firm will increase the number of workers hired from 3 to 6 (ie. from point A on the MRP_L curve to point C on MRP'_L curve)rather than to 4 (point B on the original MRP_L curve). By joining points A and C, we get the firm's demand curve for labour 'D_L' when other inputs besides labour are variable.

It is to be noted that the demand curve 'D_L' is negatively sloped and generally more elastic than the MRP_L curve in the long run, when all inputs are variable. In general, the better the complementary and substitute inputs available for labour are, the greater is the outward shift of the MRP_L curve as a result of a decline in the wage rate, and the more elastic is 'D_L'.

The Market Demand Curve for an Input

The market demand curve for an input is derived from the individual firm's demand curves for an input. If all the firms using the inputs are the monopolists in their respective product markets, market demand for the input is derived by the straightforward horizontal summation of the individual firm's demand curves for the input.

The case is different when a commodity market is composed of oligopolists and monopolistic competitors. That is, when all the oligopolists or the monopolistic competitors in a product market hire more inputs and produce more of the commodity, the commodity price will decline. This decline in the price of the commodity causes a downward shift in each firm's demand curve for labour. The market demand curve is obtained by adding the quantity demanded of each input on these downward shifting demand curve of the input of each firm.

Supply Curve of an Input – pricing and employment of an input

Monopsony: A single Firm Hiring an Input

In the above explanateon, we have assumed that the firm is a perfect competitor in the input market. This means that the firm faces an infinitely elastic or horizontal supply curve of the input and that the firm can hire any quantity of the input at the given market price of the input.

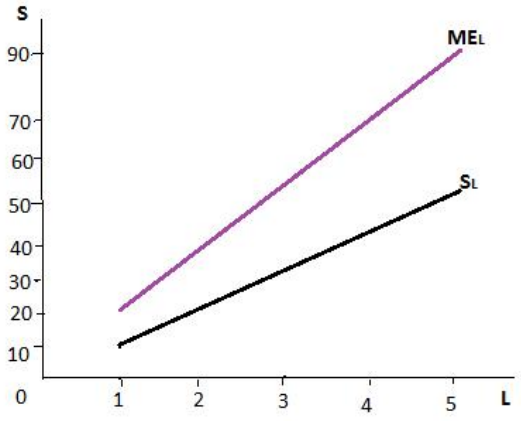
Now we can explain the supply curve of an input when the firm is an imperfect competitor in the input market. When there is a single firm hiring an input, we have a **Monopsony**. Thus while monopoly refers to a single seller of a commodity, **monopsony** refers to the single buyer of an input. As such, the monopsonist faces the positively sloped market supply curve of the input. This means that to hire more units of the input, the monopsonist must pay a higher price per unit of the input. However, as all units of the input must be paid the same price, the monopsonist will have to pay a higher price, not only for the last unit hired, but for all units of the input it hires. As a result the marginal expenditure(ME) on the input exceeds the input price.This is shown in the table below:

Marginal Expenditure on Labour			
L	W (In Rs)	TE_L(In Rs)	ME_L(In Rs)
1	10	10	….
2	20	40	30
3	30	90	50
4	40	160	70
5	50	250	90

In the table 'w' represent s the daily wage rate that a monopsonist must pay to hire various numbers of workers (L). Thus the first two columns of the table give the market supply schedule of labour faced by the monopsonist. TE_L is the total expenditure incurred by the monopsonist to hire various numbers of workers which is obtained by multiplying L by w. ME_L is the marginal expenditure on labour which indivates the extra expenditure that the monopsonist faces to hire each additional workers.

That is, MEL = $\Delta TC_L/\Delta L$

Note that ME_L > w. For example, the monopsonist can hire one worker at the wage rate Rs 10 for a total cost of Rs 10. To hire the second worker, the monopsonist must increase the wage rate from Rs 10 to Rs 20 and incur a total expenditure of Rs.40. Thus to hire more and more workers, the monopsonist will have to increase the wage rate and hence the total expenditure. The graphical representation of the first two columns (units of workers employed and the wage rate) gives the supply curve of labour (S_L). Similarly, the ME_L curve which shows the relationship between ME_L and various units of labour hired is everywhere above the $S_L$curve. That is;



The above figure represents a Monopsonist's Supply and Marginal Expenditure on Labour Curves.S_L is positively sloped market supply curve of labour faced by the monopsonist and ME_L is the marginal expenditure of labour curve which is everywhere above the S_L curve.

Pricing and Employment of One Variable Input

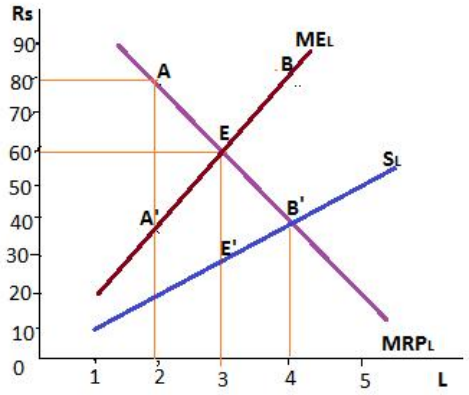
A firm using only one variable input maximizes profit by hiring more units of the input until the extra revenue from the sale of the commodity equals the extra expenditure on hiring the input. This is the general marginal condition and applies whether the firm is perfect or imperfect competitor in the product and/or input markets.

If the variable input is labour and the firm is a monopsonist in the labour market, the monopsonist maximizes its total profits by hiring labour until the MRP_L equals the ME_L. That is;

$$MRP_L = ME_L$$

$$MP_L . MR = ME_L$$

The wage rate (the price of the labour) paid by the monopsonist is given by the corresponding point on the market supply curve of labour (S_L). This is shown in the following figure.



In the figure, the S_L and ME_L curves represents supply curve of labour and marginal expenditure on labour respectively. With the firm's MRP_L curve, the monopsonist maximizes profits by hiring 3 workers (given by point E, at which the MRP_L curve intersects ME_L curve and MRP_L = ME_L = Rs 60). To prove this, consider that the second worker adds Rs.80 (point A) to the monopsonist's total revenue but only Rs.40 (point A') to its total expenditure. Thus the monopsonist's profit rise (by AA" = RS.40) by hiring the second worker. On the other hand, the monopsonist would not hire the 4th worker because he or she would add more to total expenditure (Rs.80, given by point B) than to total revenue (Rs.40 given by point B'), so that the monopsonist's total profits would fall by

Rs.40 (BB" in figure). Only at L = 3, $MRP_L = ME_L$ = Rs.60 (point E) and the monopsonist maximizes total profits.

The figure above also shows that to hire 3 workers, the monopsonist must pay the wage of Rs.30. This is given by the point E' on the S_L curve at L = 3. Thus the intersection of the MRP_L and ME_L curves give only the profit maximizing number of workers that the firm should hire. The wage rate is given by the amount that the firm must pay each worker, and this is given by the point on the market supply curve of labour at the level of employment. Note that MRP_L = Rs 60 (point E) exceeds w = Rs.30 (point E') at L = 3.

Monopsony Pricing and Employment of Several Variable Inputs

When the monopsonist employs more variable inputs he or she will maximize profits by hiring each input until the MRP of the input equals the ME on hiring it. With labour and capital as variable inputs, the monopsonist should hire labour and capital until the following equations hold.

$$MP_L .MR = ME_L$$

$$MP_K . MR = ME_K$$

Dividing both sides of the two equations by MP_L and MP_K respectively, and combining the results we get;

$$ME_L/MP_L = ME_K/MP_K = MC = MR$$

This is the optimal input combination. If the ME_L/MP_L is smaller than ME_K/MP_K, the monopsonist would not be minimizing production costs. The monopsonist can reduce the cost of producing any level of output by substituting labour for capital in production at the margin. As the monopsonist hires more labour, ME_L rises and MP_L declines, so that ME_L/MP_L rises. As the monopsonist hires less capital ME_K falls and MP_K rises, so that ME_K/MP_K falls. To minimize the cost of producing any level of output, the monopsonist should continue to substitute labour for capital in production until the following equation holds. That is;

$$ME_L/MP_L = ME_K/MP_K = MC = MR$$

Reference: Microeconomics-Theory and Applications – Dominick Salvatore

Advanced Economic Theory- H.L Ahuja