Managerial Economics

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Developed By

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On behalf of

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About the Author

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The Meaning, Scope And Methods Of Managerial Economics

Objectives

After completing this chapter, you will be able to understand:

• Meaning of Managerial Economics.

• Features of Managerial Economics.

• Scope of Managerial Economics.

• Methods of Managerial Economics.

Structure:

1.1 Managerial Economics - Its meaning.

1.2 Features of Managerial Economics.

1.3 Scope and subject matter of Managerial Economics.

1.4 Methods of Managerial Economics.

1.5 Summary

1.6 Self Assessment Questions

1.1 MANAGERIAL ECONOMICS – ITS MEANING

Managerial Economics is the application of Economic Theory to managerial practice. It relates to the use of tools and techniques of economic analysis to solve managerial problems. According to **Milton Spencer & Louis Siegelman "Managerial Economics is the integration of economic theory with business practice to facilitate decision making and forward-planning."** According to **Eugene Brigham and James Pappas "Managerial Economics is the application of economic theory and methodology to business administration practice."** It deals with economic aspects of managerial decisions and with those of management decisions that have an economic content. Thus from the broad and wide canvas of the subject of Economics, that body of knowledge, which emerges to facilitate the process of managerial decision- making in shaping efficiently the destiny of the firm constitutes the subject matter of Managerial Economics.

1.2 FEATURES OF MANAGERIAL ECONOMICS

1) **Micro Economics oriented**: There are two approaches to the study of Economics, the Micro Economic Approach and the Macro Economic Approach. Micro Economic Approach deals with the study of individual economic behaviour i.e. the behaviour of individual producer, individual consumer etc; whereas the Macro Economic Approach deals with the behaviour of the economy as a whole such as National Income, Trade Cycle etc. In Managerial Economics we are more concerned with the analysis of the decision taking aspects of the unit of management at the firm level and therefore Managerial Economics is micro-oriented.

2) **Normative Approach**: As such there are two approaches to the study of science; namely the Positive approach and the Normative approach. In positive approach we are concerned with the situation 'as it is', whereas in case of normative approach we are concerned with the situation 'as it ought to be'. Robbins has made economics a pure and positive science. Its purpose is only to describe and not to prescribe. It is only a light-bearing science and not a fruit bearing one; whereas Managerial Economics adopts a normative approach. Its purpose is not only to describe but more so to prescribe. It is the fruit-bearing science.

3) **Only a part of the Science of Economics**: Of the whole set of Economic Science which deals with many aspects and issues related to human behaviour in allocating scarce resources **Managerial Economics is only a part of the Science of Economics**. The study of Economics, covers issues like welfare economics, agricultural economics, international trade, public finance, money, banking, foreign exchange, development, underdevelopment, poverty, inflation, inequalities, utility analysis, consumer behavior etc, whereas Managerial Economics is just a subset of the set of Economics. It mainly deals with decision-taking of managerial cadre at the level of the firm i.e. the production unit or a business unit and thus it becomes only a part of the subject of Economics.

4) **Knowledge of Macro Economics is essential:** Although Managerial Economics is micro economic oriented yet knowledge of macro economics is essential i.e. no single firm works in isolation. It has got to consider so many other aspects while taking decisions for itself. It has to consider the reactions of rival firms, the possibility of Government interference through taxation, tariffs, export and import policies, the cyclical changes in the levels of business activities, the policy of disinvestment, liberalization, globalization, risks and uncertainties etc. Many of these are exogenous factors i.e. external to the theory of the firm and yet the Managerial Economist cannot afford to overlook them. Neglect of these may lead to wrong decisions.

1.3 SCOPE AND SUBJECT MATTER OF MANAGERIAL ECONOMICS

The scope of Managerial Economics envisages the inclusion of the study of specific problems of a business enterprise whose main objective is to organize resources in such a way so as to achieve the best or at least satisfactory results out of the activities undertaken. **The subject matter of Managerial Economics revolves round the Theory of the firm**. The Firm is a business unit or a production unit.

There are two dimensions to the theory of the firm: i) The Financial aspect and ii) The Physical aspect.

The **Financial aspect** itself comprises of : a) the cost side and b) the revenue side. Between the revenue and the cost, the firm aspires to gain profits and just not profits but maximum possible profit. This implies that the managerial economist after working out the cost will have to fix the **price** of

the product which in turn will also depend on the demand for the product. It is not only the current demand that will have to be considered but the firm will also have to predict or **forecast demand** for its product in the near and distant future. The product will have to be sold in the market and hence the firm will have to consider the **market morphology**. It has to find out the number of competitors producing either identical products or close substitutes. It will have to work out the **price output relations** and the **condition for profit maximization**. Although the aim of the firm is to maximize profits it may also encounter losses. As it incurs a loss the very objective of the firm will change. It would like to **minimize its losses**. The firm need not therefore close down as soon as it incurs a loss but should adopt methods **to promote sales** to minimize the loss. As long as the revenue can cover the variable cost, the firm will continue to remain in production but if the returns can't cover even the variable cost then the firm should decide to take an honorable exit. This would be regarded as **the shutdown decision** in Managerial Economics.

Besides the financial aspects the analysis of the firm also has certain **Technical aspects or Physical aspects** i.e. the **input-output relationship**. In fact, technologically, production is a process of transforming inputs into output. Inputs refer to the various factors of production such as land, labour, capital and organization. The aim of the managerial economist with reference to input-output relation is **optimization** i.e. **to make the best possible use of the available resources in order to produce the maximum possible desirable output**.

All these aspects require proper **project planning** as well as **capital budgeting**. The firm will have to work out certain strategies to undertake production and sales to meet its objectives. Thus, cost analysis, demand and supply analysis, pricing strategies, business forecasting, market morphology and the theories of profit will be covered in the scope and subject matter of Managerial Economics. In fact, 'Management without Economics has no roots and Economics without Management bears no fruits'.

Mathematical tools and techniques are also incorporated in the study of Managerial Economics. **Simple diagrams** are drawn to make the subject interesting and easily understandable. The diagrams provide a visual impact and help the viewer in capturing the detailed explanation in the shortest and simplest manner. We also make use of **derivatives, correlation and**

regression, linear-programming, probability theory, econometric models, the game theory and the input-output analysis to provide a scientific base to the subject matter of managerial economics.

As an Economic Man, i.e. an individual who behaves in an economically rational manner, the aim of the producer is to maximize profit but **profit maximization need not necessarily be the only objective of the firm**. There can be several other alternative objectives such as sales maximization, safety margins of profits, long run survival, quite-life, maintaining the goodwill of the firm, satisfying the consumers through quality of the product, etc. and therefore **judicious decisions** will have to be taken to achieve a combination of these objectives.

1.4 METHODS OF MANAGERIAL ECONOMICS

Having discussed the meaning and scope of Managerial Economics, we now turn to highlight the methods of Managerial Economics. The term 'method' symbolizes a procedure which applies some rational and systematic pattern to diverse objects, not only to make observations more accurate but also to avoid the common errors and illusions which hamper human knowledge. It is often argued that in the study of Managerial Economics, we utilize any one or more of the following methods; namely;

1) The Scientific Method or Experimental Method,

2) The Statistical Method,

3) The Method of Intellectual Experiment,

4) The Method of Simulation and

5) The Descriptive Method.

The Experimental method is of limited use to Managerial Economics, because it is difficult to carry out experiments to test the validity of managerial behavior as it deals with human aspects and human behavior is inherently complex; it is ever changing. We can think in terms of adopting the blend of Deductive and Inductive methods in analyzing the behavior of Managerial Economist. Sometimes deduction precedes induction whereas at other times induction precedes deduction. To make it a little more clear, in deductive method, we go from the general rule to the particulars, whereas in inductive method we examine behavior of individual Managerial Economists

and then eventually generalize E.g. the aim of one producer is to maximize profit, the aim of the other producer is also to maximize profit. Similarly, the aim of still other producers is also to maximize profit thus we come to the generalization that the primary aim of the producer is to maximize profits and then work out the method to derive the condition for profit maximization.

Statistical Method is a device by which the quantitative data are collected and scientifically analyzed in order to give us a more clear picture of happenings. The collected data are classified, tabulated, compared, correlated and finally interpreted. The statistical methods are generally used by Managerial Economist in demand forecasting and sales promotion. **Model Building** is yet another method used in Managerial Economics. It helps us to understand the actual socio-economic relationship existing in a firm. It can guide the Managerial Economist in taking more appropriate decisions. **The Method of Simulation** has acquired prominence with the oncoming of electronic computers. With the help of this method we can program a complex system of relationships. **The Descriptive Method** is often used by Managerial Economist to analyze the impact of original structure on the working of business enterprises. However, in the study of, Managerial Economics we do not employ any specific approach but utilize any one or more of the above mentioned methods.

If by 'methods' we mean the procedural routes to accomplish predetermined results then the methods outlined below are used in Managerial Economics to solve the problems faced by managers in their day-to-day business.

Reference to facts and figures of the firm provides complete information about the working of the firm. Systematically an approach can be set up to compile the data from the various departments of the firm. The management then is able to **co-ordinate and compile the data** so as to derive a complete picture of the overall performance of the firm which could help him to take decisions for any further future action. Thus the knowledge derived from the compilation of firm's internal data could be considered as one of the methods of Managerial Economics. Similarly the businessmen or manufacturers involved in similar process of production **may form voluntary associations** and compile the data about different business activities. Yet another method of Managerial Economics could be to obtain and **act upon the information compiled from published works or through surveys conducted by way of field investigation.**

Case Studies undertaken would provide **an invigorating method** in the learning process in the science of Managerial Economics. Case Studies bring out the complexity of the environment in which the managers have to take economic decisions and therefore case study should be regarded as an important method used for taking decision in Managerial Economics.

Undoubtedly the success of Managerial Economics lies in accepting and adopting the necessary tool-kit from economic theory and also incorporating relevant ideas from other related disciplines.

The Managerial Economist should also be conversant with important lessons from other related subjects such as Philosophy, Sociology, Psychology, Politics, Human Resource Development, Operation Research, Finance, Mathematics, Statistics, Computers, IT etc which should help him in drawing more accurate decisions.

1.5 SUMMARY

Managerial Economics is application of economic theory to managerial practice. Managerial Economics has a micro economic orientation and has a normative approach to prescribe rather than to describe. It takes care of cost as well as revenue side of business and aims at optimization of available resources.

Study of Managerial Economics utilizes five different methods and lessons learnt from other related subjects like Philosophy, Psychology, Sociology, Statistics etc. to arrive at more accurate management decisions.

SUGGESTED READINGS

1. Mote, Paul and Gupta: Managerial Economics: Concepts and Cases

2. Pappas and Hirschey: Fundamentals of Managerial Economics

3. Milton Spencer and Louis Siegelman: Managerial Economics

4. Hague D.C. : Managerial Economics

1.6 SELF ASSESSMENT QUESTIONS

1. a) What do you understand by the term 'Managerial Economics'?

    b) Outline the features of Managerial Economics.

2. Bring out the scope and subject matter of Managerial Economics.

3. Substantiate the methods of Managerial Economics.

4. Is Managerial Economics   i) Micro or Macro?

                              ii) Positive or Normative?

                              iii) Deductive or Inductive?

Elaborate your answer giving reasons with examples.

5. How would you rate 'Case Study' as a method in the learning process of Managerial Economics?

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REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video1

Video2

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2

Some Concepts Of Economics, Relevant To Business

Objectives:

After completing this chapter, you will be able to understand:

• Concepts of demand / supply and cost / price.

• Processes of Production, Distribution and Consumption.

• What is Macro and Micro Economics?

Structure:

2.1 Introduction

2.2 Wants

2.3 Utility

2.4 Demand

2.5 Supply

2.6 Production

2.7 Distribution

2.8 Consumption and Consumption Function

2.9 Cost

2.10 Price

2.11 Competition

2.12 Monopoly

2.13 Profit

2.14 Optimization

2.15 Average and Marginal

2.16 Elasticity

2.17 Micro and Macro Economics

2.18 Summary

2.19 Self Assessment Questions

2.1 INTRODUCTION

Following are some of the concepts from the Science of Economics which are absolutely relevant to business, namely; Wants, Demand, Supply, Production, Distribution, Consumption and Consumption Function, Cost, Price, Competition, Monopoly, Profit, Optimization, Average and Margin, Elasticity, Micro and Macro Analysis.

2.2 WANTS

Human wants are the starting point of all economic activities. **Want refers to the lack of satisfaction, a state of discomfort which every individual desires to eliminate**. Human wants may be in the form of Necessities, Comforts & Luxuries.

Necessities may be the necessities for life (i.e. to live), necessities for efficiency (i.e. to live efficiently) & conventional necessities arising out of habit.

Wants are unlimited. All wants cannot be satisfied simultaneously & fully. Although a single want at a time may be satiable, yet wants are recurring in nature.

Lionel Robbins has indicated that economic problem mainly arises because, human wants are unlimited whereas the means or resources to satisfy these wants are limited or scarce & these scarce means have alternative uses. The allocation of scarce means having alternative uses to meet our unlimited wants is fundamentally the problem of economics.

Therefore economic problem arises mainly because:

1. Wants are unlimited.

2. Means are scarce.

3. These scarce means have alternative uses.

2.3 UTILITY

Utility is the capacity of a good to satisfy a human want. Utility is a relative concept as well as a subjective concept because the same commodity appears to possess different degrees of utility to different individual consumers at different places and at different times.

We can distinguish between Total Utility and Marginal Utility. **Total Utility** is the aggregate of utilities derived by the consumer from all the units of the commodity consumed; whereas Marginal Utility refers to the addition to total utility made by the consumption of an additional unit of the commodity.

$$TU_n = MU_{1st} + MU_{2nd} + MU_{3rd} + \ldots\ldots MU_{nth}$$

$$TU = \Sigma MU_s$$

i.e. Total Utility is the summation of all Marginal Utilities.

Whereas, $MU_{nth} = TU_n - TU_{n-1}$

Note: **Marginal Utility goes on diminishing** as the consumer goes on consuming unit after unit of that commodity. This gives rise to the **Marshallian Law of Diminishing Marginal Utility**. Of course, the Law assumes that all units of the commodity consumed are homogenous; they are consumed in quick succession and the consumer behaves rationally.

2.4 DEMAND

Demand does not merely mean a desire or a need or a want. But in Economics demand is the desire backed by purchasing power. The purchasing power depends on the level of prices & the disposable income of the consumer. Therefore demand is the desire of the consumer to buy & it depends on his ability to pay as well as his willingness to pay.

Demand = Desire to buy + Ability to pay + Willingness to pay

Let us analyze a simple statement:

Demand for milk is 30 litres. This is not a complete statement of demand. It leads us to question

a) whose demand?

b) at what price?

c) for what period of time?

Therefore we have to specify the

1) market dimension

2) the price dimension

3) the time dimension, to formulate a complete statement of demand.

For example: We have in mind,

a) family A's demand for milk,

b) at some price say Rs 23 per litre &

c) the period of time being a month.

Now let us frame the complete statement as follows : When price of milk is Rs 23 then family A demands 30 litres of milk per month.

(Please refer the chapter devoted to the study of Theory of Demand which appears later in this book, to have a complete understanding of the Theory of Demand)

2.5 SUPPLY

Mere prevalence of demand is meaningless without the reciprocating supply. **Supply of any commodity refers to various amounts of the commodity which the sellers are willing to sell at different possible prices at any given time.** Even in case of supply we must make an effort to give a complete statement of supply i.e. the quantity of the commodity supplied at the given price in the given market at the given point of time. Without these dimensions being narrated the statement of supply will be incomplete.

(For further details please refer to the chapter on the Theory of Supply to have its complete understanding.)

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2.6 PRODUCTION

The primary & the ultimate aim of the economic activity is the satisfaction of human wants. In order to satisfy these wants individuals have to put in efforts to produce goods & services. Without production there cannot be satisfaction of wants. **Commonly understood, production refers to creation of something tangible which can be used to satisfy human want**. However matter already exists. We cannot create matter, we can only add utilities to the existing matter by either changing its form, place or keeping it over time & create values. For example: We can transform a log of wood into a piece of furniture, thereby adding utility. **This process of addition of utilities to the existing matter by changing its form, place and keeping it over time is referred to as Production in Economics**. We can therefore add form utility, time utility, place utility or personnel utility. Addition of all such utilities to the existing matter is referred to as Production in Economics. However, technologically production is referred to as the process of transforming inputs into output. In order to undertake production we require certain **Factors of Production** such as **Land, Labour, Capital & Organization**. These factors are the inputs & the product that emerges at the end of the process of production is referred to as the output.

2.7 DISTRIBUTION

The term distribution in Economic Theory refers to the sharing of the wealth produced in the community among the various factors of production. Since land, labour, capital & organization participate in the process of production, they get their respective rewards- **Land gets rent, Labour commands wages, Capital earns interest & Organization enjoys profits**. Thus according to **Chapman "The economics of distribution, accounts for the sharing of wealth produced by a community among the agents or the owners of the agents which have been active in its production."** More clearly defined "The division of fruits of production among the factors that contribute to the production process or among the people who control the factors is called distribution." The share that each factor of production receives for its services is in a way its price. Thus, the Theory of Distribution relates to the Theory of Factor Pricing. This explanation is theoretical as it pertains to economic analysis. However, in general the term distribution is loosely used to denote the process by which

the goods & services produced are made to reach through different stages to the final consumers.

2.8 CONSUMPTION & CONSUMPTION FUNCTION

A. CONSUMPTION

Consumption, in Economics implies destruction or use of utilities for satisfying human wants. As the consumer goes on consuming more and more units of the commodity, the total utility from the commodity increases although the marginal utility from the additional unit of the commodity consumed goes on diminishing & the consumer goes on consuming unit after unit till total utility becomes maximum & marginal utility becomes zero (even if the commodity is available free of cost.) Any additional unit consumed will reduce total utility & the marginal utility of that unit will become negative.

If the price of the commodity is to be considered, the consumer will go on buying the units of commodity till the Marginal Utility (MU) of

X = Price of X.

The consumer will not be just consuming a single commodity always but will be consuming combination of commodities & at that stage he will consider the prices of these commodities as well as the income at his disposal & the Law of Equi-MU will indicate that the consumer will maximize satisfaction from combination of commodities consumed when

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \frac{MU_z}{P_z}$$

B. CONSUMPTION FUNCTION

John Maynard Keynes has elaborately explained consumption function in his book '**The General Theory of Employment, Interest & Money.**' In words of **Alvin Hansen** "Keynesian analysis of consumption function is a major landmark in the history of economic doctrines." The level of consumption depends on several factors. Income is singled out as the main determinant of consumption & factors other than income influencing the level

of consumption are treated in another category. Thus, the factors influencing consumption are broadly classified into two:

1. Income (Y)

2. Factors other than income (Y)

The Psychological Law of Consumption as given by Keynes indicates that as income goes on increasing, the consumption also increases but at a rate less than increase in income, in such a way that the savings will also be increasing with the increase in income. Therefore we have the concepts of Consumption function as well as Saving Function.

Consumption Function reads: C = f(Y)

Saving Function reads: S = f(Y)

Let us now consider the concepts of **Average Propensity to Consume (APC) & Marginal Propensity to Consume (MPC).**

$$APC = \frac{C}{Y}$$

APC is the ratio of Consumption to Income:

$$MPC = \frac{\Delta C}{\Delta Y}$$

MPC is the ratio of change in Consumption to change in Income:

So we also have Average Propensity to Save (APS) & Marginal Propensity to Save (MPS)

$$APS = \frac{S}{Y} \qquad \text{And} \qquad MPS = \frac{\Delta S}{\Delta Y}$$

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Let us consider a hypothetical illustration:

Income	Rs 1000	Rs 1500	Rs 2000	Rs 2500
Consumption	Rs 900	Rs 1300	Rs 1600	Rs 1800
Saving	Rs 100	Rs 200	Rs 400	Rs 700

$$MPC = \frac{\Delta S}{\Delta Y} = \frac{400}{500} \qquad MPC = \frac{\Delta C}{\Delta Y} = \frac{300}{500} \qquad MPC = \frac{\Delta C}{\Delta Y} = \frac{200}{500}$$

$$= \frac{4}{5} \qquad\qquad = \frac{3}{5} \qquad\qquad = \frac{2}{5}$$

$$MPC = \boxed{.8} \qquad\qquad \boxed{.6} \qquad\qquad \boxed{.4}$$

And
$$MPS = \frac{\Delta S}{\Delta Y} = \frac{100}{500} \qquad MPS = \frac{\Delta S}{\Delta Y} = \frac{200}{500} \qquad MPS = \frac{\Delta S}{\Delta Y} = \frac{300}{500}$$

$$= \frac{1}{5} \qquad\qquad = \frac{2}{5} \qquad\qquad = \frac{3}{5}$$

$$MPC = \boxed{.2} \qquad\qquad \boxed{.4} \qquad\qquad \boxed{.6}$$

Thus, MPC + MPS = 0.8 + 0.2   0.6 + 0.4   0.4 + 0.6
= 1   = 1   = 1

From the above illustration we derive the following conclusions:-

1. As income increases, consumption also increases.

2. Absolute increase in consumption is less than increase in income.

3. With increase in income, consumption increases & so also savings rise.

4. As income goes on increasing, the MPC goes on falling.

5. As income increases MPS goes on rising.

6. MPC + MPS = 1

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Factors other than Income influencing consumption are further classified as subjective factors (endogenous) as well as objective factors (exogenous factors).

Keynes has listed eight motives governing individual's propensity to consume viz; 'Motives of Precaution, Foresight, Calculation, Improvement, Independence, Enterprise, Pride and Avarice'. Keynes has also listed four subjective factors which influence behaviour pattern of Business Corporation and Government bodies. They are :

i) Motive of Enterprise;

ii) Motive of Liquidity;

iii) Motive of Improvement and

iv) the Motive of financial prudence.

The Objective factors or Exogenous factors or External factors which influence Propensity to Consume are Windfalls, change in Rate of Interest, levels of prices, expectations about future change in Incomes etc.

2.9 COST

Production involves cost. The cost of production may be defined as the aggregate of the expenditure incurred by the producer in the process of production.

In order to initiate and continue the process of production, the producer hires various factors of production. He is required to make payments to these factors for participating in the process of production. Such payments made by the producer to the factors of production for their participation in process of production emerge as cost of production. **Cost, therefore is the valuation placed on the use of resources**. We have several concepts of costs such as Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost, Opportunity Cost, Private Cost, Social Cost, etc; which are further discussed in the chapter on Cost Analysis.

Activity A

Using several concepts of cost indicated above, prepare a tabulation of total costs you have to incur to complete your current learning assignment.

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Whenever an interaction takes place between the buyer and the seller in the market, price becomes the mechanism for the purpose of exchange. **The value of any thing expressed in terms of money is the 'Price' of that thing**. In fact, the price under competition is determined by the interaction of forces of demand and supply whereas under conditions of monopoly, the monopolist generally fixes the price of his product depending upon the elasticity of demand for his product in the market. If the demand for the product is relatively inelastic then that product commands a relatively high price. But if demand for the product is relatively elastic then such a product will be sold at a relatively low price.

There are two concepts of Price namely, **Market Price** and the **Normal Price**.

Market Price is the price which actually prevails in the market at a given point of time. It is the result of temporary equilibrium between demand and supply. Whereas **Normal Price is that price which is normally expected to prevail in the long run**. The Market Price is more influenced by the demand side because in the very short period the supply is assumed to be almost inelastic. However, the Normal Price is more influenced by the supply side because in the long run supply is capable of adjusting itself to demand and will thereby influence the price.

Further the Market Price goes on fluctuating from time to time, whereas Normal Price is relatively stable. The Normal Price is more or less hypothetical in nature whereas the Market Price is more real.

2.11 COMPETITION

In a market category, in the absence of monopoly there is bound to prevail the element of competition i.e. each producer tries to compete with the other producer by way of fixing the price or the output. Competition takes two forms i.e. **either perfect competition or imperfect competition. Imperfect competition** may again have several forms such as Monopoly, Duopoly, Oligopoly, Monopolistic competition, etc.

Each type of market category has its own features which we have elaborately discussed in different chapters related to different market categories.

2.12 MONOPOLY

Monopoly is that market category in which there is a single seller. In the strictest sense of the term, monopoly occurs when there is **only one producer of a commodity for which there is no substitute**. This condition is referred to as **Absolute Monopoly**. Following are the features of monopoly:

1. Existence of a single firm.

2. Firm is itself an industry.

3. Absence of close substitute.

4. Barriers to entry.

5. A monopolist can either fix the price or the output, not both.

2.13 PROFIT

In common terminology, profit refers to the excess of revenue over the cost.

$$\pi \text{ Represent Profit}$$
$$\text{TR Total Revenue}$$
$$\text{TC Total Cost}$$
$$\text{Then} \quad \pi = TR - TC$$

In Economics we refer to profits as a reward which goes to the organization (entrepreneur) as a factor of production for its participation in the process of production. We can think in terms of Gross Profit and Net Profit.

Gross Profit = Total Revenue - Explicit Costs

Where, Explicit Costs are costs shown in the Books of Accounts as payments made in the form of rent, wages, interests and for the purchase of raw material.

Therefore Gross Profit = Total Revenue - Explicit Cost ; whereas, Net Profit is arrived at taking into consideration not only explicit cost but also depreciation as well as the amount of tax paid.

Net Profit = Gross Profit - (Depreciation + Tax)

2.14 OPTIMISATION

Whenever we make an effort to study the theory of the firm we have to consider the **financial dimension** as well as the **physical dimension**. In financial dimension we look to the cost as well as revenue, whereas in case of physical dimension we try to analyze the Input-Output relationship and here the objective as such is **Optimization i.e. making the best possible use of available resources to obtain the maximum possible desired quality of output.** Therefore there is the basic difference between maximization and optimization.

2.15 AVERAGE AND MARGINAL

The concepts of Average and Marginal are both related to the concepts of Total Cost as well as Revenue, Propensity to Consume and Propensity to Save. We also can have the concepts of Average and Marginal Product. For example: Given total cost of producing unit after unit of some commodity we can obtain the Average Cost & the Marginal Cost as follows:

$$\text{Average Cost} = \frac{\text{Total Cost}}{\text{Units of Output Produced}}$$

Example: if the Total Cost of producing 10 units is Rs 100 then the Average Cost per whereas, **Marginal Cost is the additional cost for producing additional unit of output** i.e. if for producing 10 units the Total Cost is Rs 100 and for producing 11 units the Total Cost is Rs 109 then the Marginal Cost of producing the 11th unit will be Rs 9.

$$MC_{11th} = TC_{11} - TC_{11-1}$$

In other words

$$MC_{nth} = TC_n - TC_{n-1} \quad \text{Or} \quad MC = \frac{\Delta TC}{\Delta Q}$$

Similarly the concepts of Average & Marginal can be used in case of Revenue Structure i.e. Average Revenue & Marginal Revenue and also in the Theory of Production namely the Average Product & Marginal Product.

2.16 ELASTICITY

By Elasticity we mean the degree of responsiveness of change in one variable brought about by change in some other variable. For example: In simple words, the Law of Demand would state that other things remaining same, as price of X rises, demand for X will fall and when price of X falls, demand for X will rise. But it does not specify by how much, the demand for X will change as a result of change in price of X i.e. If the price for X will fall by 10%, demand for X may rise by 10%, or by less than 10% or by more than 10%. It is this **degree of responsiveness of quantity demanded of X to the change in price of X, which is called as Price Elasticity of Demand**. Similarly we can have elasticity in the study of supply. There is also the possibility of studying the degree of responsiveness of quantity demanded to the change in Income. This will be called the **Income Elasticity of Demand**. Similarly if we consider two commodities at a time then the degree of responsiveness of quantity demanded of one commodity to the change in the price of other commodity will give rise to the study of **Cross Elasticity of Demand**.

2.17 MICRO AND MACRO ECONOMICS

There are mainly two approaches to the study of the Science of Economics, namely the **Micro Economic Approach** and the **Macro Economic Approach.** The terms Micro Economics and Macro Economics were coined by **Ragner Frisch** of the Oslo University in 1920's. In Micro Economics we analyze the **behavior of individual economic units** such as individual consumer or individual producer, whereas in Macro Economics we are concerned with the **aggregates i.e. the behavior of the economy as a whole**. For example: we study National Income, National Output, Business Cycle etc.

The distinction between Micro and Macro analysis according to **Bell & Todaro** is based on how economic functions are derived. If the function is built up from a careful study of individual units then we have **Micro Economic Function** and if the function is built from the aggregative data, we have **Macro Economic Function.**

The Micro Economic Analysis was highlighted by **Alfred Marshall** whereas the credit for development of Macro Economic Approach goes to **John**

Maynard Keynes. To quote **Professor Mc Connell**, in Micro Economics we examine the tree and not the forest.

Following are the assumptions of Micro Economic Analysis:

1. **Economic man**: This term implies that every individual under consideration behaves in an economically rational manner i.e. a rational consumer tries to maximize his level of satisfaction, of course within certain constraints like income and prices. The individual producer will try to maximize his profits.

2. **Mobile resources:** There are no rigid restrictions imposed on mobility of economic units. For example: Labour is free to enter that occupation which fetches highest possible price for his services.

3. **Free flow of information**: Micro Economic Analysis assumes free flow of complete and reliable information about market conditions.

4. **Diminishing returns**: Production over a period of time is subject to diminishing returns. Similarly consumption of additional homogenous units of commodity is subject to the law of diminishing marginal utility.

5. **Assumption of full employment**: While conducting economic analysis on the basis of Micro Approach generally an assumption of full employment in the economy as a whole is made. This is a very serious limitation of Micro Economics because according to Keynes "what prevails in reality is not full employment but less than full employment." Full employment may be an exception but not a rule.

Distinction between Micro and Macro Economics:

	Micro	**Macro**
1. Unit of study:	Individual	Aggregate
2. Method:	Slicing	Lumping
3. Subject matter:	Study of product and factor pricing etc.	Study of National Income, general level of prices, trade cycles etc.
4. Basis:	Based on independence.	Based on inter-dependence.
5: Advocated by:	Alfred Marshall	John Maynard Keynes
6. Vision	Worms eye view- study of a tree.	Birds eye view- forest as a whole.

WHY TWO APPROACHES ?

The justification for two approaches lies in the fact that what is true in case of an individual need not necessarily be true for the economy as a whole. Keynes gave the example with regard to saving. To quote **Keynes** "Saving is a private virtue but it is a public vice." Similarly what is true for the economy as a whole need not necessarily be true in case of every individual. For example: America is wealthier than India. This is true in general, that does not mean that every American is wealthier than every Indian.

COMPLEMENTARITY OF TWO APPROACHES

The two approaches cannot be insulated from each other in water tight compartments. They are essentially complementary in nature. To quote **Paul Samuelson** "There is really no opposition between Micro and Macro Economics, both are absolutely vital. You are less than half educated in Economics if you understand the one while being ignorant of the other."

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SUGGESTED READINGS

1. Alfred Marshall: Principles of Economics

2. Cairncross: Introduction to Economics

3. Lipsey and Steiner: Economics

4. Paul Samuelson: Economics

5. J.M. Keynes: The General Theory of Employment, Interest And Money.

2.18 SUMMARY

Certain concepts from the science of economics are to be mastered by the Managerial Economist as they are absolutely relevant to business. These are explained in this chapter. Science of economics can be studied by Macro or Micro approach. Both the approaches are vital to managerial economics.

2.19 SELF ASSESSMENT QUESTIONS

1. "Human wants are the starting point of all economic activities." Do you agree? Give reasons for your answer.

2. Make an attempt to classify human wants.

3. What is utility? Distinguish between Total Utility and Marginal Utility.

4. 'Demand for milk is 50 litres.' This is not a complete statement of demand. Improve upon it to formulate a complete statement of demand.

5. Explain the terms production and distribution as used in Economics.

6. What is Consumption? State and explain Psychological Law of Consumption as given by Keynes.

7. Differentiate between average propensity to consume and marginal propensity to consume.

8. Show that MPC + MPS = 1.

9. Enumerate the factors 'other than Income' influencing Consumption.

10. a) Explain the concept of price.

    b) Distinguish between market price and normal price.

11. Explain the terms competition and monopoly.

12. Distinguish between   a) Gross profit and net profit.

                          b) Optimization and maximization

                          c) Average and marginal

13. What do you understand by the term Elasticity of Demand ?

14. What do you understand by Micro and Macro Economics? Bring out the major differences in these two approaches. Why do we have these two approaches? Give some examples.

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video1

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3

Demand Analysis

Objectives:

After completing this chapter, you will be able to understand:

• Factors influencing demand.

• Relationship between price and demand.

• Demand behaviour for different products and conditions.

Structure:

3.1 INTRODUCTION

In economics, demand for a commodity does not simply mean desire or need or want. In addition to these, the consumer must be **able** and **willing** to pay the price. Whenever desire for anything is backed by ability and willingness to pay for that thing it flows out in the form of effective demand. Thus demand in economics is **'desire backed by ability and willingness to pay.'**

In words of **Prof. J. Harvey, "Demand in Economics is the desire to possess something and the willingness and ability to pay a certain price in order to possess it."**

A complete statement of demand must include the market-dimension, the price- dimension and the time- dimension i.e. whose demand, at what price and for what period of time.

A simple statement saying 'demand for milk is 30 litres,' is an incomplete statement.

To be a complete and meaningful statement it should read 'when the price of milk is Rs. 23/ - per litre then family X demands 30 litres of milk per month.' This makes sense.

3.2 DETERMINANTS OF DEMAND

The quantity demanded of any commodity say X, will depend on several factors.

1. **The price of commodity X**: Demand for any commodity is primarily influenced by its price. Normally, at higher price, less of it is demanded and at lower price more of it will be demanded.

2. **The price of substitutes of X**: When the consumer goes to the market to purchase some commodity X, he also tries to find out the price of substitutes of X and then takes the decision to buy.

3. **Income of the consumer**: The demand for a commodity depends on the income of the consumer. The disposable income of the consumer has a direct influence on demand for the commodity that the consumer wants to buy.

4. **Utility of the commodity**: Demand for any commodity X arises because of its utility to the consumer.

5. **Quality of the commodity**: Demand for any good is also influenced by the quality of that good. The better the quality of the good, the more will be the demand for it.

6. **Taste and fashion**: The taste of the consumer for a particular commodity influences the extent of its demand. If a particular good is favoured over others then more of it will be demanded in the market.

7. **Size of Population:** Demand for any good also depends on the number of buyers or consumers in the market.

8. **Expectations about future prices**: Our expectations regarding prices that would prevail in the market in the near or distant future also affects the demand for the product in the present.

9. **Climatic conditions**: Demand for commodity is also influenced by climatic changes.

10. **Psychology of the consumers**: Demand for a good depends also on the psychological behaviour of the consumer. There is the possibility that as more and more consumers possess a particular good, others are also psychologically activated to buy that good. This is commonly called the **Bandwagon effect**. On the other hand, some consumers display opposite attitude. Just because others demand a particular good, they would not like to demand that good. They may prefer to have something which is not commonly demanded by others. This is called the **Snob effect**. They simply will not buy what others are buying.

11. **Advertisements and salesmanship**: In modern markets the demand for a product can be created through appropriate advertisements and salesmanship.

3.3 DEMAND FUNCTION

As the quantity demanded of commodity X is a function of (depends on) so many variables the demand function can be written as

$$Q_x^d = f\ (P_x, P^l, Y_d, U, Q, T, A\ \text{………}\ etc)$$

Where,

P_X: Price of x

P^l: Price of substitute of x

Y_d: Disposable income of the consumer

U: Utility of the commodity

Q: Quality

T: Tastes & Fashion

A: Advertisement

As this is a complicated functional relationship it would become difficult to develop a simple theory of demand if we simultaneously consider the effect of changes in all variables on demand for X. Therefore we assume that all the other variables are held constant and establish relation between price of X and quantity demanded of X.

Mathematically stated:

$$Q_x^d = f\ (P_x)$$

$$P^l = P_0$$

$$Y_d = Y_{d0}$$

$$U = U_0$$

$$Q = Q_0$$

$$T = T_0$$

3.4 THE LAW OF DEMAND

The law of demand establishes the functional relationship between price of X and the quantity demanded of commodity X, assuming factors other than price of commodity X, remain constant.

The law of demand states "**other things remaining the same quantity demanded of a commodity is inversely related to its price**," i.e. when the price of commodity X rises, the demand for it declines and when the price of commodity X falls, the demand for it rises. The law of demand can be explained with the help of a demand schedule and the corresponding demand curve.

The Demand Schedule

The Demand Schedule is a tabular representation expressing the various amounts of commodity X demanded at different possible prices of X at any given time. Thus a tabular statement showing the relationship between different alternative prices of commodity X and the different quantities of X demanded at these prices is technically referred to as **demand schedule**.

Table 3.1
A Demand Schedule

A Demand Schedule	Price per unit of Commodity X (Rs)	Quantity demanded of Commodity X per day (Units)
U	5	8
V	4	12
W	3	20
X	2	30
Y	1	50

The demand schedule shows the inverse relationship between price and quantity demanded, i.e., at lower price more units are demanded and at higher price few units are demanded.

The Demand Curve

On the basis of the demand schedule when we plot points on a graph and join these points we get the Demand Curve. **A demand curve refers to a**

graphical presentation of the relation between price and quantity demanded. It is customary to represent price on the Y-axis and the quantity demanded on the X-axis.
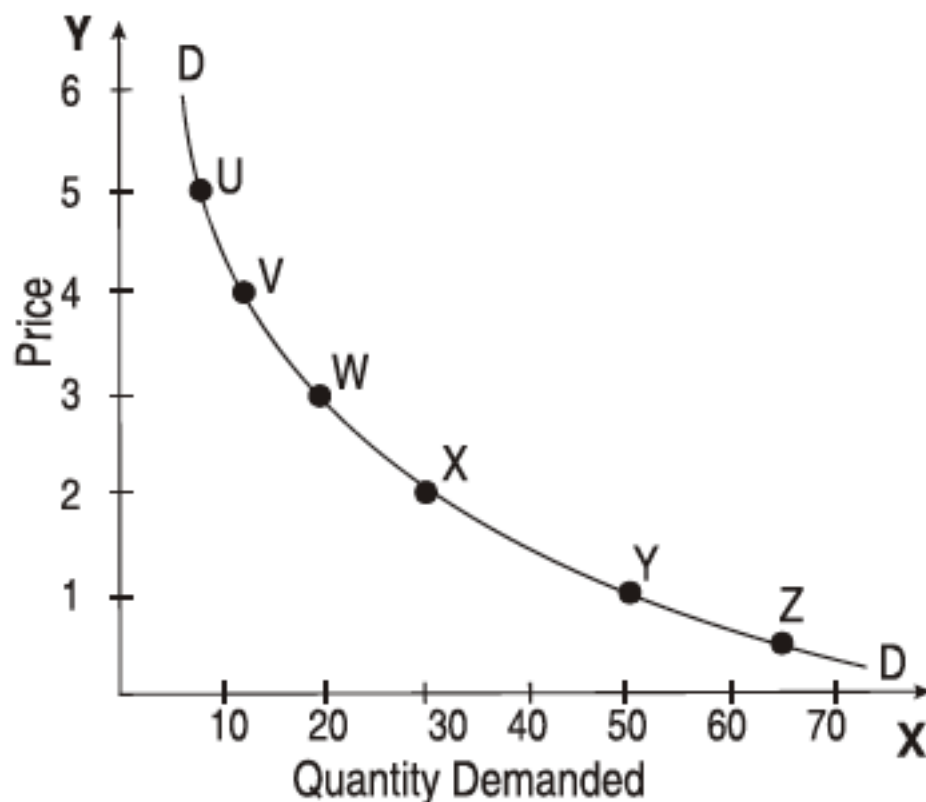
Fig. 3.1 Demand Curve

The demand curve slopes downwards from left to right indicating an inverse or a negative relationship between price and quantity demanded.

Assumptions underlying the Law of Demand

The law of demand is based on the assumption, viz, "other things remaining the same".

What then are the **'other things remaining the same'**?

I. The income of the consumer must remain the same.

II.Prices of other commodities must remain the same.

III.The taste of the consumer must remain the same.

IV.The consumer should not anticipate further changes in prices.

V.The size and the composition of population must remain reasonably stable etc.

3.5 EXCEPTIONS TO THE LAW OF DEMAND

I. **Expectations of further changes in Prices and Speculation**: The law of demand will not hold good when people expect prices to rise still further. In that case although the prices have risen today consumers will demand more in anticipation of further increase in price. This type of behaviour can be observed on the Stock Exchange.

II. **Giffen's Paradox**: Once it so happened in England that when the price of bread declined the demand for bread also declined and when price of bread increased the demand for bread also increased. This was against the law of demand. **Sir Robert Giffen** said that in case of bread, which is an inferior good of a special kind, when price of bread declined, the real income of the consumer increased and out of this increase in real income, the consumers decided to consume more of some other commodities, instead of demanding more of bread. This explanation came to be called the **Giffen's Paradox**, which is an exception to the law of demand.

III. **Qualitative changes**: The law of demand does not consider qualitative changes in the commodity. If the price is taken by the consumer as the yardstick of quality of commodity, mere rise in price of the commodity may raise the demand for it.

IV. **Price-illusions**: Consumers are, in modern world, governed more by price-illusions e.g. the consumer strongly believes that 'higher the price, better the product', and thus greater is the demand for it.

V. **Display of Standard of Living**: The law of demand fails to operate in the case of prestige articles having snob appeal. The consumer is very often governed by what is called as **demonstration effect**. Expensive jewellery, paintings, antique and other similar commodities are bought not because they are needed but the purchase of such articles will enable the possessor to display his wealth.

3.6 WHY DOES THE DEMAND CURVE SLOPE DOWNWARDS ?

The downward slope of demand curve can be explained by referring to relationship between Marginal Utility and Price of commodity. The following example will make the point clear.

As such the Law of Diminishing Marginal Utility states that the Marginal Utility of the additional unit consumed goes on diminishing as the consumer consumes more and more units of commodity. Suppose the commodity in question is Mangoes and that all units of Mangoes are identical; the consumer goes on consuming unit after unit of Mangoes, and if utility is measured in terms of 'Utils' then we can prepare the following utility schedule:

If one unit of utility i.e. 1 Util = Re 1 then we can prepare another column to express utility in terms of Money. The first unit of Mango possesses 10 units of Util. if market price of mango is Rs 5/- per unit then the first unit of mango will

Table 3.2

Units of Mangoes	Total Utility	Marginal Utility	1 unit = 1 Re of Util	Actual Price is Rs 5/- (Rs)
1	10	10	10	5
2	18	08	08	5
3	25	07	07	5
4	30	05	05	5
5	32	02	02	5
6	32	0	0	
7	30	-2	-2	

be consumed because utility is worth Rs 10/- whereas its price is Rs 5/-. The consumer will go on consuming 4 units of Mangoes where $MU_x = P_x$. If he consumes more than 4 units then Marginal Utility of 5th unit in terms of money is 02 but the price remains Rs 5/- the consumer will not consume the 5th unit. He stops at 4 units. But if price is Rs 2 per unit then consumer will

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have 5 units. If the price is Rs 7/- then the consumer will demand only 3 units.

We can prepare the demand schedule on the basis of this analysis and derive the corresponding demand curve; which is downward sloping.

When

P_x	Q_x^d
7	3
5	4
2	5

Thus at higher Price, less is demanded. and at lower Price, more is demanded
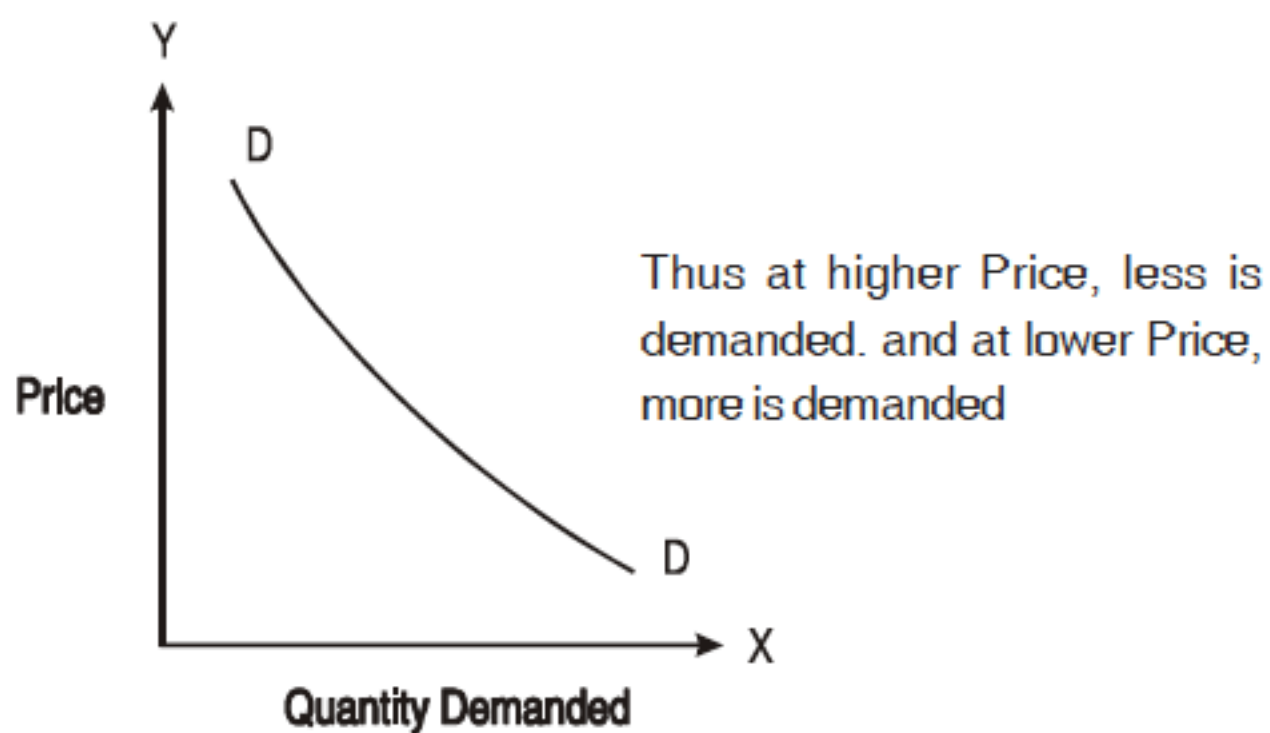
Fig.3.2

This gives rise to the Law of Demand i.e. "Other things remaining the same quantity demanded of X is inversely related to price of X." And therefore the demand curve slopes downward from left to right.

3.7 MOVEMENT ALONG THE CURVE V/S SHIFT OF CURVES

It is important to distinguish between a movement along a demand curve and a shift of the entire demand curve.

Extension and Contraction of Demand

If we consider changes in the price of a commodity as the only factor influencing its quantity demanded, then we experience movements on the same curve. We either have extension or contraction of demand. When the price of a commodity falls from OP to OP¹, the demand for it goes up from OM to OM¹. This is what is called Extension of Demand.

When the price of the commodity rises from OP¹ to OP the demand for it contracts from OM1 to OM. This is called Contraction of Demand.
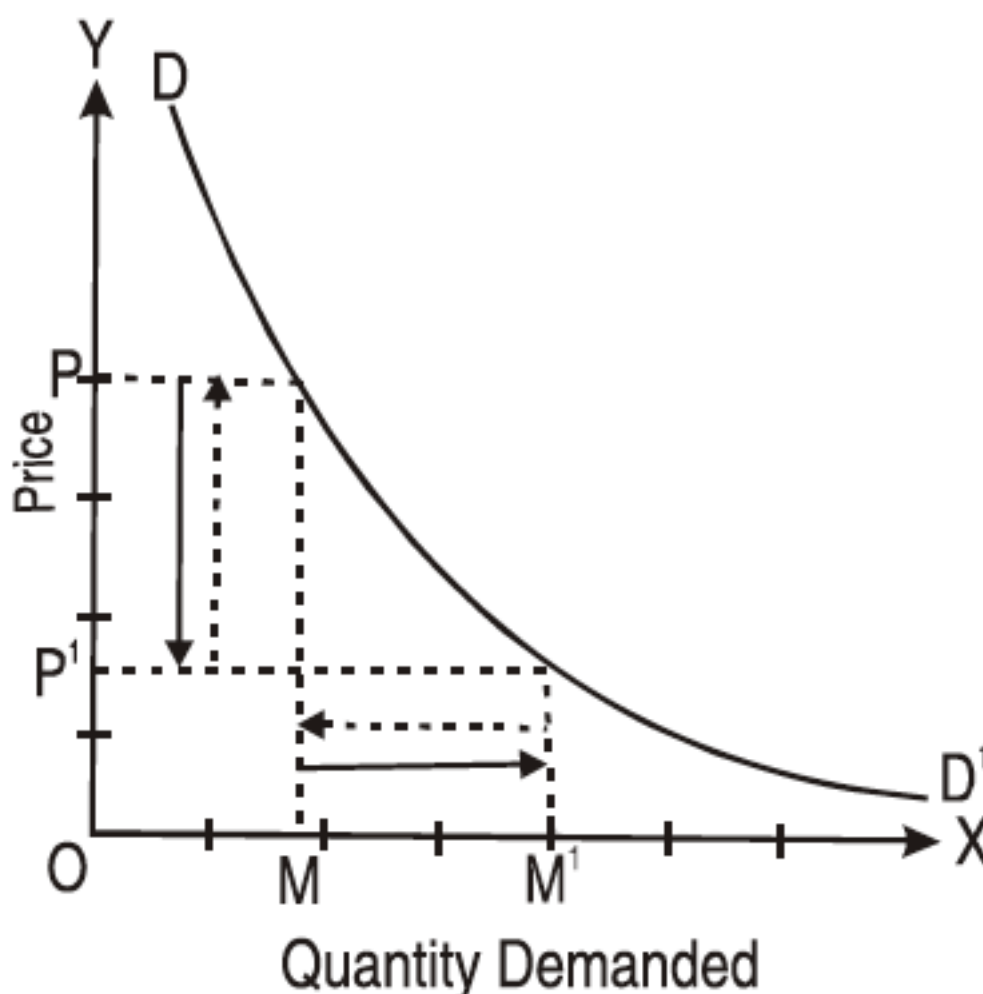
Fig. 3.3 Extension and Contraction of Demand

Both extension and contraction of demand can be shown by movement along the same demand curve.

Increase and Decrease in Demand

When factors other than price of the commodity influence the demand for that commodity, then we have either increase or decrease in demand shown by complete shifts in the demand curve.

Demand is said to have increased when:
i) At the same price more is demanded.
ii) At higher price same quantity is demanded.
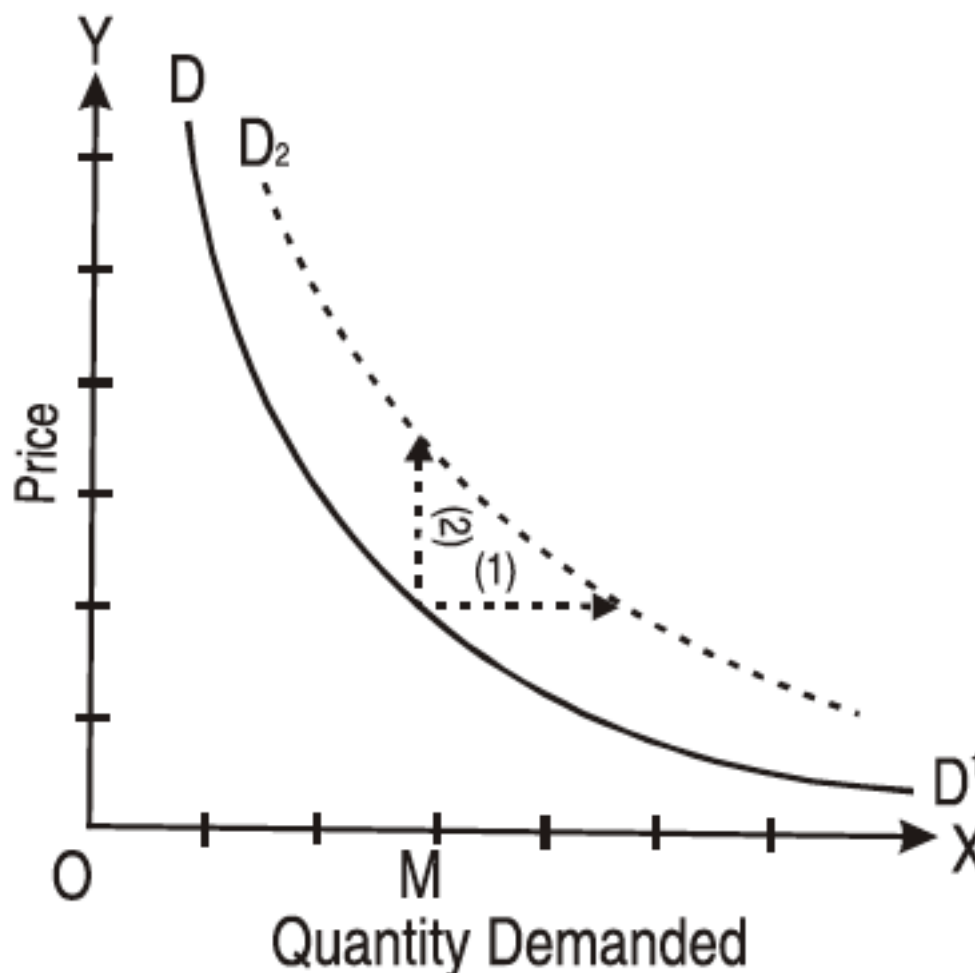
Fig. 3.4 Increase in Demand

Let us assume, to begin with, that when price is OP, quantity demanded is OM. Now at the same price, OP more is demanded or at a higher price the same quantity, i.e. OM, is demanded, both these conditions tend to reveal that the demand curve will shift to the right and we have the demand curve D_2D_3. Therefore, when demand increases, the demand curve shifts to the right.

Demand is said to have decreased when:
i) At same price, less quantity is demanded.
ii) At a lower price, the same quantity is demanded.
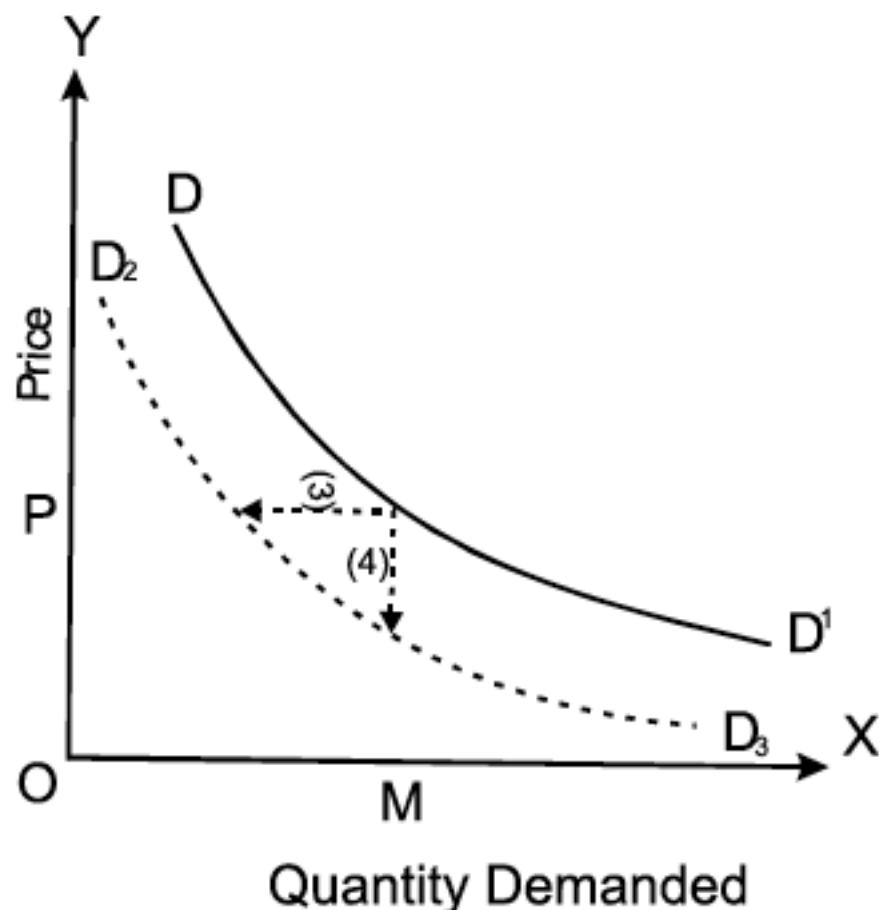
Fig. 3.5 Decrease in Demand

Both the arrows point to the fact that there is the tendency for the demand curve to shift to the left and we have the new demand curve D_2D_3 which is to left of the original. Therefore, **when demand decreases, the demand curve shifts to the left.**

Hence extension and contraction of demand are shown by movement along the curve; whereas increase or decrease in demand will be shown by shifts in the curve.

3.8 DEMAND ANALYSIS FOR VARIOUS PRODUCTS AND SITUATIONS

A. Demand for Durable and Non-Durable Goods:
Non- durable goods are also referred to as Perishables. These perishable goods loose their utility in the very short period whereas **durable goods are long lasting** and are not perishable in the short run. They can retain their utility over a considerably long period.

Durable goods are storable whereas non-durable goods i.e. perishable goods cannot be stored for a long period.

Demand for non-durables depends largely on the prevailing conditions, such as style, income or convenience whereas durable goods are mostly bought for future use and hence expectations play a vital role in influencing demand for durable goods.

Expectations regarding availability or shortages exert a greater influence than those concerning price changes. The decision to purchase durables is viewed in the light of maintenance and operating costs in relation to future income. Demand for durables, thus, depends not only on present prices or present incomes but also upon the expected changes, the state of optimism, the rate of obsolescence etc.

Storability and postponability are the two peculiar characteristics of durables. As a result of storability, the buyers build up inventories during a temporary fall in price. During recession, normally people postpone replacement of durables whereas during the period of expected shortages they increase their replacement demand. Technological upheaval produces a blast of obsolescence and influences the changing pattern of demand for novel durable.

B. Long- run and Short- run Demand:

Short run demand refers to the demand that exists **at a point of time** with its immediate reaction to change in price and income. **Long-run demand** refers to the demand that will ultimately exist **over a period of time** as a result of price changes, competition, product improvement etc.

Short-run elasticity of industry demand is normally less than long-run elasticity. However if price changes are just temporary the short-run elasticity of industry demand will be high, instead of being low. Under such situations the consumers will postpone the purchases when the prices rise and do the opposite when prices decline.

The two major factors that distinguish short-run and long-run demand are: i) Cultural lags in information and experience and ii) Capital investments required by buyers to shift consumption patterns.

Very often consumers are sticky in their consumption habits. They take time to adjust to a new situation. It also takes time to finance the purchase of new equipment that is needed to use the commodity, the price of which has fallen. The example that is often quoted is that of petrol and vehicles using it;

e.g. the full advantage of reduction in price of petrol will not be felt until consumers have had enough time to purchase vehicles using petrol.

C. Direct Demand (Autonomous Demand) And Derived Demand:

Demand is direct if the good is required for direct consumption to satisfy a human want. Example: demand for food is direct demand or autonomous demand. To understand the meaning of derived demand, let us consider a very simple example: Labour is demanded not for its own sake, we demand labour because we can use labour to produce goods which in turn are demanded by consumers to satisfy their want. Thus **demand for labour is derived from demand for goods. Hence demand for labour or for any factor of production is a derived demand.** Similarly demand for cement is derived demand, for it is needed not for its own sake but for satisfying the demand for construction of buildings.

The demand for most of the consumer goods is generally autonomous whereas the demand for producer's goods is always derived because these goods are demanded to produce other goods. The direct demand or autonomous demand is also called **Pure Demand or Conventional Demand.**

D. Joint Or Complimentary Demand:

Some goods are such which have to be jointly consumed if the want is to be fully satisfied. They are **jointly demanded**; e.g. tea, milk, water and sugar; or tubes and tyres. In such cases we have the joint demand. Such goods are called complimentaries. One without the other cannot satisfy our want. Thus demand for **complimentaries** is a joint demand.

E. Cross Demand:

Some goods are in the nature of **substitutes** i.e. we either want X1 or X2 and not both at the same time. If we demand X1 then at the same time we will not demand X2. In this case demand for one good is affected by the price of other good. We may demand more of tea not because price of tea has fallen but because price of coffee has risen. Thus **demand for substitutes take the form of cross demand**.

F. Composite Demand:

Composite demand implies that a commodity under consideration can be put to several uses. Demand for electricity is a Composite demand. It can be used for lighting, or cooking, or ironing, or for washing machine, or for radio, television, air conditioner, computer etc., same is the case with steel, or coal and many other commodities.

G. Industry Demand and Firm Demand:

Firm Demand (company demand) denotes the demand for the product/s of a particular firm. While **Industry demand** means the demand for the product of a particular industry. For e.g. the demand for steel produced by TISCO (Tata Iron and Steel Company) is a company demand while demand for steel produced by all companies in India is industry demand for steel in India. An industry comprises all the firms or companies producing similar products which are quite close substitutes to each other irrespective of the differences in their brand names.

To understand the relation between company and industry demand necessitates an understanding of different market structures. The demand curve of an individual firm is not the same as the industry or market demand curve except in case of monopoly. **Monopoly** is that market category in which there is only a single seller and therefore **there is no difference between a firm and an industry. The firm is itself an industry and therefore the demand curve of the individual firm as well as the industry demand curve under monopoly will be the same** and as we shall see later is **downward sloping**. Moreover as there are no close substitutes under monopoly the demand curve is relatively steeper showing relatively inelastic demand under monopoly.

Under Perfect Competition industry demand is completely different from the individual firm demand. The industry demand curve is downward sloping. The price in the market is determined by the interactions of the forces of demand and supply. The point of intersection between demand and supply curves determines the equilibrium price of the product. Now the number of firms under Perfect Competition is so large that a single firm has no influence on either the total output or the price. Its contribution to total output is just microscopic. If a new firm enters or an existing firm takes an exit the total output does not get affected much. A firm under Perfect

Competition cannot fix the price of its product. It will have to sell its product at the going market price as it is determined by demand and supply forces in the market. **A firm under Perfect Competition is a price taker and not a price maker**. Price is given to the firms and each unit of its output is sold at the given market price and thus the demand curve of firm or its average revenue curve becomes horizontal. Horizontality of average revenue curve (demand curve) is the acid test of a firm under Perfect Competition.

Under Monopolistic Competition there is competition among a group of monopolists producing differentiated product. The product of each firm is slightly different from that of other. There are also substitutes and therefore the demand curve of each firm's product is downward sloping and is relatively elastic in nature. In monopolistic competition there are many sellers with differentiated product and hence industry demand curve hardly has any meaning.

In case of Oligopoly market there are few sellers producing either differentiated or homogenous products. The demand for a firm's product is influenced by the actions of its rivals. **The demand curve of a firm under oligopoly has a kink.**

So far we have considered only the price elasticity relationship which is easily and usually portrayed as demand schedule. However, we must consider factors that cause shifts in the demand function; such as incomes, sales promotion and product improvement. The level and distribution of income, the volume of sales and the quality and frequency of advertisement also determine the position and slope of the demand curves. While studying the effect of these forces, industry demand requires a different framework of analysis as against the firm's demand curve. The management also distinguishes between short-term demand fluctuations and the long-run trends and also between total market and market segments.

H. Total Market Demand and Market Segments Demand:

Total market demand refers to the total overall demand for the product whereas **market segments demand** refers to the demands arising from different segments of the market. A firm or an industry may be interested not only in the total demand for its product but more so in the demand for its product arising from different market segments such as different regional markets, different distribution channels etc. each segment may differ with

respect to delivered prices, competition, seasonal patterns and net profit margins. When these differences are great, the demand analysis should be confined to the individual market segments. The knowledge of these segment demands will help the firm in understanding its total demand.

SUGGESTED READINGS

1. Alfred Marshall: Principles of Economics

2. Anderson: Supply and Demand

3. Pappas and Hirschey: Fundamentals of Managerial Economics

4. VL Mote, Samuelson and G.S. Gupta: Managerial Economics; Concepts and Cases

3.9 SUMMARY

Demand is desire backed by ability and willingness to pay. It depends on several factors like price of a product, income of the consumers, their expectations, marketing of the product etc. There is inverse relationship between price and demand resulting into downwards slope of the demand curve. As the price changes quantity demanded moves along the curve. But demand, as mentioned above, also depends upon factors other than price. When this happens we have a change in quantity demanded by complete shifts of the curve itself.

For different product groups like durable or non-durable items, or different types of demand like short run or long run, patterns of demand changes are also different and need to be analyzed correctly.

3.10 SELF ASSESSMENT QUESTIONS

1. What do you understand by the term "Demand"?

2. Explain the factors which influence the demand for any commodity say X.

OR

What are the determinants of demand?

3. What is 'demand schedule'? Prepare the individual and the market demand schedules.

4. Draw the individual demand curve. Given the demand curves of two individuals derive their market demand curve.

5. State and explain the law of demand. Mention its assumptions.

6. What are the majors exceptions to the Law of Demand?

7. Distinguish between:

    i) Extension of demand and increase in demand.

    ii) Contraction of demand and decrease in demand.

8. Show with suitable examples that 'desire', 'ability' and 'willingness' are all essential requirements of effective demand.

9. Distinguish between :

    i) Joint demand and Composite demand.

    ii) Direct demand and Derived demand.

    iii) Industry Demand and Firm Demand

10. Select a few products of daily domestic requirements and of three different income group families. Collect information about the factors influencing their demand for such products.

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REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

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Video1

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4

Elasticity of Demand

Objectives:

After completing this chapter, you will be able to understand:

• What is elasticity of demand?

• Price, Income and Cross elasticity of demand.

• Measurement and use of Elasticity of Demand.

Structure:

4.1 PRICE-ELASTICITY OF DEMAND (Ep)

Changes in quantity demanded of X may show **different degrees of responsiveness** to a change in its price, i.e. when the price of X changes the demand for it may change **either exactly proportionately or more than or less than proportionately** or, at other extremes, the demand may not change at all or even change infinitely. It is this degree of responsiveness of quantity demanded of a commodity to the change in price which is called elasticity of demand, more precisely it is the **Price- elasticity of demand**.

Price- elasticity of demand is the degrees of responsiveness of quantity demanded of commodity X to the change in price of X itself.

$$
\text{Ep} \quad = \quad \frac{\text{Percentage ChanginQd x}}{\text{Percentage ChanginPx}}
$$

Thus, price- elasticity of demand is the ratio of percentage change in quantity demanded of X to percentage change in price of X.

Ep = %ΔQdx
     %ΔPx

Mathematically stated:

$$
Ed = \frac{\%\text{ change in quantity demand of x}}{\%\text{ change in price of x}}
$$

$$
= \frac{\dfrac{\text{New quantity demanded - Old quantity demanded}}{\text{Old quantity demanded}} \times 100}{\dfrac{\text{New price - Old price}}{\text{Old price}} \times 100}
$$

$$
= \frac{\triangle D/D}{\triangle P/P}
$$

$$
\boxed{Ed = \frac{P}{D} \times \frac{\triangle D}{\triangle P}}
$$

Where P = original price, D = original quantity demanded, P = small change in price, ΔD = small change in quantity demanded.

Besides, since quantity demanded has a negative relationship with price, the elasticity of demand so obtained will have negative sign. To neutralize this negative relation between price and quantity demanded, we attach a minus sign to the formula so as to make Ed as a positive number, or we ignore the negative sign altogether.

$$\therefore \quad Ed = \frac{\%\ change\ in\ quantity\ demand\ of\ x}{\%\ change\ in\ price\ of\ x}$$

$$= -\frac{P}{D} \times \frac{\triangle D}{\triangle P}$$

FIVE TYPES OF PRICE-ELASTICITIES OF DEMAND

1. **Unit Elastic Demand**: When change in price of X brings about exactly proportionate change in quantity demanded of X the demand is unit elastic or elasticity of demand = 1, e.g. if price falls by 10% then, demand expands by 10%.

$$Ed = \frac{\%\ change\ in\ quantity\ demand\ of\ x}{\%\ change\ in\ price\ of\ x}$$

$$= \frac{10}{10} = 1$$
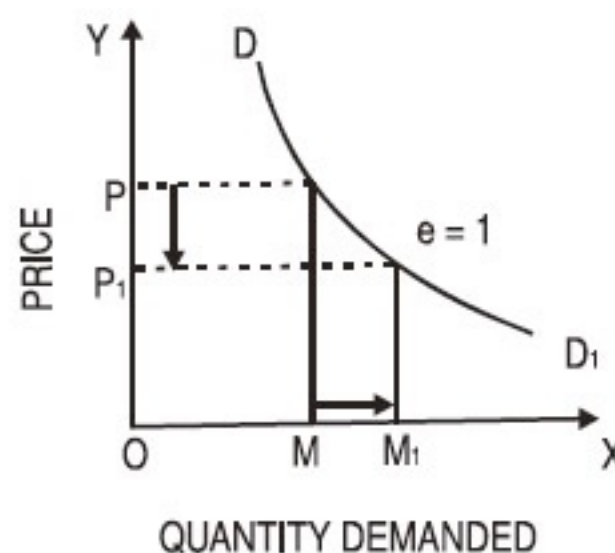
Fig. 4.1

2. **Relatively Inelastic Demand**: When change in price brings about less than proportionate change in quantity demanded, then demand is relatively inelastic or Ed is less than 1, e.g. if price falls by 10% and demand rises by 5% then,

$$Ed = \frac{\% \text{ change in quantity demand of x}}{\% \text{ change in price of x}}$$
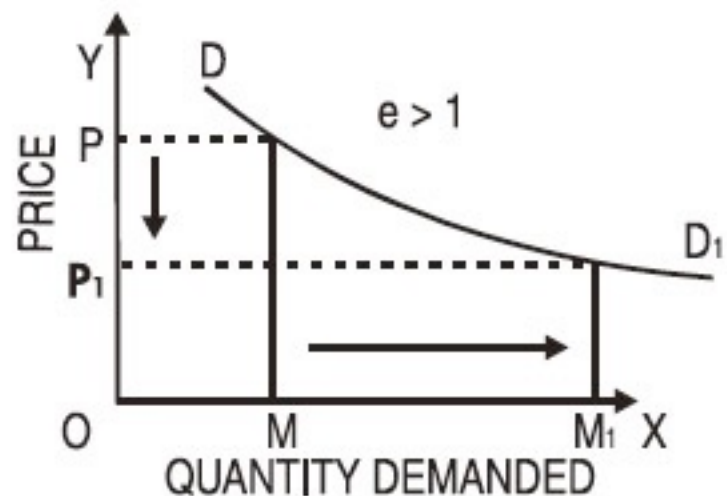
$$= \frac{5}{10} = \frac{1}{2} < 1$$
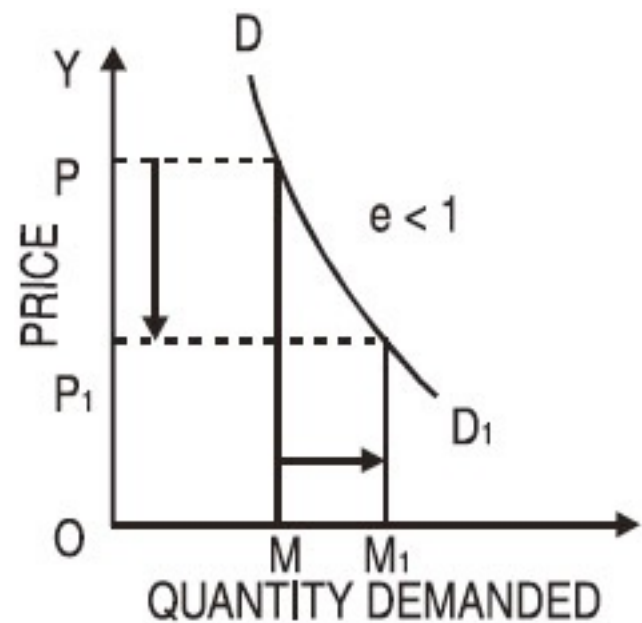
Fig. 4.2

3. **Relatively Elastic Demand**: When change in price brings about more than proportionate change in quantity demanded, then demand is relatively elastic or Ed is greater than 1, e.g. if price falls by 10% and the quantity demanded rises by 20% then

$$Ed = \frac{\% \text{ change in quantity demand of x}}{\% \text{ change in price of x}}$$

$$= \frac{20}{10} = 2 > 1$$

Fig. 4.3

4. **Perfectly Inelastic Demand**: When change in price has no effect on quantity demanded, then demand is perfectly inelastic or Ed is zero, e.g. if price changes by 10% and demand does not change at all then,

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Fig. 4.4

$$Ed = \frac{\text{\% change in quantity demand of x}}{\text{\% change in price of x}}$$

$$= \frac{0}{10} = 0$$
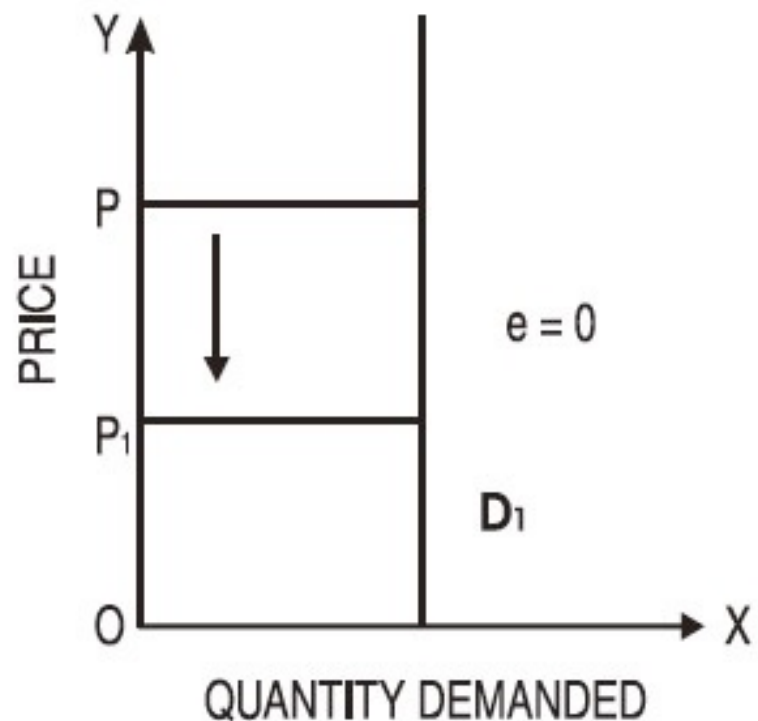
5. **Perfectly Elastic Demand**: When a slight change in price brings about infinite change in the quantity demanded, then demand becomes perfectly elastic. In this case elasticity of demand is infinity.
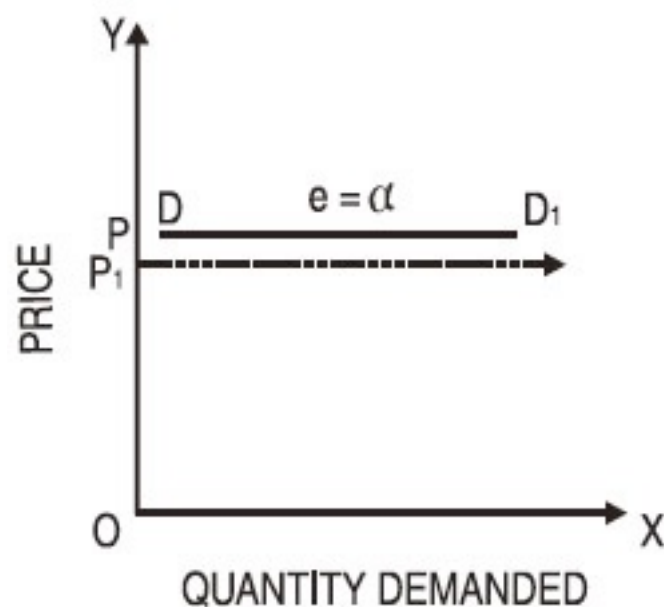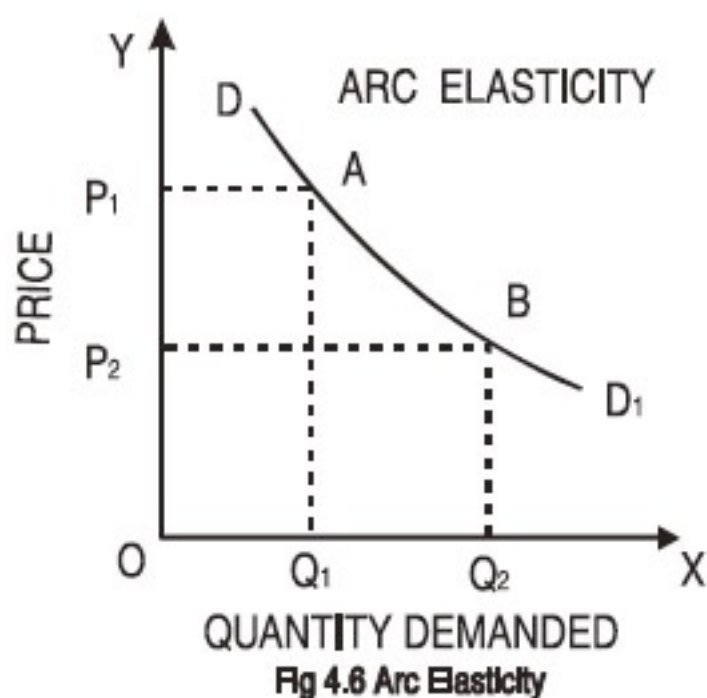

Fig. 4.5

Attempts have been made earlier to show that different elasticities of demand can be shown by different slopes of demand curve. Elasticity of demand is generally indicated by the steepness of the demand curve; i.e. regular hyperbola indicates unit elasticity of demand; flatter slope indicates more elastic demand etc. It would be improper to conclude anything definite about elasticity of demand by a mere inspection of steepness of a demand curve. The steepness of the demand curves can be compared for their elasticities only if they are drawn on the same scale. If the scales taken are

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different then the slopes for the same data will obviously be different and the results may mislead us. Besides, elasticity of demand will be different at different points on the same demand curve.

4.2 ARC ELASTICITY OF DEMAND

Although the percentage method is simple yet it is not very reliable; because it is useful only when price changes are infinitesimally small. This is rare. Normally prices do not just change by small amounts. Change in the prices are perceptible e.g price will rise from Re. 1 to Re. 1.25; and will hardly rise from Re.1 to Re. 1.01p. Thus, where price changes are perceptible, say over 10% then instead of percentage or point elasticity methods we use arc elasticity method. The 'arc' represents a segment of the demand curve between the two points under consideration i.e. AB.

Fig 4.6 Arc Elasticity

$$Ed= \cfrac{\cfrac{\text{Change in Q.D.}}{\cfrac{\text{Original} + \text{New Q.D.}}{2}}}{\cfrac{\text{change in price}}{\cfrac{\text{Original} + \text{New Price}}{2}}}$$

Formula for measuring Arc Elasticity of Demand

$$= \frac{Q2 - Q1}{Q2 + Q1} \div \frac{P2 - P1}{P2 + P1}$$

$$= \frac{Q2 - Q1}{Q2 + Q1} \times \frac{P2 - P1}{P2 + P1}$$

4.3 MARSHALL'S METHOD OF MEASURING ELASTICITY OF DEMAND (Total Revenue or Total Outlay Method)

Here the total revenue or total outlay refers to the product of price and the quantity demanded, i.e. **TR = P X D**.

According to this method:

i) If change in price brings about change in quantity demanded in such a way that total outlay remains the same, then demand is **unit elastic**, e.g.

Unit Elastic Demand		
Price	**Quantity Demanded**	**Total Outlay**
Rs 60	100 units	Rs 6,000
Rs 50	120 units	Rs 6,000
Rs 40	150 units	Rs 6,000

ii) If change in price brings about a change in the quantity demanded in such a way that the total outlay goes on falling, then demand is relatively inelastic, e.g.

Relatively Inelastic Demand		
Price	**Quantity Demanded**	**Total Outlay**
Rs 60	100 units	Rs 6,000
Rs 50	110 units	Rs 5,500
Rs 40	120 units	Rs 4,800

iii) If change in price brings about a change in the quantity demanded in such a way that the total outlay goes on increasing, then demand is relatively elastic, e.g.

Relatively Elastic Demand		
Price	**Quantity Demanded**	**Total Outlay**
Rs 60	100 units	Rs 6,000
Rs 50	150 units	Rs 7,500
Rs 40	200 units	Rs 8,000

4.4 ELASTICITY AT A GIVEN POINT ON THE DEMAND CURVE

At different points on the same demand curve the elasticity of demand will be different, e.g. let us consider a demand schedule which may tempt us to conclude that at all points on the same demand curve, the elasticity of the demand is the same.

A Demand Schedule	
Price of X	**Quantity demanded of X**
100	10
90	20
80	30
70	40
60	50
50	60
40	70
30	80
20	90
10	100
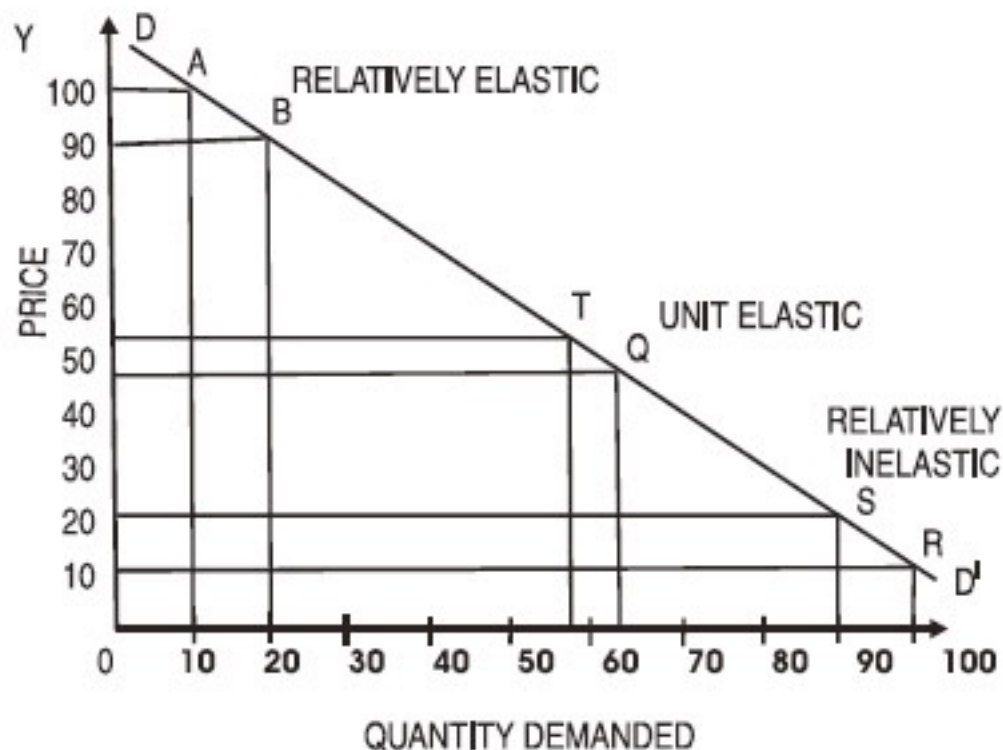
Fig. 4.7 Elasticity of demand of different points on the demand curve

Referring to the above figure, between points A and B, the demand is relatively elastic because % change in price is about 10% from (100 to 90) resulting in 100% change in quantity demanded (since demand changes from 10 to 20). Thus, demand here is relatively elastic. Besides when price changes from 10 to 20, demand changes from 100 to 90. Thus, price between R and S has changed by 100% . Thus, between R and S demand is relatively inelastic. Only at some middle range of prices, demand is unit elastic. Thus, **elasticity of demand is different at different points on the same demand curve**. To be more precise, we can derive a formula to measure the elasticity of demand at a given point on the demand curve.

Let us assume that DD^1 is the given demand curve and that we have to measure the elasticity of demand at a given point T on the demand curve.

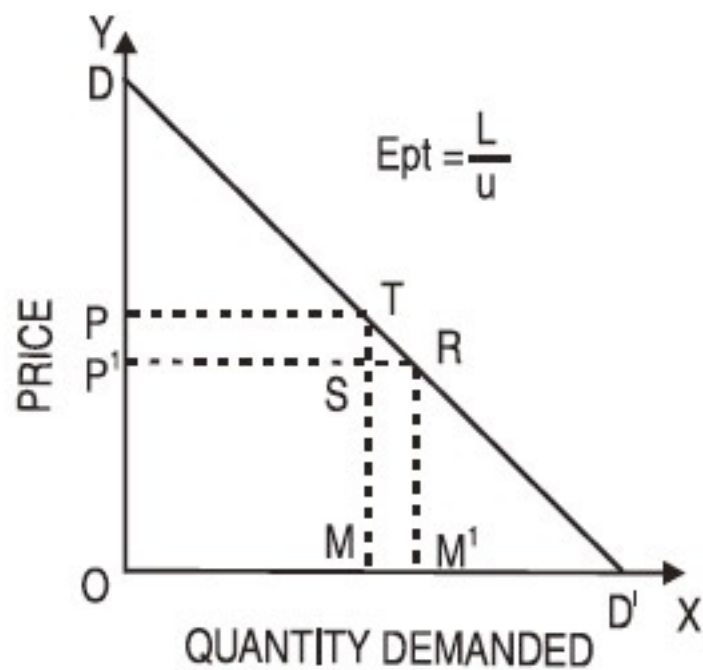Let us now assume a slight fall in price from OP to OP^I; then the demand expands from OM to OM^I.

$$Ept = \frac{L}{u}$$

Fig. 4.8

Now $Ed = \frac{P}{D} \times \frac{\Delta D}{\Delta P} = \frac{OP}{OM} \times \frac{MM'}{PP}$

Now $\frac{MM'}{PP} = \frac{SR}{ST} = \frac{MD'}{MT} = \frac{MD'}{OP}$

$\therefore Ed \frac{OP}{OM} \times \frac{MD'}{OP} = \frac{MD'}{OM} = \frac{MD'}{PT}$

And since $\triangle TMD'$ and TPD are similar

$$\frac{MD'}{PT} = \frac{D'T}{DT}$$

$\therefore$ Ed at a point T = $\dfrac{\text{Lower segment}}{\text{Upper segment}}$

Let us assume that DD^I is a given straight line demand curve intercepting the X- axis at a point D^I And Y-axis at point D. If we have to find out the elasticity of demand at any point A on this demand curve then we apply the following formula;
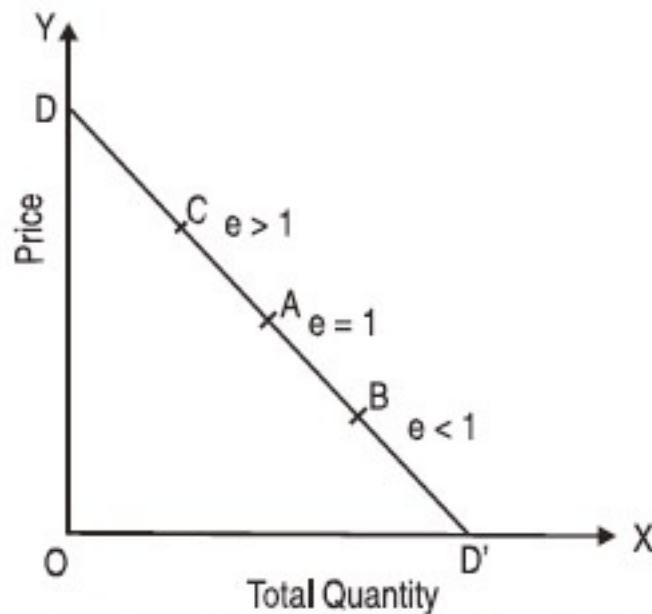
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Fig 4.9 Point Elasticity of Demand when Demand Curve is a Straight Line

$$Ed \text{ at Point } A = \frac{D'A}{DA}$$

Let us assume that the length of DD' is 8 cms.

$$\text{Then Ed at Point } A = \frac{D'A}{DA} = \frac{4}{4} = 1$$

$$Ed \text{ at Point } B = \frac{D'B}{DB} = \frac{2}{6} = \frac{1}{3} < 1$$

$$Ed \text{ at Point } C = \frac{D'C}{DC} = \frac{2}{6} = \frac{1}{3} > 1$$

Thus at lower range of prices demand becomes less and less elastic.

4.5 INCOME ELASTICITY OF DEMAND (Ey)

Income- elasticity of demand is the degree of responsiveness of quantity demanded of any commodity X to the change in consumer's income. It is expressed as the ratio of percentage change in quantity demanded of commodity X to percentage change in income. While measuring income elasticity of demand, all influences on demand other than income are held constant. The formula for income elasticity of demand is:

$$Ey = \frac{\text{Percentage change in quantity demand of x}}{\text{Percentage change in Income}}$$

$$Ey = \frac{\% \text{ of } \Delta Qdx}{\% \Delta \text{Income}}$$

$$= \frac{\dfrac{\text{New Qdx - Old Qdx}}{\text{Old Qdx}} \times 100}{\dfrac{\text{New Income - Old Income}}{\text{Old Income}} \times 100}$$

$$\therefore Ey = \frac{\dfrac{\Delta Q}{Q}}{\dfrac{\Delta Y}{Y}} = \frac{\Delta Q}{Q} \times \frac{Y}{\Delta Y}$$

$$\therefore \boxed{Ey = \frac{Y}{Q} \times \frac{\Delta Q}{\Delta Y}}$$

Where Y = original income; Q = original demand
Y= change in income, ΔQ= change in demand

There is the possibility that as the income of the consumer changes, his demand for a commodity may change either in the **same direction** or in the opposite direction or a change in his income **may have no effect at all on demand** for that commodity.

Income- elasticity may be either **positive or negative or zero**.

i) **Positive Income Elasticity: If change in income brings about change in demand for a commodity in the same direction then income elasticity of demand with respect to that good is positive**. i.e. when income rises and demand for the good also expands and with a fall in income, the demand for that good also falls then income elasticity of demand is positive. **This happens in case of normal goods.** Thus goods having positive income elasticity of demand are normal goods.

ii) **Negative Income Elasticity: If change in consumer's income brings about change in demand for a commodity in the opposite direction then income elasticity of demand is negative**. i.e. when income rises and the consumer demands less of a particular good or with a reduction in income more units of that good are demanded then income elasticity of demand is negative. This occurs in case of inferior goods. Therefore, in

case of inferior good the income elasticity of demand is negative i.e. less than zero.

iii)**Zero Income Elasticity of Demand: If change in income of the consumer has no effect on demand for the commodity, then the income elasticity of demand is zero**. The income may rise or fall but if it does not have any influence on demand then the Income Elasticity of demand is zero. E.g. our income may change but if our demand for salt is not affected due to change in income then income elasticity of demand for salt will be zero.

4.6 CROSS-ELASTICITY OF DEMAND (Ex)

Very often we find that goods are so **inter-related** that a change in demand for one good will also have some influence on demand for some other good, especially if it is a substitute or a complimentary good. **The degree of responsiveness of quantity demanded of B to the change in price of A is the cross-elasticity of demand.**

Thus cross elasticity of demand is defined as the measure of degree of responsiveness of quantity demanded of B to the change in price of A.

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$$\therefore \; Ex = \frac{\text{Percentage change in } Q_{dB}}{\text{Percentage change in } P_A}$$

$$\text{Thus, } Ex = \frac{\% \text{ change in } Q_{dB}}{\% \text{ change in } P_A}$$

$$= \frac{\dfrac{\text{New } Q_{dB} - \text{Old } Q_{dB}}{\text{Old } Q_{dB}} \times 100}{\dfrac{\text{New } P_A - \text{Old } P_A}{\text{Old } P_A} \times 100}$$

$$= \frac{\Delta Q_{BA}}{Q_B P} \cdot \frac{\Delta PQP}{QP} _A = \frac{\Delta_A}{B} \times \frac{\Delta}{A}$$

$$\therefore \; \boxed{Ex = \frac{P_{AB}}{Q_{BB}} \times \frac{\Delta Q}{\Delta P}}$$

Where; P_A = original price of A; Q_B = original quantity of B

ΔP_A = change in price of A ; ΔQ_B = change in quantity of B

Cross elasticity of demand may be either positive or negative or zero.

i) **Positive Cross elasticity of demand**: If the two commodities A and B are so related that change in price of A brings about change in demand for B in the same direction then cross elasticity of demand is positive. This happens in case of substitutes.

ii) **Negative Cross elasticity of demand**: If change in price of one commodity brings about change in demand for another commodity in opposite direction then cross elasticity of demand is negative. In case of complementary goods the cross elasticity of demand is negative.

iii) **Zero Cross elasticity of demand**: If the two goods are such that demand fro them is not at all inter-related then obviously any change in price of one good will have no effect on demand for the other. In such cases when change in price of A has no effect on demand for Z then cross elasticity of demand is zero. Thus in case of unrelated goods, say salt and pen, the cross elasticity of demand is zero.

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4.7 USES OF THE CONCEPT OF ELASTICITY OF DEMAND

1. **Fixation of Price**: The concept of elasticity of demand is useful to the monopolist in formulating a suitable price-policy. He can charge a higher price if the demand for his product is relatively inelastic.

2. **Formulation of Tax Policy**: The concept of elasticity of demand is useful to the Government in formulating an appropriate tax policy. Taxes cannot be levied heavily on commodities, the demand for which is elastic or else when the seller tries to shift the burden of tax over to the buyers by charging higher prices, the buyers may immediately reduce the demand for the product itself and hence the Government may not be able to raise adequate revenue from taxes on such commodities. Hence necessities are covered under the Tax-net. Demand for necessities is inelastic. Therefore even when price is raised due to the tax the consumers will continue to buy and the Government is assured of some amount of revenue.

3. **Factor-Pricing**: The concept of elasticity of demand is also useful in determining factor-prices. Those factors, the demand for whose services is inelastic command higher rewards in the factor market, e.g. we can well observe that the demand for highly skilled and specialized labour, say air-pilots, is relatively inelastic and hence they command higher wages.

4. **Policy of Devaluation**: The concept of elasticity of demand is to be carefully applied when the Government is planning to undertake the measure of devaluation of currency. Devaluation means reducing the value of our currency in terms of foreign currency. This measure is resorted to in order to overcome disequilibrium situation in country's Balance of Payments. Through devaluation it is expected that the country's exports will rise and its imports will decline. But if our demand for foreign goods is inelastic, we will continue to import goods from abroad and thus our Balance of Payments will become more unfavourable. Therefore, before the Government takes the decision to devalue the currency it must study our elasticity of demand for foreign goods and foreigners elasticity of demand for our goods.

5. **Policy Of Nationalisation**: The concept of elasticity of demand is also useful in formulating the policy of nationalization. The Government tries to take over or nationalize those utility concerns, the demand for whose

products and services is inelastic. If such concerns are left in hands of a private sector then the producers would fix exhorbitant prices and thereby exploit the consumers. Thus to safeguard the interest of the consumers the Government feels it fit to nationalize such industries.

SUGGESTED READINGS

1. Alfred Marshall: Principles Of Economics

2. Paul Samuelson: Economics

3. Gillis F.E.: Managerial Economics

4. Pappas and Hirschey: Fundamentals of Managerial Economics

4.8 SUMMARY

Price elasticity of demand is responsiveness of quantity demanded of a product to the change in its price. In unit elasticity, change in price brings about equal change in quantity demanded. In relatively inelastic demand, changes in price bring less than proportionate changes in quantity demanded. Marshall uses total revenue method to measure elasticity. If change in price does not bring about any change in the total amount spent on the product, the demand is unit elastic. If it brings about fall in total outlay, the demand is relatively inelastic.

Income elasticity of demand is responsiveness of quantity demanded of a product to the change in consumers' income. If change in income brings about change in quantity demanded in the same direction, income elasticity is positive. If it brings about a change in opposite direction, income elasticity is negative and if fails to bring about any change then income elasticity is zero.

Some times changes in price of product 'A' bring about change in demand for product 'B'. This is called cross elasticity of demand. It is caused by close inter relationship among products. The concept of demand elasticity is of use in decisions on pricing, tax policy, devaluation etc.

4.9 SELF ASSESSMENT QUESTIONS

1. What is 'elasticity of demand'?

2. What is 'price-elasticity of demand'? Mention its types.

3. Distinguish between 'elastic' and 'inelastic' demand.

4. How is the elasticity of demand measured?

5. What is arc elasticity of demand? Derive its formula.

6. Explain Marshall's method of measuring price elasticity of demand.

7. Derive the formula to measure elasticity of demand at a point on the demand curve.

8. Show that on the same straight line demand curve elasticity of demand at different points is different.

9. Is the slope of a demand curve a guide to its elasticity?

10. What is 'Income elasticity' of demand?

11. Explain the following statements:

    i) Income elasticity of demand is positive in case of normal goods.

    ii) Income elasticity of demand is negative in case of inferior goods.

12. What is 'cross elasticity of demand' ? How does it differ from price elasticity of demand.

13. Explain the following statements:

    i) Cross elasticity of demand is positive in case of substitutes.

    ii) Cross elasticity of demand is negative in case of complementary goods.

14. What are the practical uses of elasticity of demand?

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video

5

Demand Forecasting

Objectives:

After completing this chapter, you will be able to understand:

• What is demand forecasting?

• Methods for demand forecasting.

• Limitations of demand forecasting.

Structure:

5.1 INTRODUCTION

The firm must plan for the future. Planning for the future involves forecasting. **A forecast is an estimation or prediction about situations which are most likely to occur in near or distant future.** No businessman can afford to ignore forecasting if he wants to thrive and prosper in his business. The firm has to forecast the future level of demand for its product under different possible circumstances; such as prices, competition, promotional activities and general economic activity. Similarly forecasting will be necessary with reference to costs under changing conditions of availability of raw materials and their respective prices, changing technology, wage rates, labour training and capital acquisition programmes. Forecasting does play a key role in managerial decisions and hence forecasting is emphasized in the study of managerial economics. The objective of business forecasting is to minimize risk and the margin of uncertainty in business.

5.2 TECHNIQUES OF DEMAND FORECASTING

Many techniques are available that can be used in forecasting economic variables. Some forecasting techniques are quantitative, others are qualitative. When quantitative information is not quite available then qualitative technique is to be relied upon for getting the required forecasts.

There are, as such, **two approaches to demand forecasting**. First is to obtain information about the intentions of the spenders through collecting experts' opinion or by conducting interviews with the consumers. Second is to use past experience as the guide and using or projecting the past statistical relationships to obtain the expected level of future demand. The first method is also considered to be **qualitative** and is mostly used for short-term forecasting; whereas the second method is **quantitative** and is used for long-term forecasting. We can forecast the demand for existing product by using any one or even mix of the above methods, but to forecast demand for new product we have to use survey method only because the new product has no past or historical data to offer.
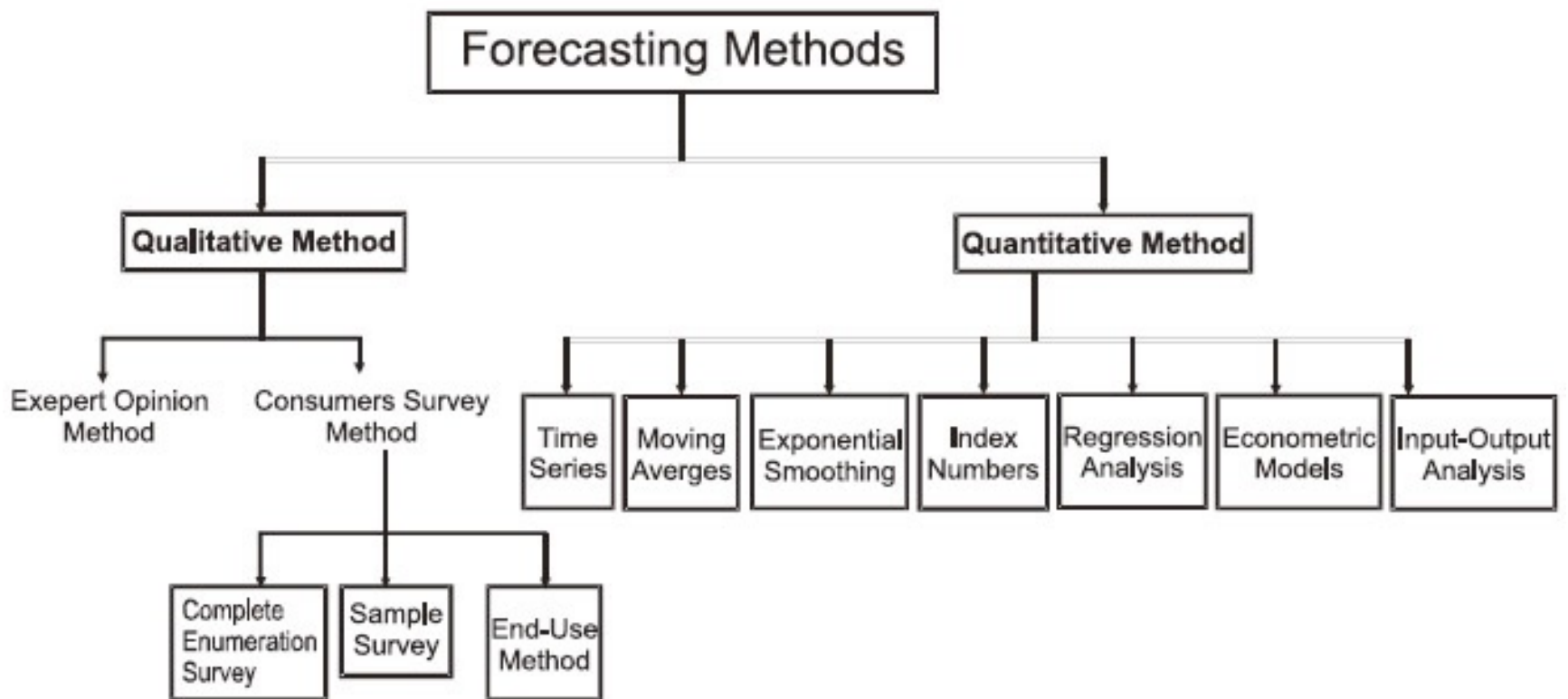
A. Qualitative Methods (Survey Methods)

1. **Expert Opinion Method**:

In this method, the firm makes an effort to obtain the opinion of experts who have long standing experience in the field of enquiry related to the product under consideration. If the forecast is based on the opinion of several experts then the approach is called forecasting through the use of **panel consensus**. Although the panel consensus method usually results in forecasts that embody the collective wisdom of consulted experts, it may be at times unfavourably affected by the force of personality of one or few key individuals.

To counter this disadvantage of panel consensus, another approach is developed called the **delphi method**. In this method a panel of experts is individually presented a series of questions pertaining to the forecasting problem. Responses acquired from the experts are analyzed by an independent party that will provide the feedback to the panel members. Based on the responses of other individuals, each expert is then asked to make a revised forecast. This process continues till a consensus is reached or until further iterations generate no change in estimates.

The advantage of Delphi technique is that it helps individual panel members in assessing their forecasts. However Delphi method is quite expensive.

Often, the most knowledgeable experts in the industry will command more fees. Besides, those who consider themselves as experts may be reluctant to be influenced by the opinions of others on the panel.

If the number of experts is large and their predictions are different then a simple average or weighted average is found so as to lead to unique forecasts. This method of forecasting is called the hunch method.

The main advantage of the Experts' Opinion Survey Method is its simplicity. It does not require extensive statistical or mathematical calculations However this method has its own limitations. It is purely subjective. It substitutes opinion in place of analysis of the situation. Experts may have different forecasts or any one among them may influence others. Who knows experts may be biased or have their own intentions behind providing their opinions. **If the consulted experts are genuinely reliable then panel consensus could be perhaps the best method of forecasting.**

2. Consumers Survey Method:

Survey methods constitute another important forecasting tool, especially for shortterm projections. The most direct method of estimating demand in the short- run is to conduct the survey of buyers' intentions. The consumers are directly approached and are asked to give their opinions about the particular product. The questionnaire must be carefully prepared bearing in mind the qualities of a good questionnaire. It must be simple and interesting so as to evoke consumers' response.

Consumers' Survey may acquire three forms:

I. Complete Enumeration Survey

II. Sample Survey

III. End-Use Method

I. **Complete Enumeration Survey**: Complete Enumeration Survey covers all the consumers. It resembles the Census Data Collection which considers the entire population. In this case all the consumers are covered and information is obtained from all regarding the prospective demand for the product under consideration. The method of Complete Enumeration has the advantage of being absolutely unbiased as far as consumer opinions are concerned. We can obtain complete information by contacting every possible present, past

or would be consumers of the product. No doubt it is not very easy to carry out the survey on such a large scale. Even the collected information will be difficult and too tedious to be analyzed. The reliability on such consumers' information may be questionable, if the opinions are not authentic.

II. **Sample Survey**: In case of the sample survey method, few consumers are selected to represent the entire population of the consumers of the commodity consumed. The total demand for the product in the market is then projected on the basis of the opinion collected from the sample. The most important advantage of this method is that it is less expensive and less tedious compared to the method of complete enumeration. The sample chosen should not be too small nor too large. This method if applied carefully will yield reliable results especially in case of new brands and new products.

III. **End -Use Method**: A given product may have different end uses. For example: milk may have different end uses such as milk powder, chocolates, sweet -meats like 'barfi' etc. Therefore the end users of milk are identified. A survey is planned of the end users and the estimated demands from all segments of end users are added. This method of demand forecasting is easy to manage if the number of end-users is limited. In this method the investigator expects the end- users to provide correct information well in advance of their respective production schedules.

Although the Survey Method is the most direct method of estimating demand in the short-run; **Joel Dean** criticized this method by saying "there are formidable barriers to learning the buying intentions of the household consumers." He adds "consumers are often inconsistent. The inability to foresee what choice the consumers will make when faced with multiple alternatives in the market, restrict the usefulness of this method of forecasting."

Activity A

Modern Shoes is launching a new brand of sports shoes. Prepare a report from Marketing Head to CEO advising how and why demand for sports shoes be forecasted using Qualitative method.

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B. Quantitative Methods (Statistical Methods)

The Quantitative Methods of demand include the Time Series Analysis, Moving Averages, Exponential Smoothing, Index Numbers, Regression Analysis as well as Econometric Models and Input-Output Analysis.

1. **Time Series Analysis**: Time Series Analysis is used to estimate future demand. The Time Series Method is based on obtaining the historical data regarding the demand for the product so as to project future occurencies on the basis of what has happened in the past. The Time Series data are chronologically arranged data from a population at different points of time. For example: demand for steel in India may be plotted for years beginning from 1951 to 2003. Based on the data plotted on the graph, a line or curve is drawn. This helps to establish a trend over a period of time. This pattern is then smoothed to eliminate the effect of random fluctuations and it can then be extrapolated into the future to provide a forecast.

The Time Series forecasting models are based on historical observations of the values of the variable that is being forecast.

The Time Series data would indicate different types of fluctuations which can be classified as Secular Trends, Cyclical Variations, Seasonal Variations and Random Fluctuations.

I. Secular Trend refers to the long run increase or decrease in the series.

II. Cyclical Fluctuation refers to the rhythmic variations in the economic series.

III. Seasonal Variation refers to the variations caused by weather patterns social habits such as festivals etc.

IV. Random Fluctuation refers to the irregular and unpredictable shocks to the system, such as wars, strikes, natural catastrophes etc.

When a forecast is to be made, the Seasonal, Cyclical and Random variations are eliminated from the collected data leaving behind the secular trend only. The Secular Trend is then projected. This trend may be a linear trend or non linear. When the trend is linear then we use the least squares method or the line-of-best fit.

Since the extrapolation technique assumes that a variable will follow its established parts, the problem is to determine accurately the appropriate trend curve. The selection of the appropriate curve is guided both by empirical and theoretical considerations. The trend projection method is more useful for long term forecasting then for short run estimation. The trend projections assume that the historical relationships involved in the Time Series will continue in future, which need not always be the case. Finally trend projections involve no analysis of causal relationship and hence offer no help in analyzing as to why a particular series moves as it does or what would be the impact of a particular policy decision on future movement of the series.

2. **Moving Averages**: The method of Moving Average is useful when the market demand is assumed to remain fairly steady over time. The Moving Average for 'n' months is found by simply summing up the demand during the past 'n' months and then dividing this total by 'n'.

Moving Average = <u>Demand in the previous n month</u>
                                              n

3. **Exponential Smoothing**: In this technique more recent data are given more weightage. This is based on the argument that the more recent the

observations, the more its impact on future and therefore is given relatively more weight than the earlier observations.

4. **Index Numbers**: The Index Numbers offer a device to measure changes in a group of related variables over a period of time. In case of index numbers we select a Base Year which is given the value of 100 and then express all subsequent changes as a movement of this number. The most commonly used is the Laspeyres' Price Index.

5. **Regression Analysis**: This Statistical method is undertaken to measure the relationship between two variables where correlation appears to exist. For example: we can establish a relationship between the age of the air condition machine and the annual repairs expenses. However this is purely based on the availability of statistical data irrespective of the actual causes of damage for which the repair expenses have to be incurred.

6. **Econometric Models**: The Econometric Models used in forecasting takes the form of an equation or system of equation which seems best to express the most probable interrelationship between a set of economic variables according to economic theory and statistical analysis. The Econometric Models can be quantitatively and qualitatively formulated. One of the first steps in the construction of an Econometric Model is to determine all or most of the factors influencing the series to be forecast. Then the influence of these factors is reflected in the form of an equation. These models are generally used by econometricians. One of the major limitations of Econometric Model approach is the assumption that the relationships established in the past will continue to prevail in the future. The Econometric Models have failed in many cases but this does not imply that we should abandon them. Being analytical in nature and process oriented in approach they throw more light on problems of a theoretical and statistical nature provided the statistical data are reliable.

7. **Input-Output Analysis**: The Input-Output Analysis provides perhaps the most complete examination of all the complex inter-relationships within an economic system. The Input-Output forecasting is based on a set of tables that explain the inter-relationship among the various components of the economy. The Input-Output Analysis shows how an increase or decrease in the demand for cars will lead to increase in production of steel, glass, tyres etc. The increase in demand for these materials will have second line effect. The Input-Output Analysis helps us to understand the inter-

industry relationships to provide information about the total impact on all industries as a result of the original increase in demand forecast.

There is no unique method for forecasting the demand for any product. The forecaster may try any one or the other method depending upon his objective, the data availability, the urgency with which forecasts are needed, resources he intends to devote for forecasting and the nature of commodity whose demand he wants to forecast. If the objective is short term forecast he may try any one of the survey methods. For long term forecasts he may use the trend method or regression method of forecasting. If the commodity in question is a new product, then Joel Dean has recommended the use of survey methods of forecasting. For old products the producer will use statistical methods. For consumer goods the end use method is not feasible; whereas the end use method is more convenient for forecasting producers' capital goods.

Activity B

Modern Shoes is installing additional capacity for its brand of sports shoes. Prepare a report from Finance Head to CEO advising how and why demand for sports shoes be forecasted using Quantitative method.

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5.3 FORECASTING METHODS USED DURING THE PRODUCT LIFECYCLE

The lifecycle of a product is divided into several stages such as the

i) research and development phase, ii) introduction of product, iii) market development, iv) advertisement and sales promotion phase, v) maturity phase , vi) saturation phase and lastly vii) the phase of possible decline. For the purpose of selecting the suitable method of forecasting the product lifecycle is divided into following three stages.

a) Development and introduction stage

b) Rapid growth stage

c) The phase of steady growth.

In the development and introduction stage the suitable methods of forecasting are the market trial survey, Delphi method or a method of an in-house survey of experts. During the rapid growth phase trend projection, Time Series Analysis and Regression Analysis are useful in estimating the demand. During the steady growth phase there is slowing down of demand. Econometric Models are used to predict the long term demand for the commodity. The Time Series Model correlation and regression techniques are also popularly used as method of forecasting in the steady growth phase.

5.4 CRITERIA FOR SELECTING A GOOD FORECASTING METHOD

1. **Accuracy**: Different methods of forecasting yield accurate results under different circumstances. An appropriate choice of method will ensure more accurate results.

2. **Reliability**: A time tested method increases the reliability of that method. If a particular method was used to give reliable result in the past then the same method can be reused for forecasting future.

3. **Economical**: Although complete enumeration method of forecasting demand would perhaps yield more accurate result yet it would be a very expensive method. The team conducting forecast cannot afford to discuss the economic aspect of forecasting and therefore should select the least expensive of the methods which would give some reliable forecasts.

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4. **Data availability**: Forecasting is made on the basis of the availability of primary or secondary data and therefore the required data should be easily available preferably in the required form.

5. **Flexibility**: As the managerial economist is faced with a number of uncontrollable variables, flexibility in using them would be a necessary condition for a good forecast.

6. **Durability**: The forecast that are made should be valid in the long run because there is a certain time lag in conducting the forecasts and the period when the product is likely to enter the market.

7. **Simplicity**: Depending upon the objective the researcher should apply a simple and straightforward method of forecasting.

5.5 LIMITATIONS OF DEMAND FORECASTING

1. Although the opinion surveys are simple and straightforward, there is an element of subjectivity involved.

2. As the surveys are expensive and time consuming there is a tendency to limit the sample of the consumers. The sample selected may not be very representative.

3. Although the Time Series Analysis is used in forecasting cyclical fluctuations, yet we cannot be sure about such forecasts because there is no regular pattern of a business cycle. Different phases of the cycle may have different intensities and timings which can make the forecast go astray.

4. Although efforts are made to use scientific method in forecasting yet there is bound to be difference between field experiments and experiments conducted in laboratories.

Afterall demand forecasting depends on the responses from the human beings but the tastes and preferences of human beings keep changing. And thus the application of even the quantitative or statistical models may not give us very reliable forecast.

Depending upon the resources and time the forecaster must use more than one method to cross check the accuracy of his forecast.

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Despite the limitations associated with forecasting, we all agree that forecasting by some technique or the other is essential. No businessman can afford to do without it. The question faced is not whether he should forecast but rather how he should forecast. Good forecasting essentially constitutes the core of business management.

SUGGESTED READINGS

1. Mote, Paul and Gupta: Managerial Economics: Concepts and Cases

2. Pappas and Hirschey: Fundamentals of Managerial Economics

3. Peterson and Lewis: Managerial Economics

4. J.J.McAnley: Economic Forecasting for Business

5.6 SUMMARY

For success of any business, it is necessary to forecast demand for its products and services to decide upon appropriate business strategy. This is arranged by collecting data about customers, their incomes, choices etc by conducting surveys under the Qualitative method of demand forecasting. Alternatively past data on consumption is used to forecast future trends under Quantitative method of demand forecasting.

The stage of a product life cycle decides choice of relevant method for forecasting. Accuracy, reliability, costs, availability of data etc. are some of the criteria to be used in selecting a good method.

Forecasting is not expected to provide absolutely correct results; hence more than one method is used to cross check forecasts.

5.7 SELF ASSESSMENT QUESTIONS

1. a. What do you understand by Demand Forecasting ?

    b. " No businessman can afford to ignore forecasting", Do you agree?

2. Explain the various Qualitative Methods of Demand Forecasting with their respective advantages and limitations.

3. Outline the Statistical method of Demand Forecasting.

4. What are the methods of forecasting used during the product lifecycle?

5. Enlist the criteria for selecting a good forecasting method.

6. Enumerate the limitations of Demand Forecasting.

7. " The forecaster must use more than one method to cross check the accuracy of his forecast ." Do you agree? Give reasons.

8. Visit a few firms/business units and find out whether they resort to forecasting. If yes, why? If no, why? What methods do they use for forecasting demand?

    Write a small essay regarding your investigations.

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

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6

The Fundamentals of Supply

Objectives:

After completing this chapter, you will be able to understand:

Law of Supply

Backward bending supply curve of Labour

Elasticity of Supply

Time element and supply

Structure:

6.1 INTRODUCTION

Supply refers to the various amounts of a good which the sellers are willing and able to sell at any given price per unit of time. The unit of time may be chosen according to the circumstances of each particular problem. It may be a day, a week, a month, a season, or a year. It is to be assumed that the general circumstances of the market remain unchanged throughout this period; that there is, for instance, no change in fashion or taste, no possibility of new substitute for the product or new invention to disturb the supply.

6.2 FACTORS INFLUENCING SUPPLY (DETERMINANTS OF SUPPLY)

The quantity supplied of any commodity, say X, depends on several factors:

1. **Price of that commodity itself** i.e. at higher price more of it is offered for sale.

2. **Price of other commodities**: The relative profitability of different commodities affects the relative attractiveness to firms for different lines of production. New firms or established firms seeking new product to produce will tend to undertake production of those commodities which provide higher possibilities of profits e.g. in agriculture, if price of wheat rises and price of cotton remains the same then the producer, other things being equal, will think of producing more of wheat

3. **Goals of the Producers**: It is quite likely that all the producers are not governed merely by the aim of profit maximization. Some producers may think of selling the maximum output and acquiring wider market; or others may prefer to function in the interest of the society and sell the products, being content so long as the cost is covered. Thus, the goals of producers differ. However, in the elementary theory of production and supply we assume that the single important goal of the firm is to maximize its profits.

4. **State of Technology**: The improvement in the technique of production essentially leads to increase in supply. Inventions and innovations make it possible to produce more or better commodities and thus tend to increase the quantity supplied of same product and to reduce the quantity supplied of products that are displaced.

5. **Cost of Production**: Changes in the price or factors of production affect the Cost of Production. When the cost of production increases the producer will decide to produce less; and vice versa, other things being equal.

6. **Availability of Raw Materials and other Inputs**: Supply will depend on the quantity of the commodity produced, which in turn will depend on the availability of inputs. In the absence of required amounts of raw materials and inputs, production, and thereby supply will be adversely affected.

7. **Climate and Forces of Nature**: The supply of a commodity is also influenced by the forces of nature. This is mainly in case of Agriculture. Agriculture in India continues to be a 'gamble in the monsoon' and hence the supply of foodgrains depends on the moods of the monsoon.

8. **Time Element**: The supply of any commodity is also determined by the period of time under consideration. There is the possibility that at a certain point of time supply cannot be enhanced. It remains fixed, irrespective of the price offered for the commodity in the market. But if sufficiently long period of time is allowed, some adjustments are possible in the quantity supplied.

9. **Transport Facilities**: The availability of transport plays an important part in influencing the size of the market; and the extent of the market will call for adjustments in supply of the products.

10. **Taxation and Subsidy**: The taxation policy of the Government will also influence the 'production-initiative' of the entrepreneurs as also the prices of the products and will thus influence the quantity of the commodities supplied. Even the amount of subsidy provided to the producers will influence the supply of goods.

11. **Expectations Regarding Future Prices**: This may lead to either speculative hoarding or even distress sales.

6.3 THE SUPPLY FUNCTION

The Supply Function for commodity X can be written as:

$$Q^S{}_X = f\ (P_X,\ p,\ c,\ G,\ T\ \dots.\ Etc)$$

Even here, as in the case of demand, we assume that everything that affects the quantity supplied, other than its price, is held constant and thus the supply function in its most simplest form can be written as follows:

$$Q^S{}_X = f\ (P_X)\ P^I = P^I0$$

$$c = c_o$$

$$G = G_o$$

$$T = T_o$$

6.4 THE LAW OF SUPPLY

The Law of Supply establishes the functional relationship between price of a commodity & its quantity supplied assuming factors other than the price of the commodity remaining constant.

The Law of Supply states: "**Other things remaining the same, quantity supplied of commodity X is directly related to its price.**" i.e. when the price of X rises the quantity supplied of X expands & when the price of X falls, the quantity supplied of X contracts.

What are the 'other things that must remain the same'?

1. The prices of other goods must remain the same.

2. The cost of production must remain unchanged.

3. The methods of production must remain the same.

4. There should be no change in the availability of inputs or factors of production.

5. There should be no change in transport facilities.

6. The weather conditions should remain the same.

7. There should be no change in the tax structure or in the amount of subsidies.

8. Goals of the producer must remain unchanged.

9. The seller should not expect further changes in prices.

In short, all the factors, other than the price of that commodity, influencing the supply of that commodity must remain the same for the law of supply to hold good.

The Supply Schedule

The Supply Schedule refers to a tabular presentation of the various amounts of commodity supplied at different possible prices at

Table 6.1

A Supply Schedule		
	Price of commodity X per unit	**Quantity supplied of commodity X per unit**
U	50	53
V	40	48
W	30	40
X	20	30
Y	10	18
Z	5	7

The supply schedule shows the direct relationship between price & quantity supplied, i.e. at a higher price the seller is prepared to sell more of commodity X, and at a lower price he is inclined to sell less.

The Supply Curve

On the basis of the supply schedule, when we plot points on a graph we get the Supply Curve. The supply curve refers to a graphical presentation of the relation between price & quantity supplied. It is customary to represent price on the Y- axis & the quantity on the X- axis.
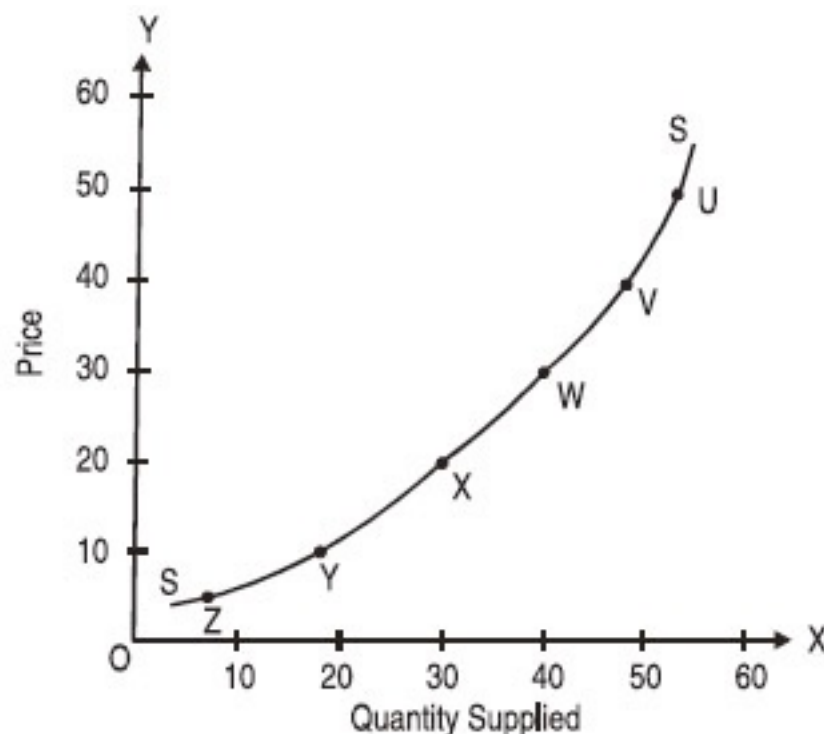
Fig 6.1 A Supply Curve

6.5 BACKWARD BENDING SUPPLY CURVE OF LABOUR; AN EXCEPTION TO THE LAW OF SUPPLY

The Supply Curve shows the complete functional relationship between price and the quantity supplied. **The supply curve slopes upwards from left to right,** indicating a **positive relationship** between price & quantity supplied & hence the supply curve has a positive slope.

An interesting exception to the law of Supply is provided by the **Supply curve of labour**: In case of supply of labour we come across the unusual phenomenon of the **Backward Bending Supply Curve**. An example would make the point clear.

To begin with, the supply curve of labour slopes upward as usual because as the wage rate per hour goes on increasing the supply of labour (number of hours of work) goes on increasing, i.e. the workers do show greater willingness to work as the wage rate begins to rise. This continues till the time the wage rates have risen sufficiently e.g. In the

Fig 6.2 Backward Bending Supply Curve of Labour

when wage rate is Rs 5/- per hour the worker puts in 8 hours of work per day & gets in all Rs 40/- per day i.e. 1,200 per month. If he is given Rs 7/- per hour he may increase the supply of his labour and show preparedness to work for even 10 hours a day & enjoy Rs 70/- per day i.e. 2,100 per month. It is also likely that given Rs 10/- per hour he may be prepared to work even 12 hours a day (between 7.00 a.m to 7.00 p.m or 8.00 a.m to 8.00 p.m) and enjoy Rs 120 per day; i.e. Rs 3600 per month. But now the maximum limit is reached; if the wage rate is now raised to Rs 12 per hour; the worker will reduce his supply of labour to 10 hours per day because that too will give him Rs 120 per day and Rs 3600 per month; besides he will now have more of leisure. Thus, if the wage rate goes beyond a particular level the worker prefers to substitute work by leisure and cuts short the supply of labour. Hence, beyond a certain level of wage rate, the supply curve of labour slopes backward. This is called the **backward bending supply curve of labour and is an exception to the Law of supply.**

6.6 RESERVATION PRICE AND SUPPLY

The Reservation Price of a seller is that price below which the seller would not sell the commodity.

The Reservation Price of a seller depends on:

i) The **need for liquid cash**. If the seller is in urge need of liquid cash, his reservation price will be low because he will desperately be in need of converting his goods into ready money.

ii) The **durability of the commodity**. If the commodity is highly perishable, the reservation price is low and therefore he disposes of the stock of the perishable goods.

iii) The **expectations** of the price of his commodity likely to prevail in the market in future. If he expects that prices are likely to rise in the future, his reservation price is substantially higher than the current price of the commodity in the market and therefore, he will not release his stocks for sale. But if he anticipates prices to decline in the future, his reservation price will be low and he will prefer to dispose of his stock at the existing market price.

iv) The **cost of storage** of the commodity. If the cost of storage is high, his reservation price may be duly affected and he would like to dispose of the stock at the earliest possible opportunity. In the absence of storage facility the reservation price will be low.

6.7 VARIATIONS AND CHANGES IN SUPPLY

(**Movements along the Curve V/S Shifts of Curves**)

As we distinguished between the concepts of 'extension and increase' in demand and **'contraction and decrease'** in demand so also we can differentiate between **'extension' and 'increase'** in supply and **'contraction' and 'decrease' in supply**. To understand the distinctions let us first clarify the meaning of extension and contraction and then consider the concept of increase and decrease in supply.

Like demand behaviour, the supply behaviour too is influenced by the determinants of supply. The most significant among the determinants being the **'price' factor, it causes the variation in supply** in the form of extension and contraction of supply. On the other hand, the **factors other than the price lead to the change in supply**, in the form of increase and decrease in supply.

A. Variations in Supply (Extension and Contraction of Supply)

If change in the price of X is the only factor influencing the quantity supplied of X then we have either extension or contraction in supply. If the price rises from OP to OP^I the supply expands from OM to OM^I. This is

called extension of supply and if the price falls from OP^I to OP, the quantity supplied will contract from OMI to OM. This is called contraction of supply. **Both extension and contraction of supply are shown by movement along the same supply curve.**
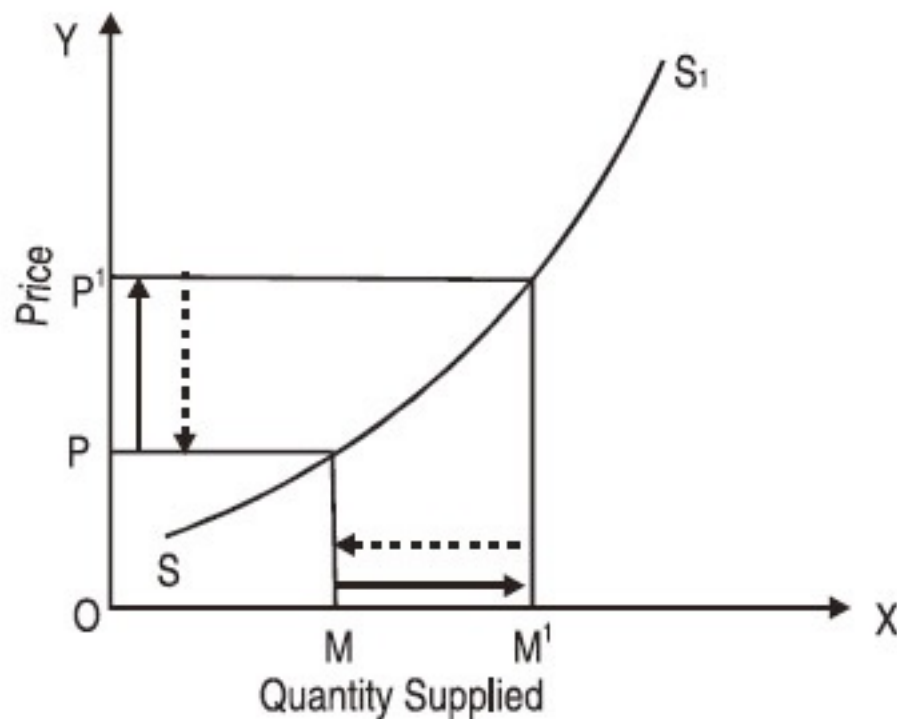

Fig 6.3

B. Changes in Supply (Increase and Decrease in Supply)

When factors other than price of a commodity influence the supply of that commodity, then we have either Increase in Supply of that commodity or Decrease in its Supply, shown by shifts in the Supply Curve.

THE SUPPLY IS SAID TO HAVE INCREASED IF:

i) At the same price, more is supplied (arrow 1)
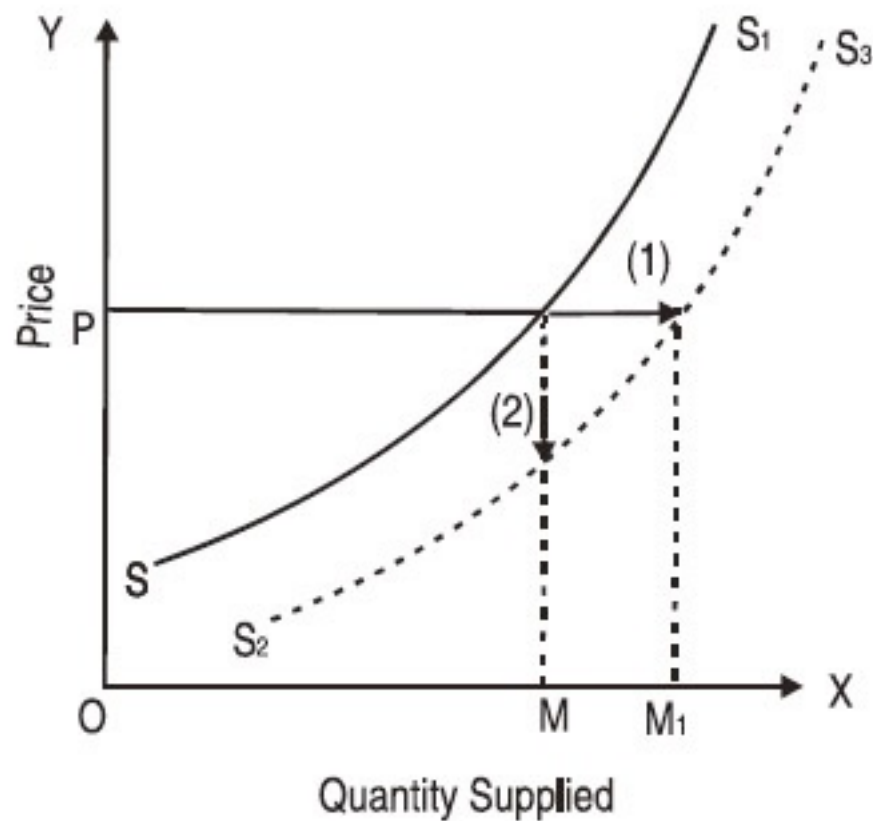
Fig 6.4 Increase in Supply

ii)At a lower price, the same quantity is supplied (arrow 2) When supply increases the supply curve shifts to the right. e.g the new supply curve is now S_2S_3

THE SUPPLY IS SAID TO HAVE DECREASED IF:

i) At the same price less is supplied; (Arrow 3)
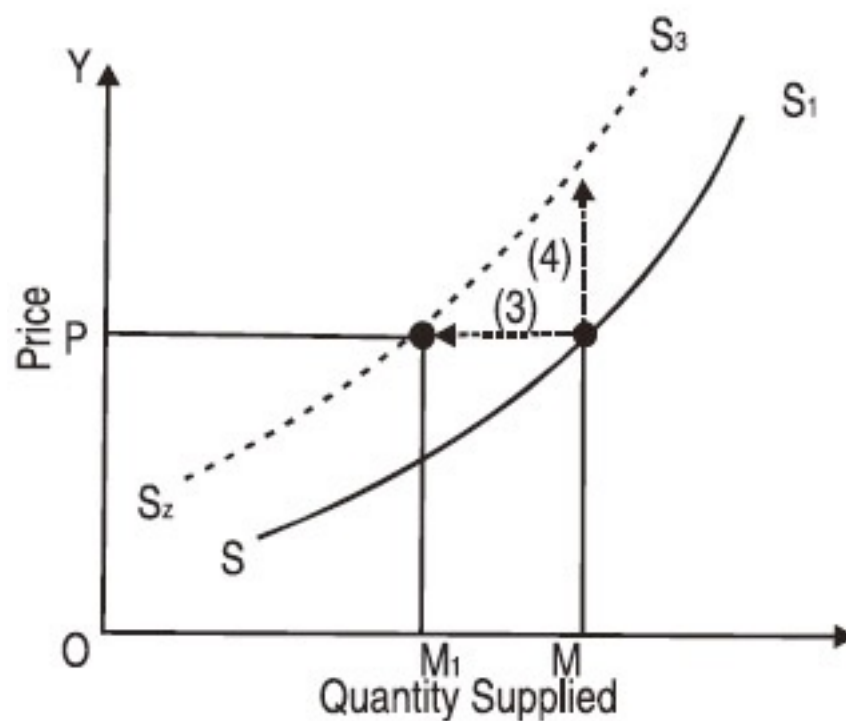
Fig 6.5 Decrease in Supply

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At higher price, the same quantity is supplied (Arrow 4)

When supply decreases, the supply curve shifts to the left. e.g. from SS$_1$ to S$_2$S$_3$.

6.8 ELASTICITY OF SUPPLY

The change in price of a commodity may bring about either exactly proportionate or less than proportionate or more than proportionate change in the quantity supplied of that commodity. It is this degree of responsiveness of quantity supplied to the change in price which is called elasticity of supply. Thus, **Elasticity of Supply may be defined as the degree of responsiveness of quantity supplied of X to change in price of X.**

$$Es = \frac{\% \text{ change in Quatity Supplied of X}}{\% \text{ change in price of x}}$$

$$= \frac{\dfrac{\text{New Quantity supplied - Old Quantity supplied}}{\text{Old quantity supplied}} \times 100}{\dfrac{\text{New price - Old price}}{\text{Old price}} \times 100}$$

$$= \frac{\dfrac{\triangle S}{S}}{\dfrac{\triangle P}{P}}$$

$$\therefore Es = \frac{P}{S} \bigg/ \frac{\triangle S}{\triangle P}$$

Five Types of Elasticities of Supply:

1. **Unit Elastic Supply**: When change in price of X brings about exactly proportionate change in its quantity supplied then supply is unit elastic i.e. elasticity of supply is equal to one, e.g. if price rises by 10% and supply expands by 10% then,

$$Es = \frac{\%change\ in\ Quality\ Supplied\ of\ x}{\%\ change\ in\ price\ of\ x} = 1$$

2. **Relatively Inelastic Supply**: When change in price brings about less than proportionate change in the quantity supplied the supply is relatively inelastic or elasticity of supply is less than one.

3. **Relatively Elastic Supply**: When change in price brings about more than proportionate change in the quantity supplied, then supply is relatively elastic or elasticity of supply is greater than one.

4. **Perfectly Inelastic Supply**: When a change in price has no effect on the quantity supplied then supply is perfectly inelastic or the elasticity of supply is zero.

5. **Perfectly Elastic Supply**: When a negligible change in price brings about an infinite change in the quantity supplied, then supply is said to be perfectly elastic or elasticity of supply is infinity.

All the five types of Elasticities of supply can be shown by different slopes of the supply curve.

Fig. 6.6 (a) shows the supply is unit elastic because change in price from OP to OP^I brings about exactly proportionate change in the quantity supplied of commodity X
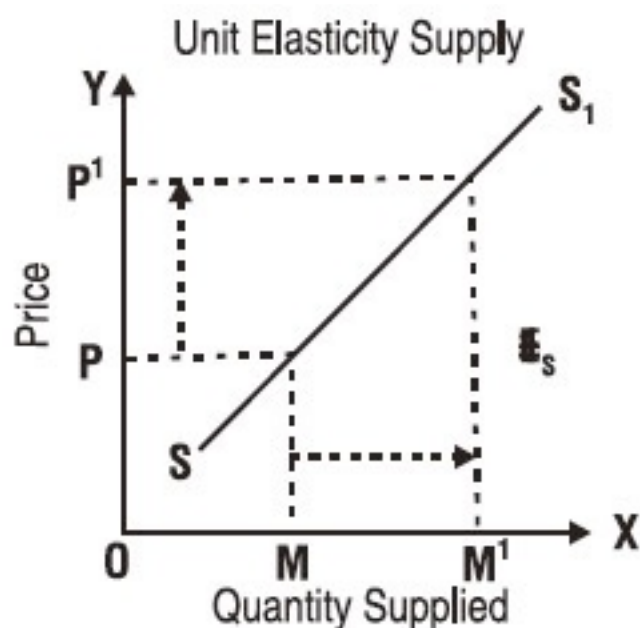
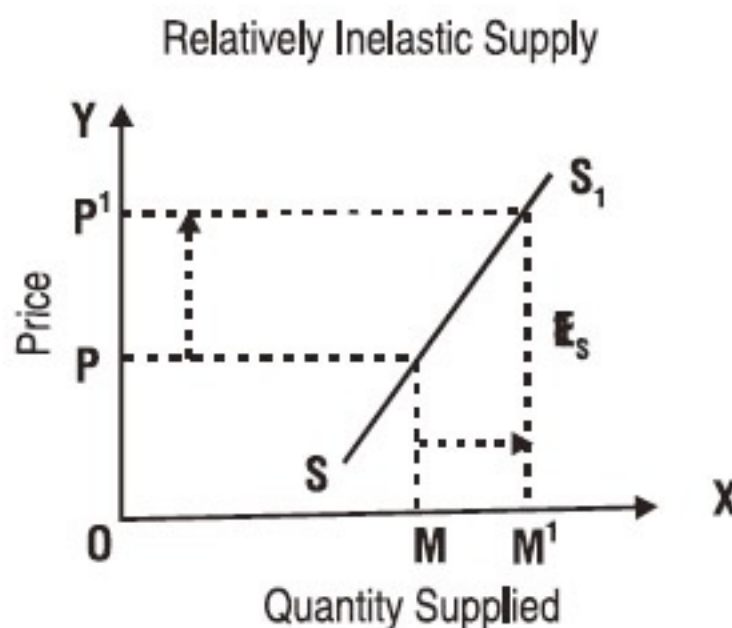viz., from OM to OM^I. In this case $E_S = 1$.

Fig 6.6 (a)
Fig 6.6 (b)

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Fig 6.6(b) shows that supply is relatively inelastic because change in price of from OP to OP^I brings about less than proportionate change in quantity supplied of X. in this case $E_S < 1$.

Fig 6.6(c) shows that supply is relatively elastic because change in price of X from OP to OP^I brings about more than proportionate change in quantity supplied of X. in this case $E_S > 1$.

Fig 6.6(d) shows that supply is perfectly inelastic because change in price of X from OP to OP^I has absolutely no effect on quantity supplied of X. in this case $E_S = 0$. Thus, if the supply curve is vertical, i.e. parallel to Y-axis it represents perfectly inelastic supply.

Fig 6.6 (c)
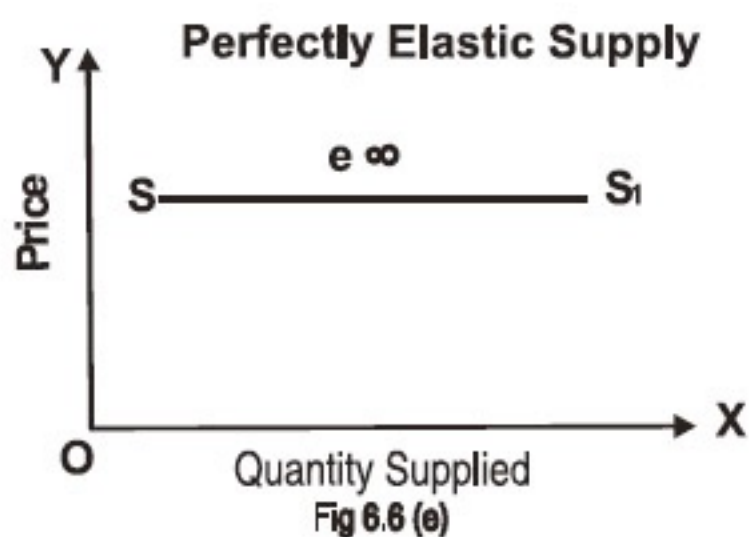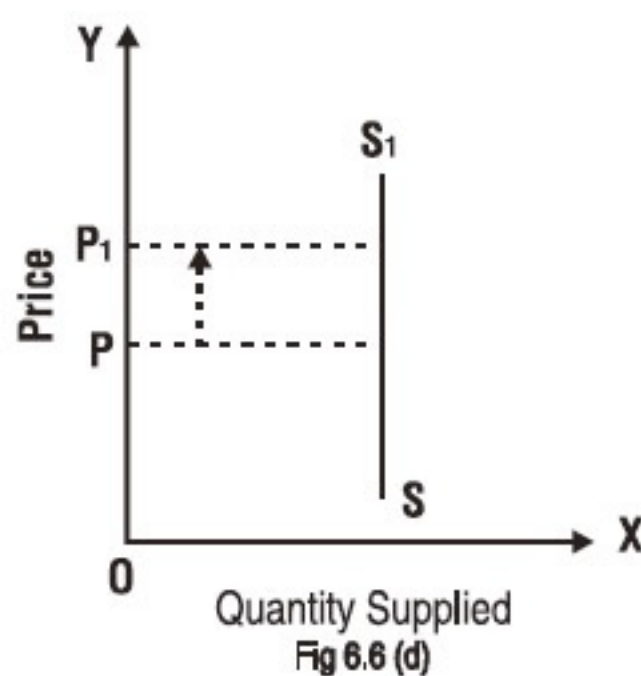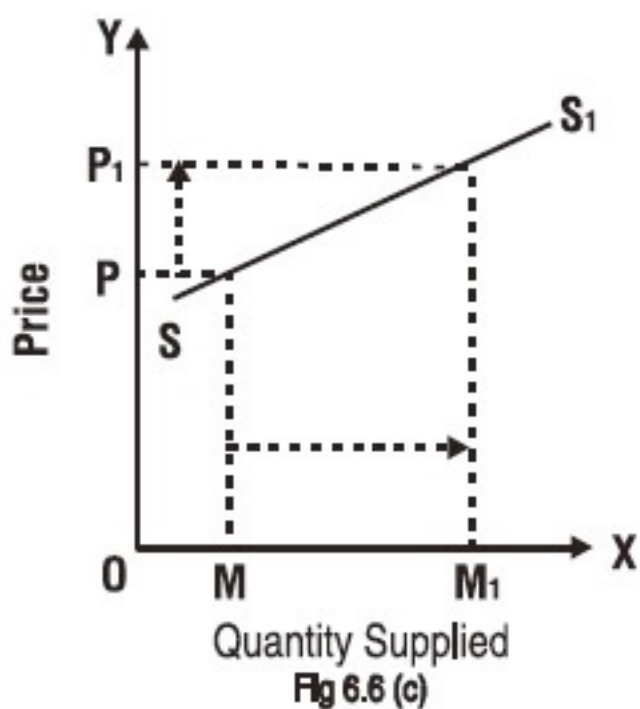

Fig 6.6 (d)

Perfectly Elastic Supply

Fig 6.6 (e)

Fig 6.6(e) shows that supply is perfectly elastic because a small change in price of X brings about infinite change in supply. Thus, if the supply curve is horizontal or parallel to Xaxis it represents perfectly elastic supply.

Hence, the five different types of elasticities of supply can be shown by five different slopes of supply curve.

6.9 TIME ELEMENT AND SUPPLY

Marshall assigned considerable importance to the element of time in the determination of supply. More often than not, demand responds readily to a change in price but supply takes some time to adjust itself to the change in price; so much so that demand today is the function of price today, i.e. q = f(pt); of course, assuming other things remaining constant, but supply today may be the function of the price prevailing in the immediate past.

Now **depending upon the period of time supply can adjust itself either partly or fully or not at all to the change in demand and price**; and will in turn influence the price. Hence **Marshall has classified time period into four categories** on the basis of the degree of responsiveness of the supply to adjust itself to changing market conditions.

i) **The Very Short Period or the Market Period** is that period of time in which the supply is fixed or is perfectly inelastic. The very short period is so short a period that supply cannot adjust itself to change in demand, e.g. if the demand for fish, or milk, or any such commodity shoots up one fine morning, it would be difficult to increase their supply immediately to meet the demand.

ii) **The Short Period** is that period in which the supply can adjust itself only partly to the change in demand; may be as a result of firms making use of their plant capacity by varying the amounts of only variable factors. The short period is not long enough to enable the firms to expand their plant capacities.

iii) **The Long Period** refers to that period of time in which the supply can adjust itself more fully or even fully to the change in demand. The supply becomes more elastic and at times even perfectly elastic. The long period is long enough to permit the firms to expand their plant capacities and also enables new firms to enter the field of production.

iv) **Very Long Period** is that period of time for which it is difficult to predict as to what will happen to the forces of demand and supply. Tastes and

preferences change. Technology undergoes drastic change. In fact Keynes expressed his opinion, 'In the very long period we are dead'.

Thus, depending upon the period of time allowed to pass, the supply can adjust itself either partly, fully or not at all to change in demand and will thus influence price in the market. Time element thus plays an important role in the theory of price through its influence on supply.

Activity A

Marketing Manager has requested for 15% increase in supply of Tractors in the busy season starting next quarter, as he expects higher prices. Write a letter to him stating how and why, in a short period supply can adjust only partly to the change in demand. Also emphasize why he should prepare long term demand forecasts to overcome problem next year.

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SUGGESTED READINGS

Alfred Marshall: Principles of Economics

Anderson: Supply and Demand

G.J.Stigler: The Theory of Price

Alan Morrice: The Fundamentals of Economics

6.10 SUMMARY

Supply refers to the various amounts of a good which the sellers are willing and able to sell at any price per unit of time. The quantity supplied of any commodity depends on price of that commodity, price of other commodities, cost of production, availability of inputs, transport facilities etc.

The Law of Supply states that 'other things remaining same, quantity supplied of commodity 'X' is directly related to its price. The supply curve slopes upwards from left to right indicating positive relationship between price and quantity supplied. Supply of labour, however, does not increase beyond a certain point which offers workers a comfortable lifestyle. This is known as backward bending supply curve of labour and is an exception to the Law of Supply.

Suppliers do not sell if the price drops below what is called a Reserve Price. Supply changes due to change in prices are called extension or contraction; while changes caused by factors other than price are called increase or decrease in supply.

Elasticity of supply is defined as the degree of responsiveness of quantity supplied of 'X' to change in price of 'X'. When change in price of 'X' brings about exactly proportionate change in its quantity supplied then supply is unit elastic. If it brings about less than proportionate change the supply is relatively inelastic and if more it is relatively elastic.

Depending upon the period of time supply can adjust itself either partly, fully or not at all to the change in demand and price. In short time supply is fixed while in the long term supply can adjust more fully.

Over very long time, both supply and demand are difficult to predict.

6.11 SELF ASSESSMENT QUESTIONS

1. Explain the term 'Supply'. Outline the major determinants of supply.

2. State and explain the law of supply.

3. In what way supply of labour could be an exception to the Law of Supply?

4. What is Reservation price? On what factors does it depend?

5. Distinguish between Variations and Changes in supply.

6. Differentiate between :

   i) Extension in supply and increase in supply.

   ii) Contraction in supply and decrease in supply.

7. 'Extension and contraction of supply are shown by movement along the curve whereas increase and decrease in supply are shown by shifts in the curves.' Explain.

8. What is elasticity of supply? Mention its types.

9. Explain Marshallian Time period analysis with reference to Supply.

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

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7

Cost Analysis

Objectives:

After completing this chapter, you will be able to understand:

• Fixed and Variable Costs.

• Relationship of Costs to Volumes.

• What is a Learning Curve?

• Various Cost Concepts.

• Cost of Joint and By-products.

Structure:

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7.1 INTRODUCTION

Production involves cost. In order to initiate and continue the process of production, the producer hires various factors of production. He has to make payments to these factors for participating in the process of production. From the point of view of producer, such payments made to the factors of production for their participation in the process of production emerge as cost of production. Thus, **the cost of production may be defined as the aggregate of expenditure incurred by the producer in the process of production. Cost, is therefore, the valuation placed on the use of resources.**

We have several concepts of costs such as; Fixed Cost, Variable Cost, Total Cost Average Cost, Marginal Cost, Money Cost, Real Cost, Implicit Cost, Explicit Cost, Private Cost, Social Cost, Historical Cost, Replacement Cost And Opportunity Cost.

7.2 FIXED COST AND VARIABLE COST

Fixed costs are those costs which remain fixed, irrespective of the output. They have to be incurred on equipment, building etc and they are incurred even when the output is zero. Fixed costs are also called Supplementary costs or Overheads or Indirect costs.

Variable costs are those costs which vary with the output. For example the cost of raw materials, electricity, gas, fuel etc. Variable costs are also called Prime costs, Direct costs or Operating costs.

The difference between the short-run and long run production function is based on the distinction between fixed and variable costs. In the short-run production function, the output is increased only by employing more units of variable factors; other factors of production remaining fixed. In the long run all factors are variable and thus all costs are variable.

7.3 TOTAL COST, AVERAGE COST AND MARGINAL COST

Total cost is the aggregate (sum-total) cost of producing all the units of output. It is the summation of total fixed cost (TFC) and total variable cost (TVC). Thus,

TC = TFC + TVC

Table 7.1

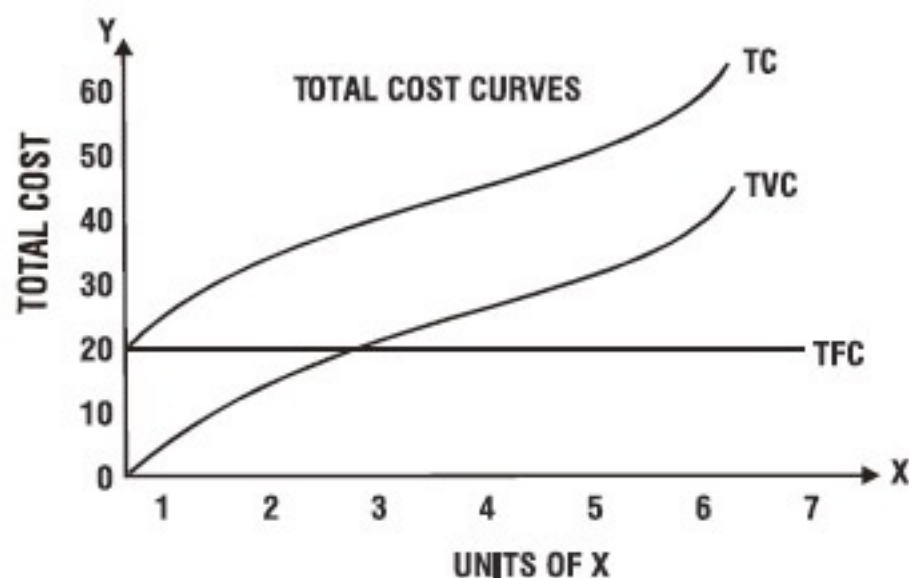| Total Cost Schedule			
Output	**TFC**	**TVC**	**TC**
1	20	10	30
2	20	17	37
3	20	22	42
4	20	25	45
5	20	27	47
6	20	33	53

Fig 7.1 Total Cost Curve

The Total Fixed Cost curve is a horizontal straight line, parallel to the X-axis. The total variable cost curve slopes upwards as output increases. The total cost curve is parallel to the total variable cost curve as it is the lateral summation of total fixed cost and total variable cost curves.

Average Cost

The Average Cost is the cost per unit of output produced. Thus, the Average Cost is obtained by dividing the total cost by the total output.

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

Where AC stands for Average Cost

TC stands for Total Cost

And Q stands for Total Quantity of output

Since $AC = \dfrac{TC}{Q}$ and as

$TC = TFC$ and TVC

$\therefore$ AC can be rewritten as

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

$\therefore$ $AC = \dfrac{TFC}{Q} + \dfrac{TVC}{Q}$

$$AC = AFC + AVC$$

Note: Average cost is also often referred to as Average Total Cost or Average Total Unit Cost.

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The Average Fixed Cost is the fixed cost per unit of output.
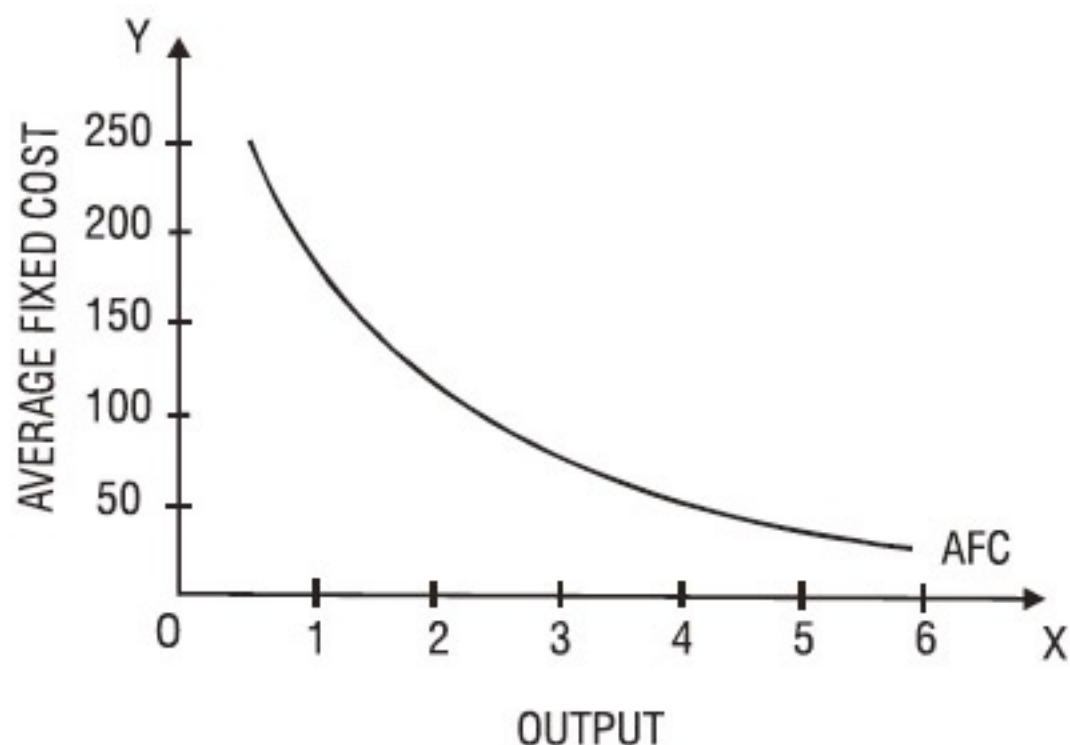
i.e. $AFC = \dfrac{TFC}{Q}$

Fig 7.2 AFC Curve

Now, if the output goes on increasing, the AFC will go on falling because the total fixed cost will be thinly spread over the number of units of output; e.g. let us assume that the total fixed cost is Rs 200/- thus when the firm produces only one unit of

Output the average fixed cost will be $\dfrac{TFC}{Q}$ i.e. $\dfrac{Rs.\ 200}{2}$ = Rs. 100/- only, and if the

output is 2 units then the $AFC = \dfrac{TFC}{Q}$ = Rs 100/-

For 4 units of output, the average fixed cost will be Rs 50/- . hence as the output goes on increasing, the average fixed cost goes on falling. **Thus the average fixed cost curve slopes downwards from left to right.**

The Average Variable Cost is the variable cost per unit of output.

i.e. AVC = $\dfrac{TVC}{Q}$

To begin with, the average variable cost is rather high. But as more and more units of output are produced, the firm starts enjoying several advantages in the form of transport, commercial and marketing economies and thus the

average variable cost goes on falling. However, after a certain size of output is produced, then any further effort to increase the output brings about disadvantages in marketing and other processes involved in production, mainly associated with the employment of variable factors and thus the average variable cost begins to rise.
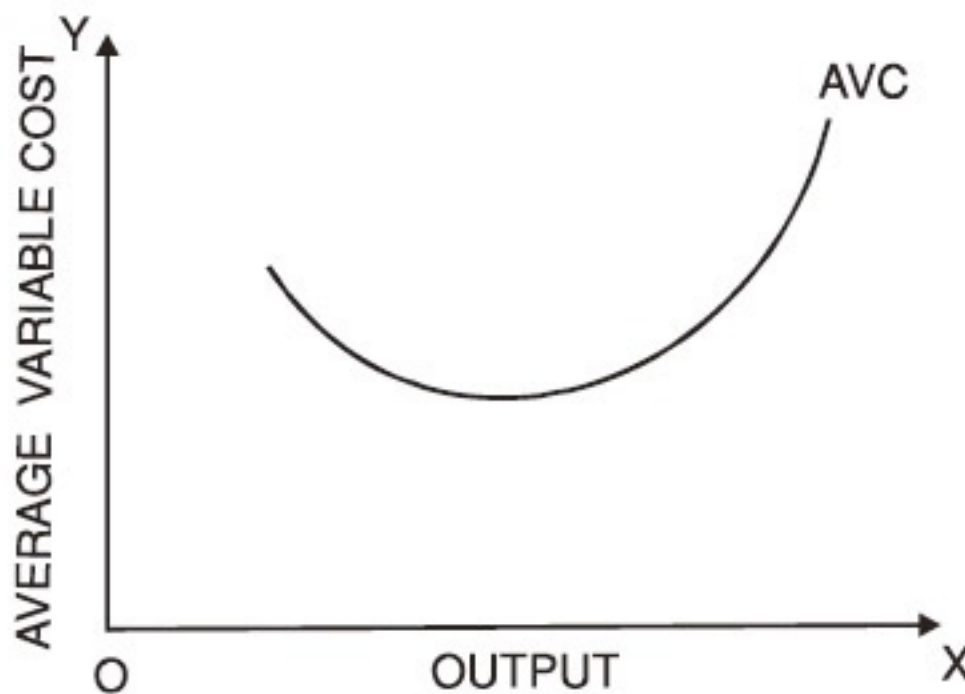

Fig. 7.3 AVC Curve

Thus the average variable cost curve acquires a peculiar shape; viz. in the beginning, it is high; then as output goes on increasing, the average variable cost goes on falling and after having reached the minimum, it begins to move upwards.

The Average Cost Curve in the Short-Run

Since the average cost is the sum total of AFC and AVC and after having seen the slopes of these curves, it is not difficult to derive AC curve. **The AC curve is the lateral summation of the average fixed and variable cost curves.**

AC = AFC + AVC

The average fixed cost curve slopes downwards from left to right (AFC curve) and average variable cost curve first goes downwards and then bends upwards (AVC curve).

Each point of AC curve can be plotted as the sum of AFC and AVC.
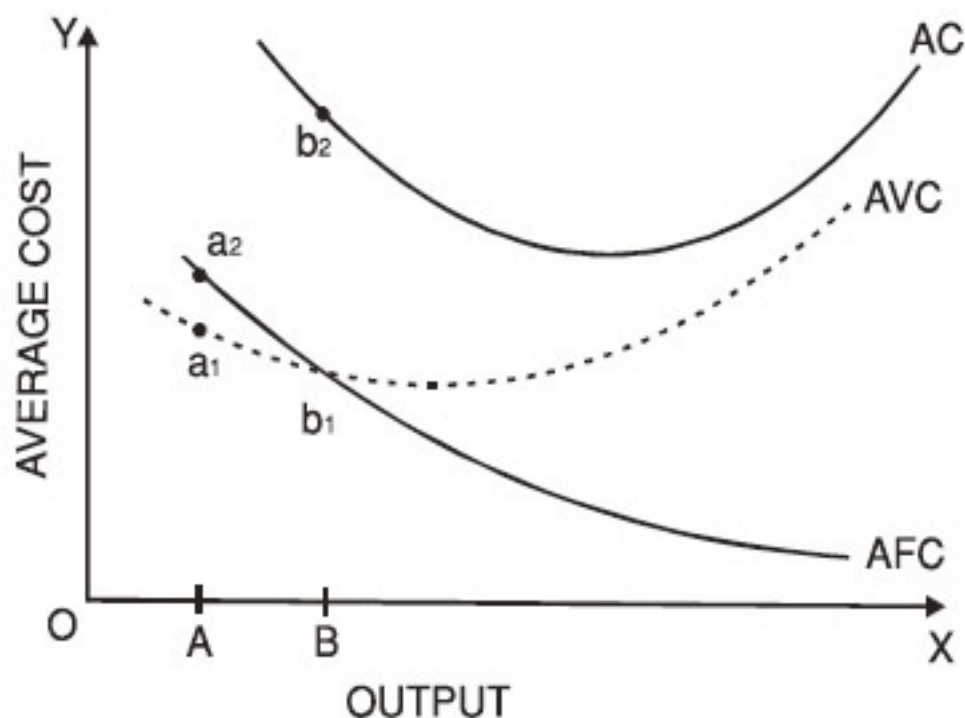
7.4 Average Cost Curves

The U-Shape of Average Cost Curve is explained in two ways:

i) **The Geometrical explanation**: The shape of AC curve depends on the slopes of AFC And AVC curves. To begin with, both AFC and AVC are high and thus AC is also high. As the output goes on increasing, AFC and AVC begin to fall, and, therefore, the AC curve also starts falling. But then AFC continues to fall, whereas AVC keeps on rising and the rate of rise in AVC is faster than the rate of fall in AFC, thus the net result is that AC curve is pushed upward. **Therefore, the AC curve acquires Ushape**.

ii) **The Theoretical explanation**: The U-shape of the AC curve is also explained with the help of economies and diseconomies of scale; namely, in its initial stage of production, the firm does not enjoy the various advantages of scale of operation and thus its AC of production is rather high, but as the output expands, the firm begins to place bulk orders for inputs and enjoys concessional and preferential treatment in obtaining inputs. It starts enjoying economies of scale which is reflected in the reduction of AC. The AC curve begins to slope downwards. This happens till the optimum factor combination is struck. Now if the firm desires to expand its output beyond this optimum point, then all its economies gradually get converted into diseconomies and thus the AC curve begins to slope upwards. **Thus the AC curve becomes U-shaped**.

Marginal Cost

Marginal Cost is the net addition to total cost for producing an additional unit of output, e.g. the marginal cost of producing 11th unit of output is the total cost of producing eleven units, minus the total cost of producing ten units. If it costs Rs 100/ - to produce ten units and Rs 108/- to produce eleven units, then Rs 8/- is the marginal cost for producing the 11th unit.

Thus, $MC_{11th} = TC_{11} - TC_{11-1}$

We may generalize this statement by saying that the marginal cost of the nth unit equals the total cost of n units minus the TC of n-1 units.

$$\therefore \boxed{MC_{nth} = TC_n - TC_{n-1}}$$

Note : MC depend only on Variable Cost .

$$E.g.\ MC_{nth} = TC_n - TC_{n-1|}$$

$$\therefore MC_{nth} = (TFC_n + TVC_n) - (TFC_{n-1} + TVC_{n-1})$$

$$\therefore MC_{nth} = TFC_n + TVC_n - TFC_{n-1} - TVC_{n-1}$$

But $TFC_n = TFC_{n-1}$ because fixed costs remain fixed whether the output is n or n-1. Thus $TFC_n - TFC_{n-1}$ will cancel out.

$$\therefore MC_{nth} = TVC_n - TVC_{n-1}$$

Hence the **MC depends only on variable cost**. In other words, **marginal costs are independent of fixed costs.**

Marginal cost may also be redefined as the incremental cost for producing additional unit of output and can be represented as:

$$\boxed{MC = \frac{\Delta TC}{\Delta Q}}$$

Activity A

Vijay Shoes can sell sports shoes and ladies shoes at the same price. Inform through a memo in simple terms to the Production Manager why only marginal cost needs to be considered to find out whether sports shoes are more profitable or ladies shoes.

_____

_____

_____

_____

_____

_____

7.4 THE OVERALL HYPOTHETICAL COST SCHEDULE

The relationship between various cost concepts can be best explained with the help of a hypothetical **cost schedule**.

Table 7.2

Cost Schedule							
Output	TFC	TVC	TC	AFC	AVC	AC	MC
1	20	10	30	20	10	30	_____
2	20	18	38	10	9	19	8
3	20	25	45	6.6	8.8	15	7
4	20	28	48	5	7	12	3
5	20	30	50	4	6	10	2
6	20	52	72	3.33	8.7	12	22
7	20	85	105	2.9	12.1	15	33
8	20	140	160	2.5	17.5	20	55

Given the TFC, TVC and TC columns

We can obtain

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

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

$$AC = AFC + AVC$$

$$Or = \frac{TC}{Q} \text{ And}$$

$$MC_{nth} = TC_n - TC_{n-1}$$

Columns by considering the respective formulae.

7.5 RELATION BETWEEN AC AND MC

When we plot the Average and Marginal cost curves on the basis of the Cost Schedule, refer Table 7.2 we observe that some definite relationship exists between them.

Please note : When plotting the MC point, we plot the MC at the mid-point of the interval between the units over which consumption is carried out.
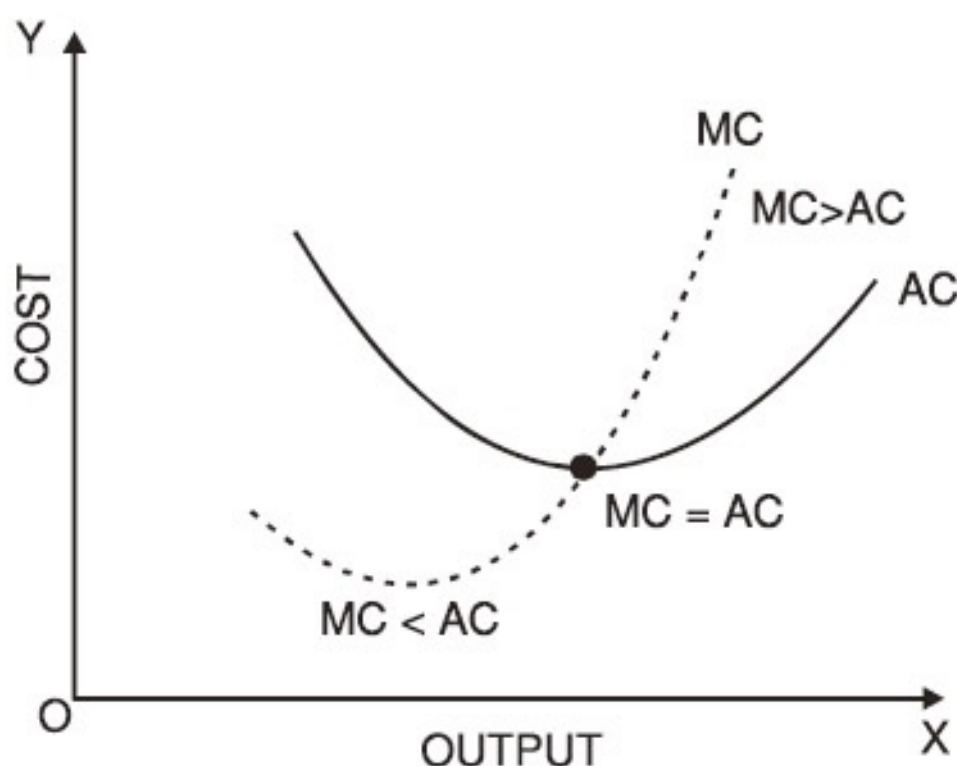

Fig. 7.5 AC & MC Curves

i) **When AC is falling, the MC lies below it**. It is worth drawing your attention to the fact that it is not necessary that when AC is falling MC should also be falling. When average cost is falling MC may be falling or rising, but the fact remains that MC lies below the AC when AC is falling.

Now why is it that even when AC is falling, MC may be rising? The answer is quite obvious. We have seen earlier that MC depends only on variable cost. When VC is rising, FC may be falling and the rate of fall of FC is faster at some stage than the rate of rise in VC and thus the net result is that AC will be falling. Therefore, AC may be falling even when MC is rising; or in other words, when AC is falling, MC may be rising.

ii) Secondly MC cuts the AC at the lowest point of AC curve.

iii) Thirdly, **when AC curves begin to rise, the marginal cost curve will be above the AC curve** showing that MC rises faster than the AC curve.

7.6 LONG- RUN AVERAGE COST CURVE

Long- Run Average Cost Curve will envelope the related series of all short-run AC curves.

In case of short-run since some factors are "Indivisible" the producer has to remain contented by making best use of the given plant; whereas in the long run the scale of operation can be altered and the producer will choose the most feasible plant. There will be a new short run average cost each time the scale is revised. Let us assume that the firm has a short run average cost SAC_1. Given SAC_1 the optimum output will be OM_1 at the lowest cost L_1M_1.

Now if the output is to be raised to OM_2 and given the cost curve SAC_1, Then OM_2 will be produced at the cost of $M_2 L_2$. But in the long run there is the scope of altering the plant. A new plant can be installed. The new short run average cost curve is SAC_2. This implies that with new plant, $OM2$ units can be produced at the SAC of L_3M_2 which is lower than L_2M_2. **We can thus have a series of short run average cost curves in the long run**.
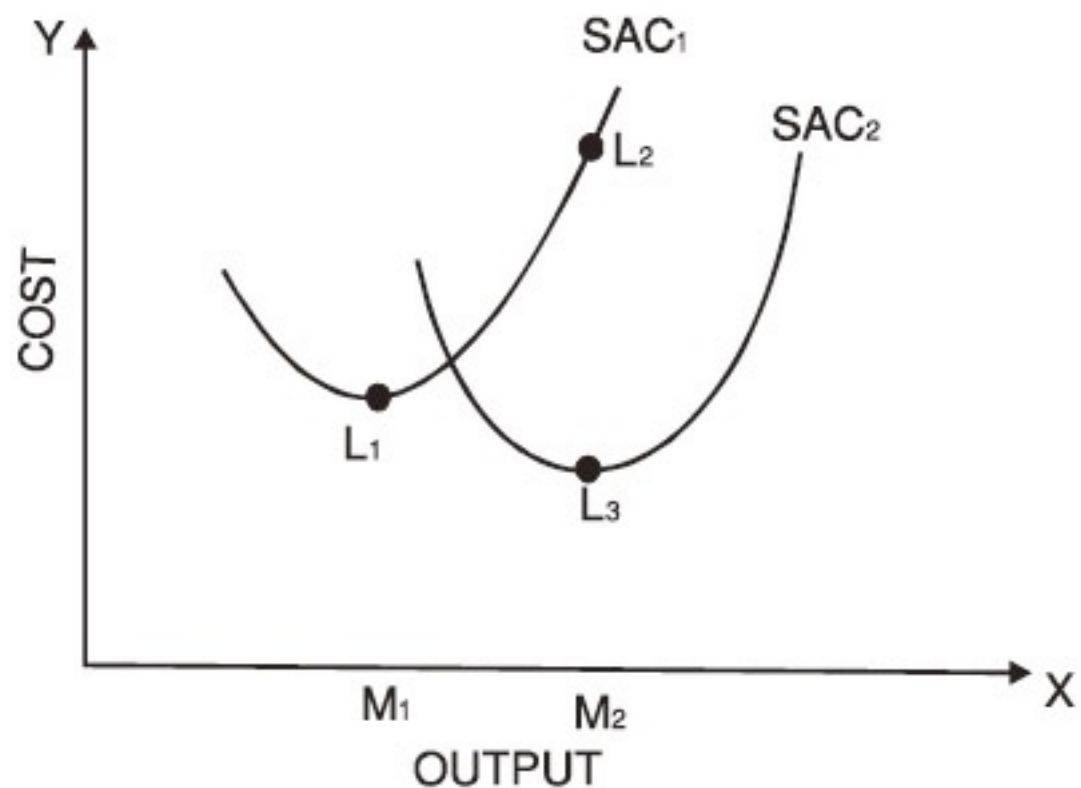
Fig 7.6 Two SAC Curves

Let us assume that the firm can install three plants represented by three SAC curves, SAC_1, SAC_2 and SAC_3 . The three short run AC curves show the average cost associated with these three plants. If only three such curves are there then the **bold zig-zag curve is the LAC curve**.
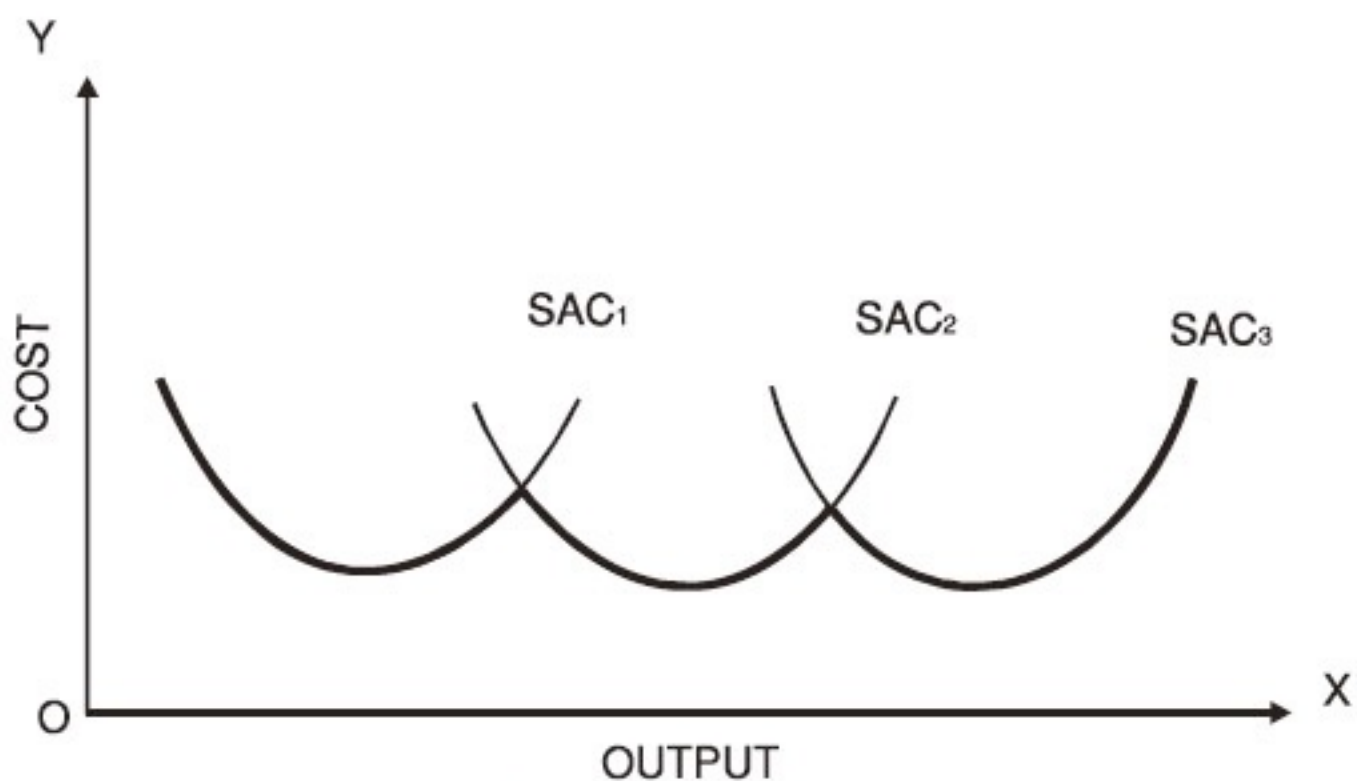

Fig 7.7 Three SAC Curve

Theoretically, there can be unlimited number of different scales of plants, each relating to different size of output. **Thus a series of SRAC curves can be drawn and the tangent to all possible short run average cost curves gives us the long run AC curve.** The LAC curve envelopes all the SAC

curves; therefore, it is called the **Envelope Curve or the Long-term Planning Curve**.
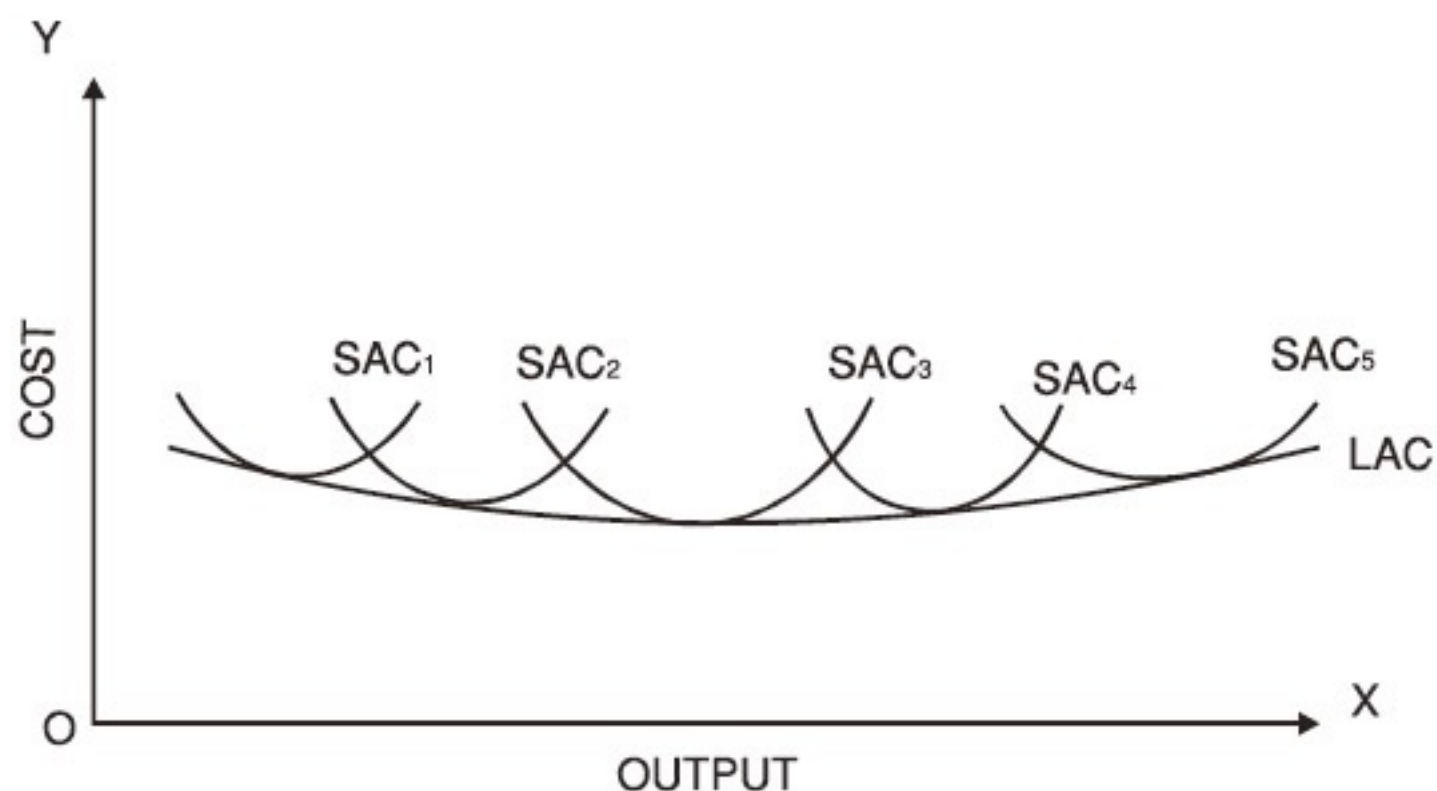

Fig 7.8 The Long -Run AC Curve

Under assumption of constant factor prices and perfect divisibility of factors there is the possibility of the minimum points of AC to lie in the same plane and thus the LAC curve may become horizontal.

This is rare, because all factors are not infinitely divisible even in the long run. E.g. entrepreneurs are often regarded as less divisible, and thus upto a certain level of output the minimum point on successive AC curve will be lower than the previously lowest point on earlier AC curve and beyond a certain level of output management becomes more difficult and less efficient and being less divisible the AC will be slightly on a higher plane. The minimum point on the successive AC curves will lie higher and higher.

The LRAC curve represents the least cost combinations of resources for different levels of output. The LAC is also U-shaped but is flatter than the SRAC curve. **That is, the U-shape of LAC curve is less pronounced than the U-shape of SAC curve.**

The L-shaped Average Cost Curve

So far we have shown that LAC curves are U-shaped although the U-shape of LAC is less pronounced than the U-shaped of SAC curves. But of late it is observed from certain empirical evidence that the LAC curves are more L-

shaped rather than U-shaped. In the event where we assume that there is no technological progress, the LAC is U-shaped but in the context of modern times where technological revolution is inherent, the empirical studies have shown that there is greater likelihood of prevalence of LAC to be L-shaped rather than U-shaped. The LAC is characterized by a rapid downward slope in the early part of the curve, whereas the curve, may remain flat or slope gently downwards in later stages.
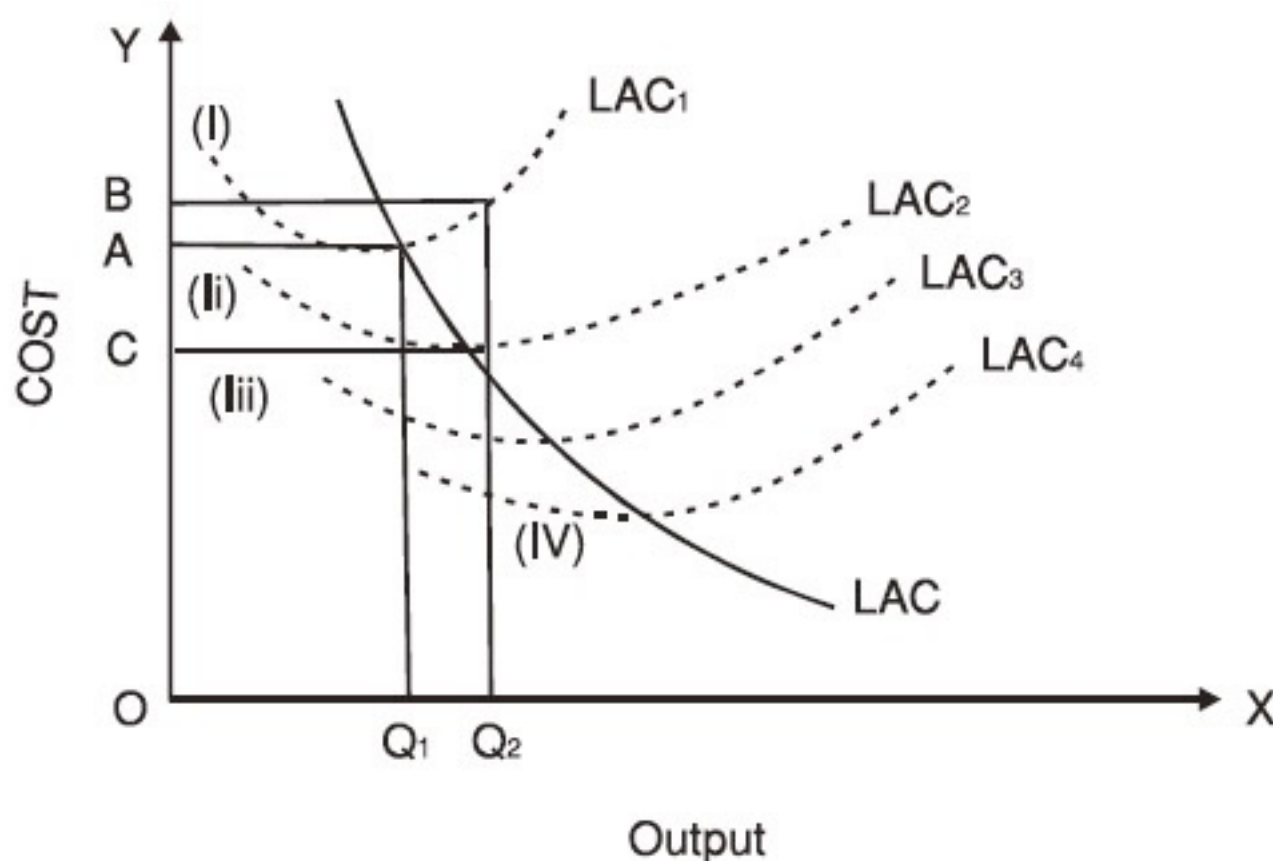

Fig 7.9 The L-shaped LAC Curve

The above fig shows that initially the firm is producing OQ at the minimum possible average cost on LAC, i.e. at OA. When demand increases, the firm produces OQ_2 at the average cost of OB on LAC_1. But if we assume that technological progress takes place then the new LAC will be LAC_2 and the output OQ_2 would be produced at the average cost of OC which is less than oB. Thus, introduction of technology reduces the long run average cost.

LAC_1, LAC_2, LAC_3 and LAC_4 are possible long run average cost curves with different technology. When we join the minimum points of LAC curves we get the LAC which acquires the L-shape in the long run under condition of changing technology. The L-shape of the LAC curve is also the outcome of the **process of 'learning'** in course of production over a period of time. Thus new technology and process of learning influence the shape of LAC curve. We may conclude that **"While the short run average cost must be U-**

shaped, the long run average cost curve can be either U-shaped or L-shaped."

7.7 LEARNING AND COST

In many of the manufacturing processes the average costs decline substantially as the cumulative total output increases. This is the outcome of both labour and management becoming more knowledgeable about production techniques with growing experience. '**There is an element of learning involved through experience**.' Practice makes a man perfect. Doing the work repetitively makes labour more efficient. Productivity is enhanced and these lessons of enhanced productivity lead to greater efficiency which in turn will result in overall reduction in the average cost of production.

To quote **James L. Pappas and Mark Hirschey "The learning curve (also known as experience curve) phenomenon has an effect on average costs similar to that for any technological advance that provides an improvement in productive efficiency.**" "Learning through experience in production enables the firm to produce output more efficiently and economically at each and every level of output."
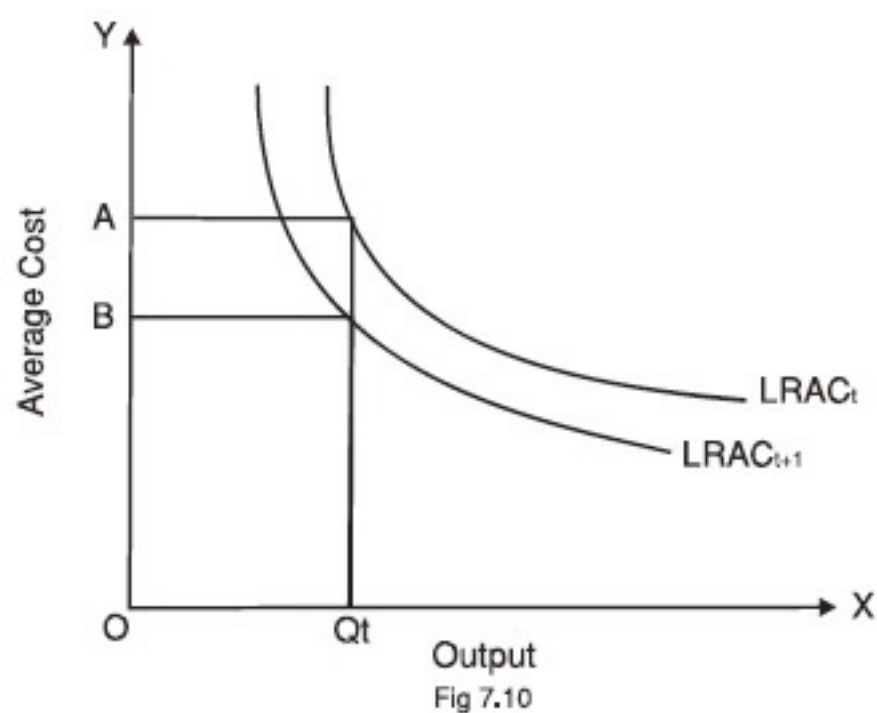
Fig 7.10

The long run AC curve Effects of Learning

Fig. 7.10 shows the hypothetical long run average cost curves for periods t and t+1. As a result of more experience and enhanced knowledge of production method the long run average costs have declined from $LRAC_t$ to $LARC_{t+1}$ for every level of output. This implies that before any learning or experience Q_t output was produced at the average cost of OA; whereas after 'experience' gained Q_t output is produced at average cost of OB. Thus AB represents cost saving.

The effect of learning on production curve comes as a result of several types of improvements; such as; job familiarization, less time required to instruct workers, development of skill, getting better equipped through training, short-cut methods of production, improved competition-ordination, better competition-operation etc Aircraft manufacturers, ship-building, manufacturer of electronic items testify the effect of learning and experience on cost.

Learning or experience rates of 20 to 30 percent are often reported. If the learning rate is, say, 20% then we can conclude that every time, the quantity of output produced doubles the accumulated average time for all units produced to that point will be 80% of its former level. E.g. if to produce first 10 units of X, an average of 100 man-hours each are required then to produce first 20 units of X (i.e. inclusive of the first 10 units of X) on an average 80 manhours each will be required.

It must be noted that the learning curve relation be accurately represented only when output scale, technology and input prices are held constant. Mistakenly often the learning curve concept is identified with Economies of Scale. It must be remembered that although related, the two are quite distinct. **Economies of Scale are shown in terms of Cost-output relation measured along the same** Long Run Average Cost Curve; whereas, **Learning Cost** relate cost differences to total cumulative output levels for a single product. **These are measured in terms of shifts of long-run average cost curves**. Care needs to be taken to separate learning and scale effects in cost analysis.

7.8 OTHER CONCEPTS OF COST

A. **Money Cost and Real Cost**
   Money cost refers to the payments made to the factors of production in terms of money proper in return for their services enjoyed by the producer in his process of production. For e.g. payments made for purchasing raw material, rent of land, wages for labour. **In words of Alfred Marshall** " Money costs of production are the prices which have to be paid in order to call forth an adequate supply of the efforts and waiting that are required for making the product, or in other words they are its supply price" Marshall refers to money cost as **expenses of production**.

   Economists distinguish between money cost and real cost. **The sacrifices of factors made during the process of production are the real costs**. Real cost denote the **toil, suffering, exertions and sacrifice involved in producing a commodity**. Energy is spent which also should be a part of the real cost. Thus cost in real terms denotes the sacrifice of the factors. Money cost can be measured and quantified whereas real cost cannot be quantified.

B. **Explicit Cost and Implicit Cost**
   Explicit cost refers to the making of actual payments in the process of production. Whereas **Implicit cost** implies that although the work gets done yet there is no corresponding payment for it in terms of money. For example if the manager of a company employs a driver to drive his car then the driver is paid for the work done. This is an item of explicit cost. But if the manager drives the car himself he is not paid by the company for doing the work of a driver. This is an implicit cost. Work is done without corresponding money payment.

C. **Private and Social Cost**
   Until recently the cost analysis revolved round money or real costs incurred by the firm in its process of production. Our attention was focused on costs as viewed purely from producer's point of view. But the pioneering study of **William Nordhan and James Tobin** relating to Measure of Economic Welfare (MEW) highlighted certain aspects of cost which have to be incurred by the society as a whole due to the action of the producer in his process of production. **Paul Samuelson** too in his concept of **Net Economic Welfare (NEW)** takes cognizance of **several**

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diseminities of urbanization and industrialization; e.g. an industrial plant set up anywhere involves cost, no doubt, for the producer but it also involves cost from the society's point of view. The industrial plant discharges smoke and pollutes society's point of view the cost is very high. It could be measured in terms of payments to be made to the Doctors for diagnosis of the diseases caused by pollution. Air pollution, water pollution and to an extent sound pollution are examples which can explain the concept of Social Cost.

The following example can be used to elucidate the concept of social cost. Let us suppose a factory on the bank of a river disposes of its waste into the river. This method of waste disposal would minimize the private cost but it imposes a very heavy cost on the society in the form of polluted water. The resulting water pollution may destroy the fish industry. It makes the water totally impure. The community may have to install a water purification plant to overcome this problem.

We can understand that when a firm comes into existence, it will generate in its neighbourhood certain effects. These are called **externalities** of the firm. Externality may take a **positive form** such as having a garden, a children's park, a new bus stop etc. may come up as a result of the emergence of the firm. These are **positive externalities**, but at same time the firm may generate **negative externalities** in the neighbourhood; such as pollution of every time, overcrowding, etc. thus on one hand the emergence of the new firm has advantages and contributes to the national income but this may result in destroying some other industry or through pollution enhance social costs. It is in this context that Prof. Paul Samuelson tried to derive at the Net Economic Welfare of society. Since then the concept of social cost has gained importance.

D. **Historical Cost and Replacement Cost**
   The cost of replacing a piece of capital is of greater importance to a firm than the original, past or historical cost of this capital, especially in a period of rising prices. **Historical cost is the original cost incurred by the firm while purchasing the input in the past.** By cost, the financial accountant invariably means historical cost or actual cost. Unlike financial accountants, the **management accountants are more interested in future costs rather than the historical cost**. Past cost is just for record keeping and becomes a passive function. Whereas in continuous

production process the management accountant is more curious about the replacement cost. A forward looking manager needs cost information about future costs for expansion programme etc. cost information can be put to better managerial use when it is obtained through projection of future rather than being based on past records.

When calculating costs for use in completing a firm's Income Tax Returns, accountants are required by law to consider the actual amount spent to hire labour, purchase raw material and capital equipment used in production. Thus for Tax purposes actual historical outlays are the relevant costs. For managerial decisions, historical costs are not considered to be appropriate. Current and future costs would be regarded more relevant.

E. **Opportunity Cost (Alternative or Transfer Cost)**
The concept of opportunity cost has been developed to emphasize the fact that use of resources for producing a good involves the sacrifice of some other good which could have been produced with those resources instead. The decision to produce a good involves a choice between alternatives. A farmer producing wheat on his farm sacrifices another crop which he could have produced with the same factors of production.

To quote Benham, "The opportunity cost of anything produced can thus be defined as the next best alternative that can be produced instead by the same factors or by an equivalent group of factors costing the same amount of money."

Resources are limited and therefore they cannot be used for more than one purpose at the same time. E.g. If land is used for building a house, the same land cannot be used for agricultural purpose. In general terms, if a resource can produce either 'A' or 'B', then the opportunity cost of producing 'A' is the loss of 'B'.

"The cost of using something in a particular venture is the benefit foregone (or opportunity lost) by not using it in its best alternative use."

For e.g. if an individual prefers to hold on to liquidity of say Rs. 20,000/- then he has to forego the opportunity of earning interest. This opportunity lost is his opportunity cost. It is in this context that we use the old Chinese

proverb "where there is no gain, the loss is obvious."

Opportunity cost is thus the cost of displaced alternatives. The foregone alternative is opportunity cost.

7.9 COST OF MULTIPLE PRODUCTS

Although, most modern firms make several products, Economic Theory has been developed on the premise that each firm produces only one product. The reasons for such inadequate premises are found partly in the historical origins of theory and partly in the simplicity of theoretical analysis when it is confined to production of just one single product. In many manufacturing enterprises two or more different products emerge from common production process and common raw-material used. Production of multiple product has almost become the rule.

When two or more different products emerge from a single common production process and a single raw material, they get identified as separate products only at the end of common processing which is called the **'Split of Point'. The costs that that have been incurred upto the split of point are common costs. The common costs cannot be traced to the separate products**. Some common costs are unaffected, such as cost of factory building. Thus common costs that are fixed need not be allocated, they will remain constant. Only those common costs which vary with the decision should be allocated to individual products. **The problem of product costing arises in identifying parts of common costs with particular products**. In fact, short-run variable costs are most important and warrant special attention.

For multiple product costing it is desirable to distinguish the two broad categories of common products: viz; i) The Joint Products and ii) The Alternative Products.

When an increase in the production of one product causes an increase in the output of another product, then the products and their costs are traditionally defined as **joint**.

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Whereas, an increase in the output of a product is accompanied by a reduction in the output of other products, it is case of what is called the **alternative products**.

When one product is much less important than other, it may be regarded as a **by-product**, a gratuitous use of waste material. However there is no real distinction between joint- products and by-products. Where the pace of technology is rapid, as in some sciences, **by-products soon become joint products and may even surpass the main product**.

The cost of an alternative product can always be computed in terms of the foregone profits from the other product, whereas the cost of joint product is not quite determinate.

For joint products the cost problems relate more commonly to the incremental effect of an increase in output rate to meet new demand for one of the joint products. An increase in demand for one of the joint products will imply increase in production of other joint products as well. These joint-products, except the one whose demand has increased, will not fetch enough returns to cover their cost. They will have to be sold out at a much lower price. In that case the price of the joint product-in-demand must be sufficiently high not just to cover the marginal cost of the whole product-package but also to cover any loss of revenue due to the lowered prices of other not-so-in-demand joint products.

It would be possible to estimate the independent effect upon cost by varying the output of one product while holding all other constant; thereby arriving at the cost allocation for that product.

SUGGESTED READINGS

Stonier and Hague: A Text Book of Economic Theory

Alfred Marshall: Principles of Economics

Cairncross: Introduction to Economics

Joel Dean: Managerial Economics

Samuelson Paul: Economics

Lipsey and Steiner: Economics

Pappas and Hirschey: Fundamentals of Managerial Economics

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7.10 SUMMARY

Total costs are broken into variable costs like material, wages, power, which vary with output; and fixed costs which do not vary with output. Total costs divided by total output provide unit Average cost; and net addition to total cost incurred to produce one additional unit of output is called Marginal cost. Marginal cost, therefore, is independent of fixed cost. When unit average cost is falling marginal cost is less than unit average cost and vice versa.

Both labour and management learn through experience in production which enables the firm to produce output more efficiently and economically at each and every level of output bringing down the unit average cost. This is called learning curve of average cost. There are different concepts of cost like historical, money, real, explicit, implicit, social, replacement, opportunity etc. and one of them appropriate to the application needs to be used.

When two or more products emerge from a single common production process and a single raw material, joint costs are incurred. Proper method needs to be applied to determine cost of such joint and by products.

7.11 SELF ASSESSMENT QUESTIONS

1. Distinguish between Money cost and Real cost, and also between Fixed and Variable costs. What is their importance to the firm?

2. Explain with diagram the relationship between marginal cost and average cost.

3. Outline the nature and structure of short run and long run average cost curves.

4. Why is the average cost curve called "envelope curve"?

5. How would you distinguish between short run and long run cost curves?

6. Explain the following statements:
   i) The long run average cost curve (LRAC) is flatter than the short run average cst curve (SRAC).
   ii) The long run average cost curve is called the 'Envelope Curve'.
   iii) The U-shape of a cost curve will be less pronounced the longer the

period to which the curve relates.
iv) The long run cost curve is tangent to all short run average cost curves.

7. State giving reasons whether the following statements are true or false:
   i) As output increases total cost fall.
   ii) The MC curve cuts the AC curve at the lowest point of latter.
   iii) As long as the MC is less than AC a rising MC is consistent with falling AC.
   iv) The AC and MC curves are U-shaped.
   v) A firm continues in a business even when it makes losses in the short run.
   vi) In the long run all costs are variable costs and they enter into MC.
   vii) If the fall in AFC is greater than the rise in AVC, AC (ATC) will rise.
   viii) MC is dependent on fixed costs.

8. "Economies of Scale are shown in terms of cost-output relation measured along the same long-run average cost curve; whereas learning costs are measured in terms of shifts of long-run average cost curves." Discuss

9. Distinguish between the following:
   a) Fixed cost and variable cost.
   b) Prime and supplementary cost.
   c) Average cost and marginal cost.
   d) Real cost and Money cost.
   e) Short run costs and long run costs.
   f) Historical cost and replacement cost.

10. Write notes on:
    i) Concept of Opportunity Cost.
    ii) Cost of Multiple Products.

11. When economies of scale are available to a firm in the long run, why does the long run average cost curve rise after a point.

12. Visit a few firms. Understand the Cost structure of each. Prepare the Cost Schedules. Draw their respective Cost Curves. What conclusions can you draw between theoretical understanding of Cost Curves and Costs in reality? Do these firms maintain a rational Cost Structure? Do they try to adopt measures to keep the Cost to the minimum? If so, what measures do they adopt? If not, why not?

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

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Video2

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8

Production Function, ISO-quants and Economies of scale

Objectives:

After completing this chapter, you will be able to understand:

• Concept of Production in Economics.

• Production Function.

• Laws of Returns.

• Producer's Equilibrium.

• Production Economies & Diseconomies.

Structure:

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8.1 PRODUCTION

The primary & the ultimate aim of the economic activity is the satisfaction of human wants. In order to satisfy these wants individuals have to put in efforts to produce goods & services. Without production there cannot be satisfaction of wants. Commonly understood, **production refers to creation of something tangible which can be used to satisfy human want**. However, **matter already exists**. We cannot create a matter. We can only add utilities to the existing matter by either changing its form, place or keeping it over time & create values. For example: We can transform a log of wood into a piece of furniture, thereby adding utility. **This process of addition of utilities to the existing matter by changing its form, place and keeping it over time is referred to as Production in Economics**. We can therefore add **form utility, time utility, place utility or personnel utility**. Addition of all such utilities to the existing matter is referred to as Production in Economics. However **technologically production is referred to as the process of transforming inputs into output**. In order to undertake production we require certain factors of production such as land, labour, capital & organization. These factors are the inputs & the product that emerges at the end of the process of production is referred to as the output.

8.2 AGENTS OF PRODUCTION

The agents of production are broadly classified into four categories, viz. Land, Labour, Capital and Organisation.

(i) **Land** in economics has a much wider connotation than being understood merely as a portion of the surface of the earth. In economics, **land refers to all the natural resources found on, above and under the surface of the earth and which are essentially free gifts of Nature**.

(ii) **Labour** essentially refers to the **human factor** in the process of production. Labour in economics may be defined as **human efforts, mental or manual, undertaken in order to add utilities and create values**.

(iii) **Capital** is a **man-made factor of production**. When labour works on land, it produces two types of goods, **consumers' goods** which directly satisfy human wants and capital goods which satisfy human wants only

indirectly. Capital goods are those goods which are used to produce other goods. Thus **Capital is often defined as the "produced means for further production"**.

(iv) **Organisation** refers to that factor of production which **coordinates the various other factors** (Land, Labour, and Capital) in a manner so as to minimize the cost of production and maximize the output.

Production, as such has two dimensions: (i) Technical or Physical and (ii) Financial.

In **Technical sense** production is concerned with conversion of inputs into output.

However it should be noted here that production does not necessarily imply merely a physical conversion of inputs into a physically new unit of output.; but processes like transportation and storage should also be incorporated in the definition of production for they too are involved in addition of utilities to goods. An **input** refers to any good or service which enters the process of production and an **output** is the resulting good which emerges as the consequence of production process.

There is also the **financial dimension** to the process of production. In fact, production involves cost. Certain amount of expenditure is to be incurred to initiate and continue production.

8.3 PRODUCTION FUNCTION

The technological relationship between inputs and output of a firm is generally referred to as the production function. The production function shows the functional relationship between the physical inputs and the physical output of a firm in the process of production. To quote Samuelson, **"The production function is the Technical relationship telling the maximum amount of output capable of being produced by each and every set of specified inputs. It is defined for a given set of technical knowledge."**

According to Stigler, "the production function is the name given to the relationship between the rates of input of productive services and the rate of output of product. It is the economist's summary of technical knowledge.

In fact the production function shows the maximum quantity of output. Q, that can be produced as a function of the quantities of inputs $X_1, X_2, X_3, ….. X_n$.

In equation form the production function can be presented as :

$$Q = f(X_1, X_2, X_3, ….. X_n, T)$$

Where :

Q : Stands for the physical quantity of output produced.

f : represents the functional relationship.

$X_1, X_2, X_3, ….. X_n$: indicate the quantities used of factors $X_1, X_2, X_3, ….. X_n$

T (read T bar;) stands for a given State of Technology; Technology held constant.

Production function, thus expresses the technological functional relationship between inputs and output. It shows that output is the function of several inputs. Besides, the Production function must be considered with reference to a particular period of time and for a given state of technology.

It may be remembered that the Production function shows only the physical relationship between inputs and the output. It is basically an engineering concept; whereas selecting an optimal input combination is an economic decision which requires additional information with respect to prices of the factor inputs and the market demand for the output.

Short-run Versus Long-run Production function

The short run and the long run have no calendrical specificity. These are only functional and analytical period-wise classification. The **Short-run** is that period of time in which at least one of the factors of production remains fixed. Whereas, the **Long-run** is that period of time in which all factors are variable. The major determinant of the short-run or long-run time periods is the existence or non-existence of fixed input. **When one or more inputs**

remain constant we consider that period of time as short period; whereas when all inputs are capable of being varied that period is regarded as the long-period.

If we consider a simple production function with two inputs labour (l) and capital (k) and only one output (Q) then we can summarise the short-run production function as :

$$Q = f (l, k)$$

OR $\quad Q = f (l, k)$

When the bar above k or l shows that the amount of that input is fixed.

The long-run production function may be summarised as

$$Q = f (l, k)$$

where both labour and capital are variable inputs. Since in short-run, not all inputs can be varied simultaneously, the proportions in which inputs are combined go on varying. Therefore the analysis of input-output relation depicted by the short-run production function is called the Returns to Variable Proportions. It takes shape in the **Laws of Returns**. Whereas the long-run production function gives the input-output relationship when all inputs are varied. In fact economists are particularly interested in finding out as to what happens to the output when all inputs are varied proportionately. This analysis of relationship between proportionate change in inputs and the resulting output gives rise to proportionate change in inputs and the resulting output gives rise to **Returns to Scale**.

8.4 LAWS OF RETURNS AND RETURNS TO SCALE

A. LAWS OF RETURNS

The relationship between the inputs and the output in the process of production is clearly explained by the Laws of Returns or the Law of Variable Proportions. This law examines the production function with only one factor variable, keeping the quantities of other factors constant. The laws of returns comprise of three phases:

(a) The Law of Increasing Returns.

(b) The Law of Constant Returns.

(c) The Law of Diminishing Returns.

The Laws of Returns may be stated as follows:

"If in any process of production, the factors of production are so combined that if the varying quantity of one factor is combined with the fixed quantity of other factor (or factors), then there will be three tendencies about the additional output or marginal returns:

(i) Firstly, in the beginning, as more and more units of a variable factor are added to the units of a fixed factor, the additional output or Marginal Returns will go on increasing. Here we have the **Law of Increasing Returns** operating.

(ii) Secondly, if still more units of variable factor inputs are added to the units of a fixed factor, the additional output or marginal returns will remain constant. The **Law of Constant Returns** begins to operate; and

(iii) Finally, if still more units of variable factors are fed into the process of production, then the additional output or marginal returns begins to decline. Thus, eventually, we have the operation of the **Law of Diminishing Returns**. We can best illustrate these three stages of Law of Returns with the help of a model. Let us assume that a farmer has a fixed size of land, say one acre, and that he now applies gradually doses of variable factor, say labour, in order to produce wheat.

We can now tabulate the results as follows:

Table 8.1
Total, Average and Marginal Product

Fixed input Land, (acres)	Variable Input Units of Labour	Total production of wheat in Kg.	Average Product	Marginal Product	
1	1	40	40.00	40	Increasing Returns
1	2	95	47.50	55	
1	3	160	53.30	65	
1	4	230	57.50	70	Constant Returns
1	5	300	60.00	70	
1	6	360	60.00	60	Diminishing Returns
1	7	400	57.10	40	
1	8	410	51.25	10	Zero Returns
1	9	410	45.55	00	Negative Returns

We can illustrate the relation between the variable inputs and the Marginal Returns graphically by plotting the units of inputs on X-axis and the Marginal Returns on Y-axis. Here too we may consider Samuelsonian Approach for plotting Marginal Returns on the graph, in which marginal returns can be viewed as occurring in the interval between the two successive units of inputs, e.g. Marginal Returns of 65 Kgs. cover the interval of labour units between 2 and 3 and would be graphically represented half-way between them; or we may confine ourselves to the schedule and plot points accordingly.

(We need not enter into this controversy here, because ultimately both approaches are able to serve our purpose equally well.)
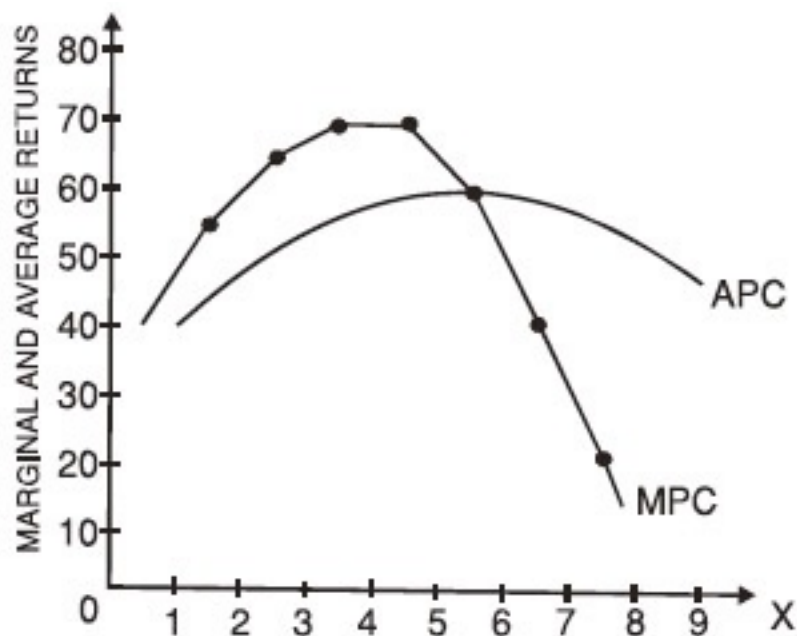
Fig 8.1 Marginal and Average Product Curves

It is now clear that as more and more units of variable factors are added, the total returns will go on increasing, first at a faster rate, then at a diminishing rate; whereas the marginal returns will first increase, then remain constant and then will begin to decline. The Marginal Returns may even become zero and may even become negative; thus the total returns may even start declining.

In the initial stages, we experience the phase of Increasing Returns, because in the beginning, the quantity of fixed factor is abundant in relation to the quantity of variable factors. Hence, when more and more units of variable factors are added to the constant quantity of fixed factors, then the fixed factor is more efficiently utilized. This causes the output to increase at a rapid rate. Besides, generally those factors are taken as fixed which are "**indivisible**". Indivisibility of a factor means that due to technological requirements, a minimum amount of it must be employed, irrespective of the size of output. Thus, as more units of variable factors are employed the indivisible fixed factor is then fully and effectively utilized so as to yield increasing returns. Besides, when more variable factors are introduced, then the greater is the scope for specialization and division of labour and hence greater the tendency towards Increasing Returns. However, ultimately we reach the stage when the Returns start diminishing. Once the point is reached at which the amount of the variable factor is sufficient to ensure the efficient utilization of the fixed factor, further increases in the variable factor will cause the marginal returns to decline, because now the fixed factor becomes inadequate relative to the variable factor. If the fixed factor was divisible neither increasing nor diminishing returns would have occurred. **To**

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quote Prof. Bober; **"Let divisibility enter through the door; law of variable proportions rushes out through the window"**. Thus, it is the "indivisibility" of the fixed factor which is responsible for the laws of variable proportions.

Mrs. Joan Robinson tries to point out that Diminishing Returns occur because the factors of production are **imperfect substitutes for one another**, viz. fixed factors are scarce and perfect substitutes for them are rare to come across, If perfect substitutes were available, then the paucity of the scarce factors in combining with variable factor would have been avoided.

When there are 9 labourers on our assumed plot of land, they start to get in one another's way. Marginal Returns then become nil and thereafter they may even become negative and the total output may even begin to decline absolutely.

Although we have elaborated the Law of Diminishing Returns in case of agriculture, it needs to be stressed that this **Hypothesis of Eventually Diminishing Returns** is applicable not in the case of land alone, but is also equally applicable in case of any and every other process of production. It is equally applicable in case of industry, mining, forestry, etc.

It may, however, be noted that the Law of Diminishing Returns is based on the following **assumptions and limitations**:

(a) This law is based on the assumption that all the successive units of variable factors are homogeneous, i.e. every additional unit of labour is equally efficient. This is not necessarily so.

(b) The law also assumes that in case of extensive cultivation, we first cultivate the superior land and then the inferior.

(c) The law is based on the assumption that the technology and the techniques of production remain unaltered; but if better methods of production are used, the stage of diminishing returns can be postponed. Apart from these limitations, the Law of Diminishing Returns has universal applicability and stands as a landmark in the history of economic doctrines.

B. RETURNS TO SCALE

In the process of production when all the inputs can be varied in equal proportion then the relation between factor inputs and the output gives rise to returns to scale. Thus Returns to Scale become relevant only in the long period when all the inputs can be varied simultaneously in the same ratio.

There is the possibility that an increase in all the inputs by 10% at a time may bring about an equal or more than or less than proportionate increase in the resulting output.

Thus the returns to scale can also be analysed into three stages viz. Increasing

Returns to Scale, Constant Returns to Scale and Diminishing Returns to Scale.

When the proportionate change in total output is greater than proportionate change in all the inputs then we have the stage of Increasing Returns to Scale e.g.

When one unit of labour and one unit of capital work on three acres of land the total output is two quintals of wheat. Now two units of labour and two units of capital work on six acres of land the total output is five quintals of wheat; then the proportionate change in output is more than proportionate change in inputs and thus we have the **Increasing Returns to Scale**. When the proportionate change in output is equal to the proportionate change in factor inputs then we have **Constant Returns to Scale** and when the proportionate change in output is less than proportionate change in factor inputs then we have the **Diminishing Returns to Scale**.

Thus depending upon whether proportionate change in output is greater than, equal to or less than the proportionate change in factor inputs we have increasing, constant or decreasing returns to scale.

The ratio of proportionate change in output to a proportionate change in inputs is called the production function coefficient,

i.e. $Q = A. L^{\alpha}. K^{1-\alpha}.$

$$\epsilon = \frac{\Delta q/q}{\Delta n/n}$$

Where $\Delta q/q$ indicates proportionate change in output

$\Delta n/n$ indicates proportionate change in all inputs

If   (i) $\epsilon > 1$, we have **Increasing Returns to Scale**

         (ii) $\epsilon = 1$, we have **Constant Returns to Scale**

         (iii) $\epsilon < 1$, we have **Decreasing Returns to Scale**

Activity A

In the production unit you are associated with, number of production machines/centres is doubled. Compile data to show whether law of increasing or diminishing returns is operative.

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_____

_____

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8.5 THE COBB-DOUGLAS PRODUCTION FUNCTION

Perhaps the best known production function in economics, is the Cobb-Douglas Production Function. It is named after its pioneer Douglas who fitted a function suggested by Cobb on the basis of the statistical data pertaining to the entire business of manufacturing in U.S.A. The Cobb-Douglas Production Function is a Linear Homogeneous Production function implying Constant Returns to Scale.

It takes the following form:

$$Q = A. L^\alpha . K^{1-\alpha}.$$

Where   Q Stands for the Output.

            L and K are inputs

            A is a positive constant

            α Is a positive fraction i.e. $\alpha < 1$.

In the above formula if L and K are increased in equal proportion i.e. if L becomes gL and k becomes gK, then the output Q will become gQ.

i.e. $Q = A. L.^\alpha \; K^{-\alpha}$

Now let us increase L & K by g, then we have

$$A (gL)^\alpha . (gK)^{1-\alpha}$$

$$= \quad A.g.^\alpha L.^\alpha g^{1-\alpha} , K^{1-\alpha}$$

$$= \quad A.g.^\alpha g^{1-\alpha} L.^\alpha . K^{1-\alpha}$$

$$= \quad A.g^{\alpha+1-\alpha} , L^\alpha . K^{1-\alpha}$$

$$= \quad A.g.L^\alpha . K^{1-\alpha}$$

$$= \quad g.A.L^\alpha . K^{1-\alpha}$$

$$= \quad g.Q \qquad\qquad (\because Q = A.L^\alpha . K^{1-\alpha}).$$

Thus the **Cobb-Douglas Production function indicates constant Returns to scale**. The Cobb-Douglas Production function also shows that Elasticity of Substitution equals One. Further it hints that if one of the inputs is zero the output will also be zero. The Cobb- Douglas production function strengthens the validity of Euler's Theorem, which states that if factors of production are paid according to their marginal product then the total product will be exhausted.

Criticism of the Cobb-Douglas Production function

i) The Cobb-Douglas production function only considers two factor inputs viz, Labour and Capital. Besides Cobb-Douglas production function were often used for manufacturing sector alone.

ii) The Cobb-Douglas production function assumes only constant Returns to scale, and thus it would be difficult to explain diminishing returns in process of production in the long-run.

iii) It is easier to calculate labour input in terms of number of men employed or hours of work, but it is difficult to measure capital input, more so because it depreciates over a period of time.

iv) The Cobb-Douglas production function assumes the prevalence of perfect competition in the market.

v) All the units of labour are assumed to be homogeneous.

Several studies were made in 1920s' and 1930s' which assured that Cobb Douglass production function was highly reliable. But in 1937, **David Dorrand** proposed that the restricted function of

$$Q = A. L^{\alpha} . K^{1-\alpha}$$

needed modification. According to Dorrand, the use of α and $1-\alpha$ restricted the model to Constant Returns alone; because the sum of the exponents would always be equal to one. Thus to enable the exponent of capital to be independently determined the Cobb-Douglas Production function was slightly modified to be read as follows:

$$Q = A. L^{\alpha} . K^{1-\alpha}$$

In this Production function, the sum of the exponent shows the type of Returns to Scale.

If $\alpha + \beta = 1$ then it represents Constant Returns.

If $\alpha + \beta > 1$ then it indicates Increasing Returns.

and   If $\alpha + \beta < 1$ then it indicates Decreasing Returns.

Despite criticism levied against the Cobb-Douglass Production function it continues to remain, even today, perhaps the most popularly used production function.

$\alpha + 1-\alpha$

8.6 ISO-QUANT OR EQUAL-PRODUCT CURVE

Iso-quant literally means equal quantity or the same amount of output.
The Isoquant is a locus of points showing that different combinations of factor-inputs give the same quantity of output. The Iso-quant is also called **Equal Product Curve.**

Let us consider an Iso-quant schedule. An Iso-quant schedule shows that different combinations of factor inputs give same quantity of output.

Table 8.2

An Iso-quant Schedule			
Factor Combination	Units of Factor X	Units of Factor Y	Quantity of Output
A	1	9	20 units
B	2	6	20 units
C	3	4	20 units
D	4	3	20 units

Let us plot the graph with factor X shown on the X-axis and factor Y on the Y-axis. Plotting the factor combinations; viz. points A, B, C and D respectively and joining these points we get the curve. This is an Iso-quant representing 20 units of output.
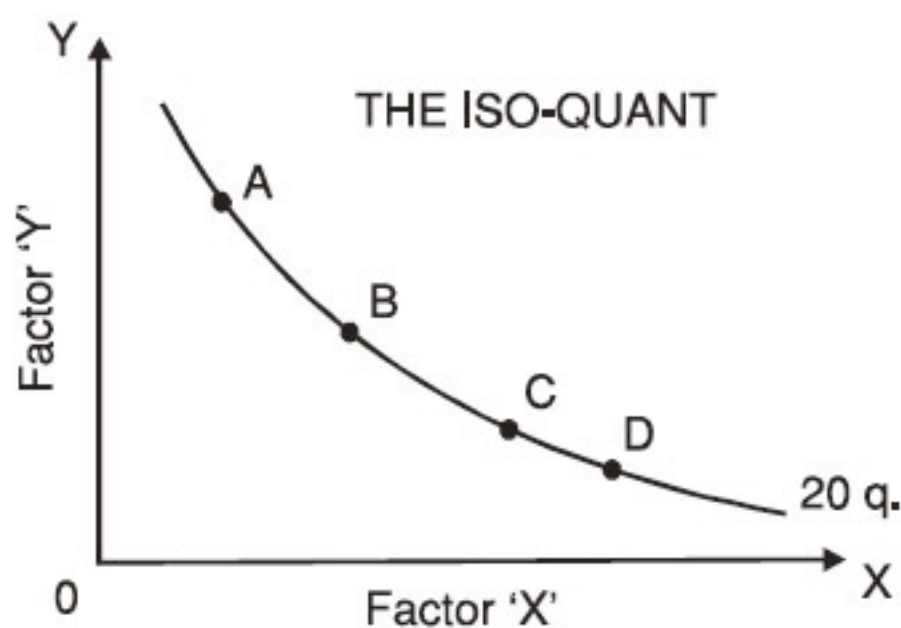

Fig 8.2

Thus different points on the same Iso-quant show that different factor combinations can be used to yield the same quantity of output. The Iso-quant is also called the **equal-product curve**.

Thus an Iso-quant is a curve any point on which shows that various combinations of factor inputs yield the same level of output. At this stage it may be noted that as the Isoquant represents the level of output and as output is physically quantifiable the Iso-quant must be labeled not only as just IQ but must represent the quantity produced e.g. 20q. The Iso-quant thus labeled as 20q shows all possible combinations of factors that yield 20 units of output at any point on that curve.

The Iso-Product map comprises **family of iso-quants**, viz. 10q, 15q, 20q, etc. Each isoquant depicts a different level of output. **The higher the iso-quant the greater will be the level of output**.
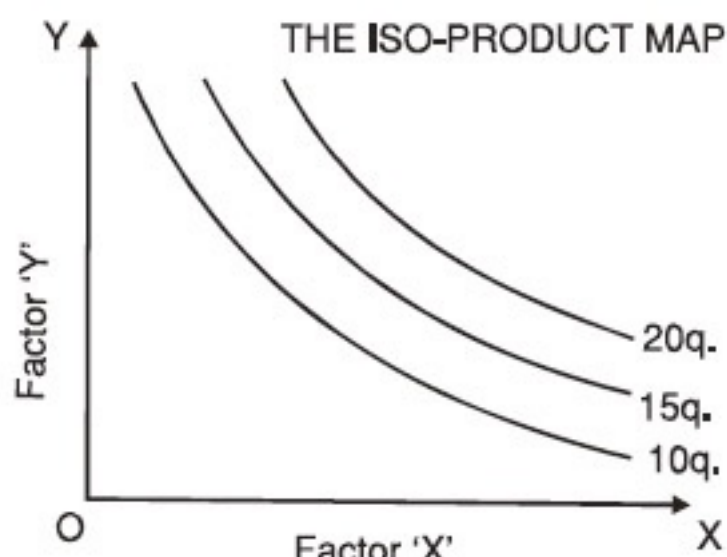

Fig. 8.3

Marginal Rate of Technical Substitution

Since with different factor-combinations we are able to produce same quantity of output it necessarily implies that factors of production are substitutes to each other; for if factor-inputs were not substitutes then we would not have obtained the same level of output. Thus the Isoquant implies factor-substitutability. The factors need not be perfect substitutes but they do possess an element of substitutability e.g. if 1x+9y can produce 20q and 2x +6y can also produce 20q, then it implies that 3 units of input Y are substituted by 1 unit of input X, so as to yield the same level of output.

The rate at which one factor-input is substituted by the other is called the Rate of Technical Substitution. To obtain the **Marginal Rate of**

Technical Substitution (MRTS) we try to find out as to how many units of input Y are substituted by one additional unit of factor input X. combination A of 1X + 9Y yields 20q ; and combination B of 2X + 6Y also yields the same quantity of output viz. 20q, one unit of factor X can displace 3 units of factor Y. hence the MRTS is 3:1

$$MRTS = \frac{\Delta Y}{\Delta X}$$

Table 8.3
Marginal Rate of Technical Substitution (MRTS)

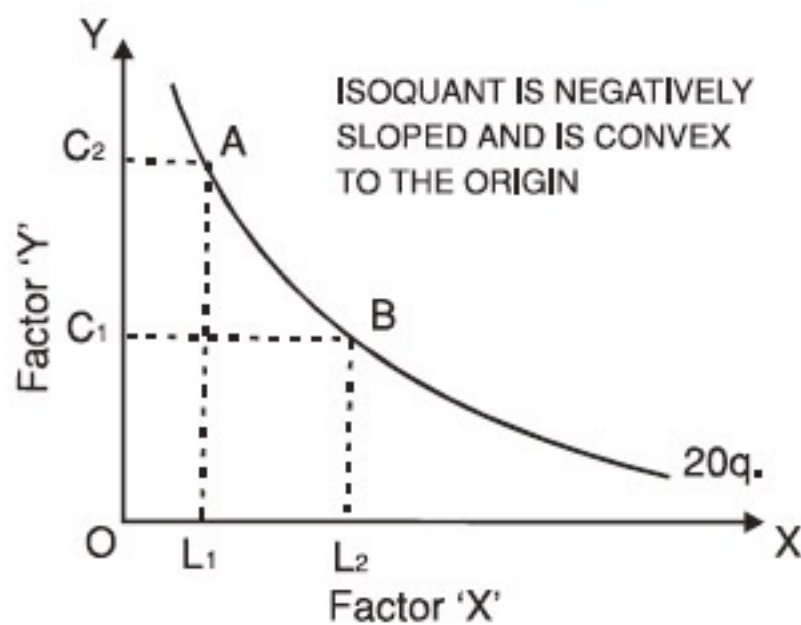| Factor Combination	Units of Factor X	Units of Y Factor X	$MRTS = \frac{\Delta Y}{\Delta S}$
A	1	9	—
B	2	6	3:1
C	3	4	2:1
D	4	3	1:1

Fig 8.4

It is important to note that the MRTS goes on diminishing. This gives rise to the **Principle of Diminishing Marginal Rate of Technical Substitution.**

8.7 PROPERTIES OF ISO-QUANT

1. An Iso-quant must slope downward from left to right.

However let us assume that the Iso-quant does not slope downwards from left to right but it slopes upwards left to right or is either vertical or horizontal.

Factor X ⟶

Fig 8.5
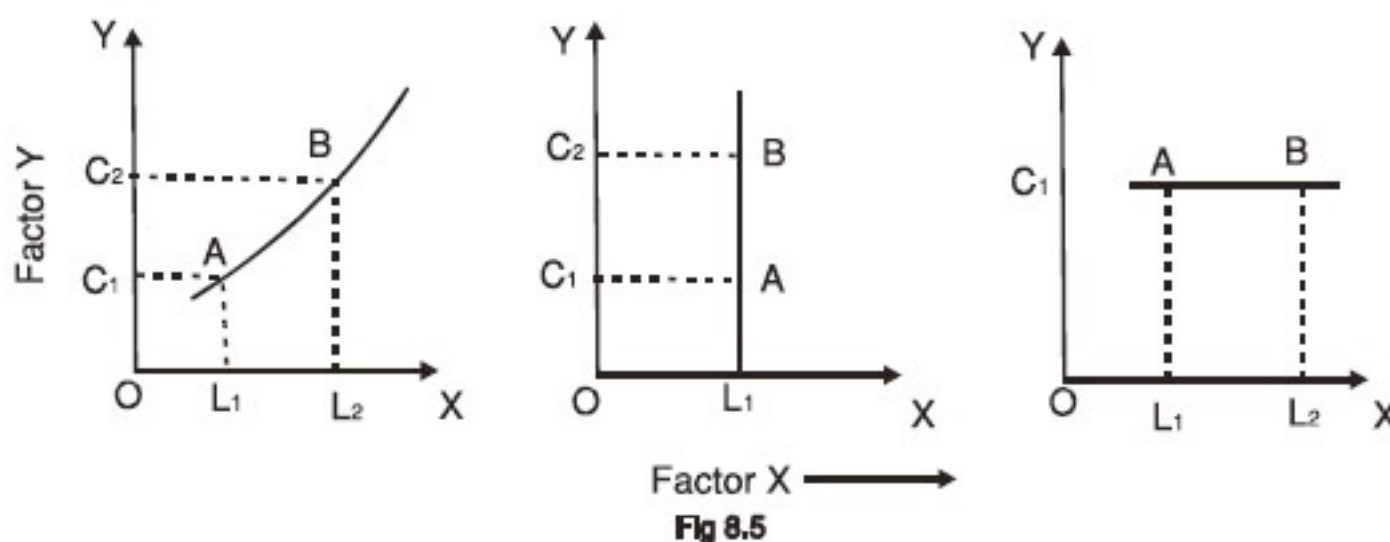
If the curve slopes upwards from left to right we observe that a point A, OL_1 of factor X + OC_1 of factor Y produce some quantum of output. But at point B we observe that we have increased the units of both the inputs X and Y i.e. we are now employing OL_2 of X+ OC_2 of Y and yet to argue that the level of output at B will be the same as that at A will not be correct. It would normally be expected that when we increase the units of both the inputs we are bound to increase also the level of output. Therefore, at points A and B, the level of output will not be the same and that being so, the Iso-quant cannot slope upwards from left ot right; nor can it be vertical or horizontal and thus the Iso-quant must slope downwards from left to right. This method of proving a property is called reductio ad absurdum method.

2. Iso-quant must be Convex to the point of Origin.

We have seen above that the **MRTS should go on diminishing**. In accordance with this principle the iso-product curve has to be convex to the origin. Then alone we can have diminishing marginal rate of technical substitution. But if the Iso-quant was to be concave to the origin then the

MRTS instead of diminishing would go on increasing. To avoid this situation it would be rational to assume that Iso-quant be convex to the origin.
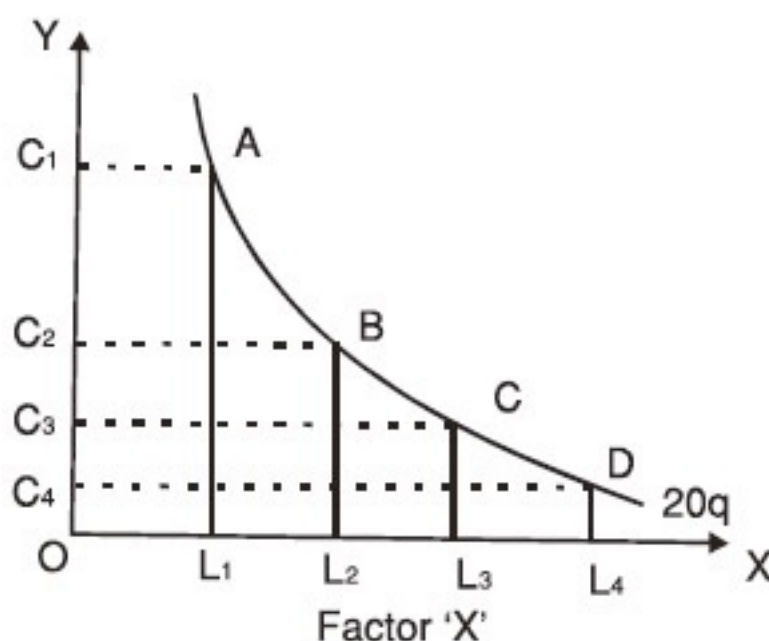

Fig 8.6

3. No two Iso-quants should intersect.

The Iso-quants must be non-intersecting. However, let us assume that the two Isoquants have managed to intersect at some point C. When we analyse this situation, we realize that between A to C the level of output should be higher than between D to C; this is because AC is higher than between DC and that higher the IQ indicating 20q and DC lies on IQ indicating 30q. This goes against our conclusion that we have seen in Isoquant Map. Point C is still more controversial because the two IQs meet, one that represents 30q and other 20q. Hence what is the correct output at C. All this is absurd and inconsistent. This inconsistency arises from the fact that the Iso-quants have managed to intersect. Thus to avoid these absurdities and inconsistencies it would be fair to assume that no two Iso-quants should ever intersect.
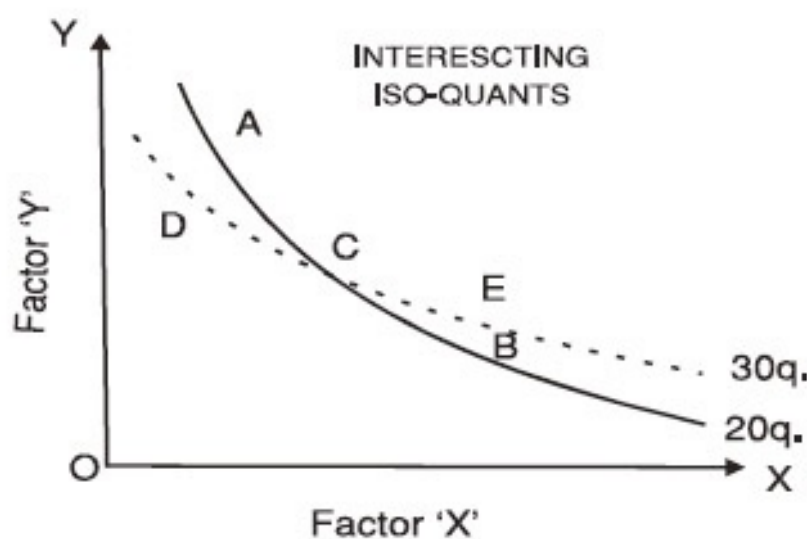

Fig 8.7

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8.8 PRODUCER'S EQUILIBRIUM : (THE POINT OF LEAST-COST FACTOR COMBINATION)

Given the Iso-product map, the producer would like to ride on the highest possible Iso-quant because any point on it would yield maximum possible output. But the producer's desires are limited by his **budgetary constraints**. Before he selects a certain combination of inputs he has to take into consideration the size of his **investment outlay** and the **prices of the factors of production**.

THE ISO-COST LINE: Let us assume that the investment fund is given and the prices of factors X and Y are also known. On the basis of these assumptions let us suppose that the firm were to spend the entire amount on employing units of only input X. Then it could hire OB units of factor X. On the other hand if the producer wants to allocate his entire investment outlay in employing factor Y then he could hire OA units of Y. We have now obtained the two extreme situations A and B.
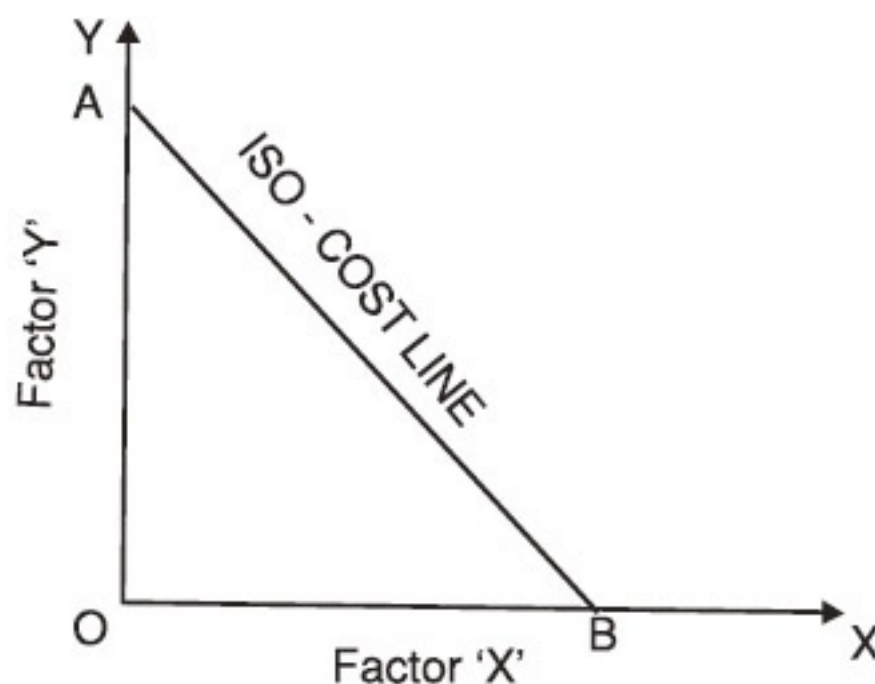

Fig 8.8

When we join the points A and B we get the Iso-cost line. The Iso-cost line is so called because whatever be the combination of factor inputs we select at any point on this line we shall obtain that combination at the same total cost. Thus line AB is also called the equal cost line.

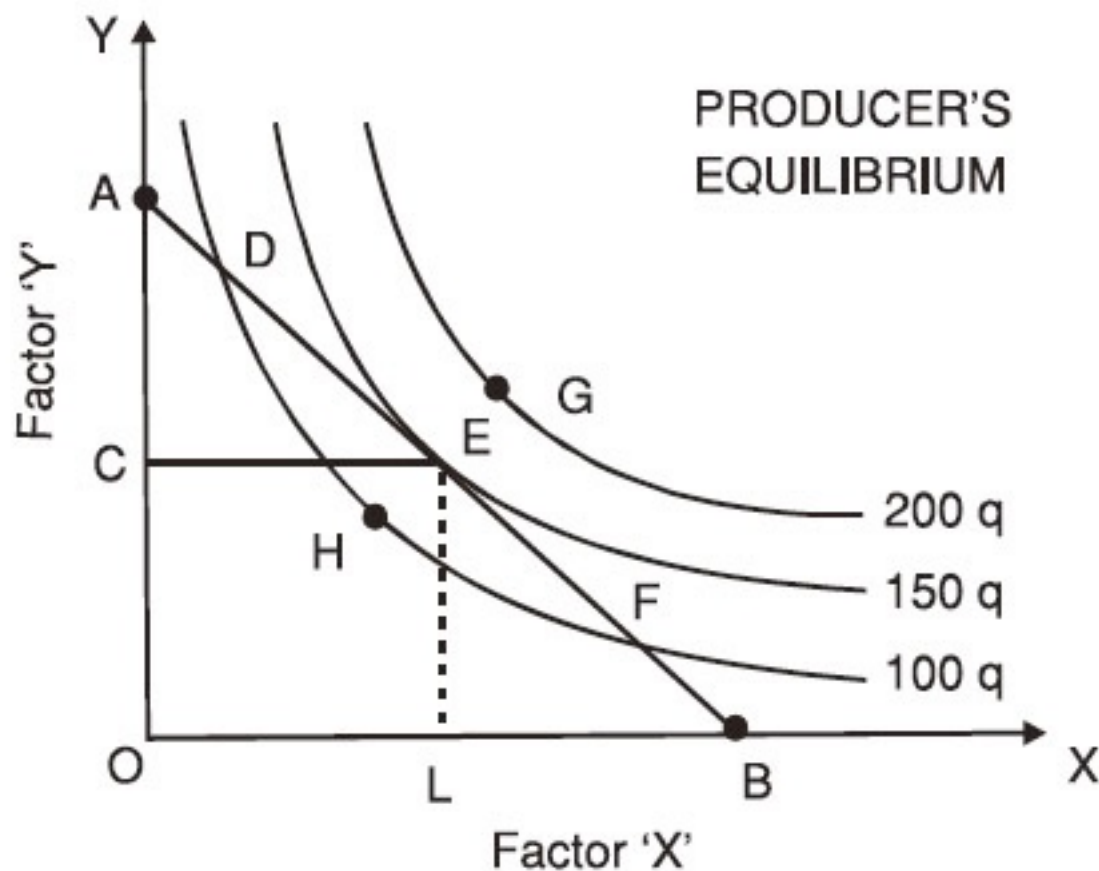**Superimposing the Iso-quant map on the Iso-cost line**

Fig 8.9

When we superimpose the Iso-quant map on the Iso-cost line then we observe that certain Iso-quants lie above the Iso-cost line. Some may lie below it. Others may cut and touch it. The Iso-quant 200q lies above the Iso-cost line. Therefore it is beyond the economic reach of the producer. He would have preferred to ride on the Iso-quant 200q but his investment outlay does not permit him to enjoy any such factor combination which could yield 200q. His choice of factor inputs is thus restricted by a given investment fund. Thus points similar to G on Isoquants above the Iso-cost line are beyond the producer's economic reach. Let us now consider any point below the Iso-cost line. Such points will be within the reach of the producer but will not exhaust his investment outlay and thus will not fetch the maximum possible return. Points D and F are on the Iso-cost line itself, showing that the producer can afford these factorcombinations but they would yield only 100q. Thus between points D, E and F, point E would be most preferred; because at E the factor-input combination costs the same as at points D and F but the level of output at E is higher than at D or F. Therefore, the producer will finally settle down at point E. **At point E, the Iso-cost line is a tangent to the Iso-quant. Thus, the tangency between Iso-cost line and Iso-quant represents the point of producer's equilibrium.**

At point E, the slope of Iso - cost line and the slope of Iso-quant is the same. Now slope of Isoquant gives us the MRTS and the slope of Iso-cost line denotes the ratio of prices of factors i.e. Px and since at point E, both slopes are the same; therefore at point E.

Py

$$MRTS = \frac{Px}{Py}$$

Thus, the producer is in equilibrium at the point of tangency between the Iso-cost line and the Iso-product curve. This is the best possible point of factor combination within the budget constraints.

8.9 THE OUTPUT- EXPANSION PATH AND THE SCALE-LINE

So far we assumed outlay was given and so were given the prices of various factors of production, on the basis of which we could obtain the iso-cost line; and the point of tangency between the iso-cost line and Iso-quant was the point of producer's equilibrium. Suppose the original isocost line was AB and original point of equilibrium E, showing that the producer produced 100 units of output. Now let us assume that the investment outlay of the producer increases but the prices of factors X and Y remain the same, Then the producer is faced with a new Iso-cost line say A^{I}B^I; and he can now move over to a higher Iso-quant. The new point of equilibrium will be EI. He employs more of factors X and Y in order to produce higher level of output viz. 200q When we join points E E^I we get the **output-expansion path**. It is also referred to as the **Scale Line**.
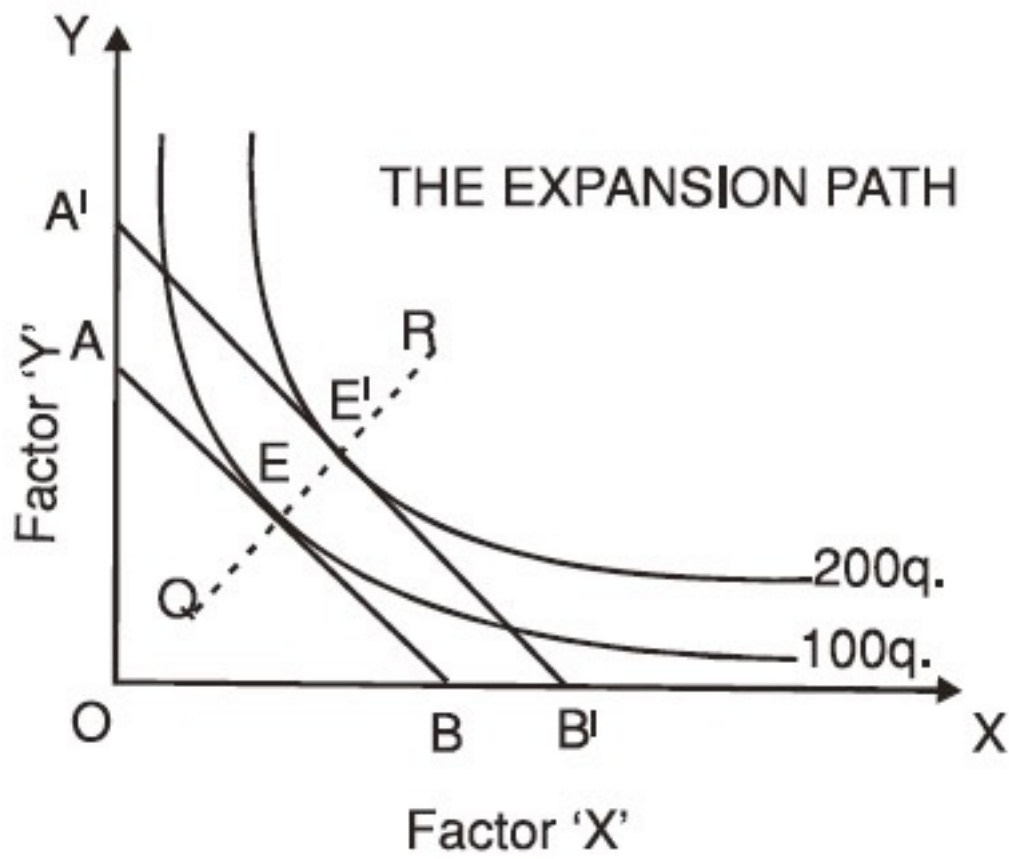
THE EXPANSION PATH

Factor 'X'

Fig. 8.10

The output **expansion path shows the least cost way of producing each level of output. It traces out as to how the firm will expand its scale of production as a result of increase in its investment outlay.**

The following fig. 8.11 shows three different output-expansion paths for three different Isoquant maps. In each diagram the points A, A1 and A2 represent the least cost way of producing the level of output of Iso-quant they are on:

(a)
Least cost Factor proportions are unchanged as output changes

(b)
Capital is subtituted for labour as output increases

(c)
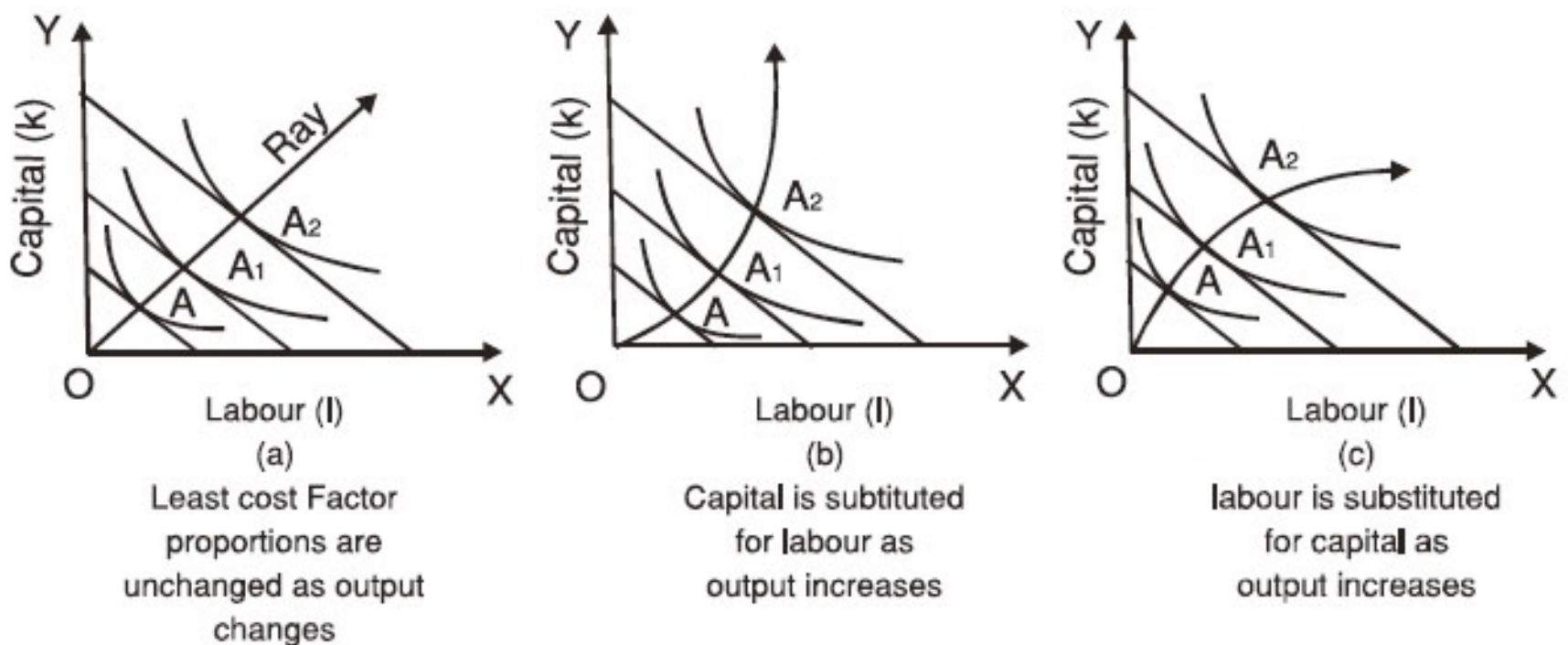labour is substituted for capital as output increases

Fig. 8.11

In fig.1 the output-expansion path is a straight line from the origin i.e. a ray. The distinguishing feature of a ray is that proportion of L to K is everywhere

the same. This shows that the least cost factor proportions are unchanged as output changes.

In fig.2 capital is substituted for labour and in fig. 3 labour is substituted for capital as output increases.

8.10 ECONOMIES AND DISECONOMIES

In the process of production a firm enjoys several advantages or experience several disadvantages which are either the result of the scale of operation or due to the location of the firm. The advantages and disadvantages thus experienced are reflected in the cost of production. The average cost of production is favourably affected when a firm starts enjoying economies, whereas the average cost begins to rise when the firms experience diseconomies. Those advantages or disadvantages that accrue to a firm from within, as a result of its scale of operation are summarily referred to as **Internal economies and diseconomies**, whereas those advantages or disadvantages which come to the firm from outside and are experienced by the industry as a whole mainly due to localization are referred to as **External economies and diseconomies** respectively.

INTERNAL ECONOMIES

Internal Economies are those advantages which a firm enjoys from within itself by way of reduction in its average cost of production as its scale of operation expands. These Internal Economies can be estimated in advance and a firm can set out to secure them by a deliberate policy.

Internal Economies have been conveniently classified by **Prof. E.A.G. Robinson** under five headings : technical, managerial, commercial, financial, and risk-bearing.

1) **Technical Economies**: When production is carried out on a large scale, the firm can fully utilize the unused capacity of the indivisible factors (e.g. plants and machines) and thereby reduce the average cost of production immensely.

a) When production is carried out on a large scale, the process of production can be broken down into a number of different sub-processes and each sub-process can be assigned to workers who are best suited for it. At

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once all the advantages of division and specialization will be enjoyed. The larger the scale of production, the greater the scope for specialization.

b) The large producer will also be able to employ specialized machinery, because he can keep it fully occupied; e.g. some large firms can afford to keep their own blast furnaces. A large shoe-making company can afford to have special machinery for different processes, but the small shoe-maker cannot and will not go in for such machines, because the machinery would stand idle for most part of the day.

c) The large firm will be able to carry out research or even undertake training of its workers to reap further benefits in its operation.

d) The initial outlay may be lower and operating costs may be saved by using a bigger machine, even when two or more smaller machines could do the same work, e.g. a double-decker bus can carry twice as many passengers as a single-decker, but the initial cost is not twice as much nor the running costs doubled.

e) There is a mechanical advantage too in working on a large scale. **Prof. Cairncross** compares the mechanical advantages involved in employing one large ship instead of two smaller ones, each of half the carrying capacity of the large ship. "The carrying capacity of a ship increases in proportion to the cube of its dimensions; the resistance to its motion increases, roughly speaking, in proportion to the square of its dimension. The power required to drive a given weight through the water is less. Therefore, there is considerable mechanical advantage in a large than in a small ship." Besides, the cubic capacity of a tank is increased eight times the original by just doubling its dimensions but the materials required for its construction amount to only four times. These are also called "the economies of increased dimensions."

f) Economies are also achieved through linking processes. In a large firm, the various stages in the production of a commodity can be carried out in a continuous sequence, e.g. a composite textile mill producing on a large scale can carry out all the processes within itself, thereby reducing the cost of handling, transport, packing and unloading simultaneously.

2. **Managerial Economies**: On the managerial side, economies may be enjoyed because a large firm can afford to employ specialists and apply the principle of division of labour in management. Experts can be employed to

manage independently various departments, e.g. production, sales transport and personnel departments. Each department may be further subdivided into sections, e.g. Sales Department into sections for advertisement, exports and the survey of consumers' welfare, etc.

3. **Commercial Economies**: Commercial Economies accrue to the large firm both during the time of buying of raw materials and in the process of selling the finished product. In its capacity as a buyer, the large firm places higher orders and hence enjoys preferential and concessional treatment from the suppliers of raw materials. On the sales side, too, varied types of advantages can be enjoyed, e.g.

i) Very often the Sales Department is not being worked to capacity and hence a far greater quantity of goods can be sold at a little extra cost.

ii) Much less work is involved in packaging, and invoicing a large order than when a similar amount of goods is split up into many small orders.

iii) Very often, the large firm manufactures many products, including by-products, and then one commodity acts as an advertisement for another.

iv) The principle of division of labor can be introduced on the commercial side, expert purchase and sales officials can be employed.

4. **Financial Economies**: A large firm can command better credits and raise finances not only at lower rates of interest from the banks but also on liberal terms and conditions. A large firm can offer better security to bankers, and as it commands reputation, even individual investors are prepared to invest their funds with them.

5. **Risk-Bearing Economies**:

a) To meet variations in demand, a large firm can produce more than one product and so by diversification of output, avoid "putting all its eggs in one basket."

b) The firm can also develop different markets for its product.

c) On the supply side, the materials used may be attained from many different sources thereby guarding against variation in supply of raw materials from a certain market.

INTERNAL DISECONOMIES

The disadvantages accruing to the firm when it produces the output beyond a particular point, resulting in an increase in the average cost of production could be termed as diseconomies of scale. In the beginning as the output of the firm goes on increasing it begins to enjoy several advantages by way of reduction in the average cost of production which we have detailed as the economies of scale, but **all these advantages or economies are converted into disadvantages or diseconomies, once the output crosses the optimum level**. Following diseconomies are likely to arise beyond the level of optimum output.

1. **Efficiency to inefficiency**: Once the output crosses the optimum level the efficiency in management will give away to managerial inefficiency. In fact an element of mismanagement will ceep in. Effective supervision will no longer be possible.

2. **Administrative difficulties**: Administration, beyond a point becomes unwieldy and impersonal. Problems of competition-ordination and control begin to be experienced. Even the best of the administrations will not be able to strike an effective balance among various departments set up in the plant.

3. **Industrial Unrest**: As the scale of operation begins to expand and the number of workers goes on increasing much of personal contact is lost between the workers and the management. The weakening of this contact is often reflected in an atmosphere of discontent, disharmony, distrust and frustration, resulting in slowing down of the process of production, inefficiency, work to rule practices and a recourse to militant attitude. All these forces bring about a rise in the average cost of production.

4. **High cost of Reconversion**: Larger the scale of production, greater will be the overhead expenditures. The bigger the size of the plant, the higher the initial fixed costs which are in themselves irredeemable. If the demand for the product falls then it is difficult to reconvert these plants to produce the required goods.

5. **Enhancement of Risks**: The larger the scale of production, the greater will be the element of risk involved. If the work comes to a standstill then the standing costs are very high. There is under utilization of capacity and yet labour charges will have to be paid in the form of wages. The wage bill

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will run high even in the event of stoppage of work. Since these firms would order raw materials in bulk, there is high storage cost involved and if these happen to be perishable in nature then the loss incurred during stoppage of work is enormous. There is equally the risk of over production and lower returns. These firms run the risk of training workers too and once they acquire their training they seek employment elsewhere when there is less of competition so as to receive higher grades. Therefore there is a continuous flow of labour out of such industries, who are trained at their expense but give the benefit of their traning to other competing firms.

6. **Increasing Costs:** Initially the overheads will be high. The total cost of purchase, storage, distribution etc will also be high as the firm expands its scale of operation beyond optimum, its demand for raw material will increase, so also its demand for capital, land and labour will rise and therefore the prices of these factors will start rising. Thus the cost of production will begin to rise an account of toil in demand for factors. Its cost of advertisement, salesmanship etc. will also rise. As efficient units of production are already employed, the additional demand for factors will increase their price and in return the firm will secure only the less efficient units of input. The additional units of inputs will be low efficiency and inferior quality. These are the diseconomies entailed in expanding the scale of operation beyond optimum.

EXTERNAL ECONOMIES

External Economies are those advantages which accrue indirectly and externally from the growth, not in the size of the firm but in the size of the industry as a whole. The external economies do not depend on the size of the individual firm and while the firm can hope that they will arise as the industry expands, it cannot plan to achieve them by a deliberate policy of increasing output. No doubt external economies are generally grouped into three categories.

i) **Economies of Concentration**: Economies of concentration arise mainly from the localization of an industry in a particular geographical region.

a) As the industry grows, the workers in the region will become skilled in the processes pertaining to that industry and hence the firm will get constant supply of skilled labour.

b) Common services will also come to be provided when an industry grows in size. The industry may expand to a size which may justify the construction of a new road or a new railway line or even establishment of a bank. These services will automatically be enjoyed by the firm.

c) Special institutions, e.g. training schools, research centers may also be set up, and the firm can reap the advantages flowing from them.

d) When an industry comes to be concentrated in a particular area, the region comes to acquire its own reputation, which brings a distinct additional advantage to the firm which is located in that region.

ii) **Economies of Information**: As an industry grows in size, the workers doing the same type of job or making the same kind of product group themselves together in unions., associations and societies. These groups issue periodicals and publications which help in disseminating information regarding research, etc. As a result of this, the technique and methods of production improve and help the firms in reducing the cost.

iii) **Economies of Disintegration**: When a firm initially commences production, it may have to produce every part of the good itself, but gradually when the industry expands, a particular firm may specialize in the production of only one particular part and supply it to the whole industry. This is called the process of vertical disintegration. Similarly, when the industry itself, it will not pay every firm individually to go out selling its wastes and by-products, but when the industry grows in size, a special firm may arise to deal with a particular by-product of all the firms.

EXTERNAL DISECONOMIES

Excessive concentration or localization of industries will result in diseconomies for the firms located within that region. The economies of transport, communication, labour and managerial economies will all be converted gradually into diseconomies.

Diseconomies of concentration may arise because of **excessive pressure on transport**. Transport bottlenecks and delays will be experienced in procuring raw materials and disposing of the final products. As the industry gets concentrated in a particular region, **the demand for land will keep on increasing and therefore the land values will soar high**. Thus rent begins to rise **as the demand for labour goes on**

increasing the labour cost too will show a considerable rise. Further the **labour unions of various firms within the region may unite** and together ask for higher wages or else resort to strikes and go-slow tactics, which may result in a sharp decline in industrial production and consequently higher prices. The cost structure would be affected. The demand for capital too will increase because of localization in a particular region. Thus the **cost of capital will rise** and financial diseconomies will emerge. **Power and raw material shortages** will be experienced in the light of growing demand. As a result of localization of firms the geographical area will experience **pollution**. Excessive regional concentration of firms may lead to **over-crowding and unhygienic conditions**. Thus external economies, beyond a point will be converted into external diseconomies.

SUGGESTED READINGS

Alfred Marshall: Principles of Economics

Lipsey And Steiner: Economics

Alec Cairncros: Introduction to Economics

Boulding K: Economic Analysis

Benham Frederic: Economics

Koplin H.T.: Microeconomic Analysis

8.11 SUMMARY

Technologically production means transforming inputs into outputs. In Economics, the process of addition of form utility, time utility, place utility or personnel utility to the existing matter by changing its form, place and keeping it over time is referred to as production. Thus Land, Labour, Capital and Organisation are agents of Production. The relationship between the rates of input of productive services and the rate of output of product is called Production Function.

In any process of production, if the varying quantity of one factor of production is combined with fixed quantity of other factors of production, there will be increasing, constant or diminishing additional outputs. These additions are governed by Laws of Increasing, Constant or Diminishing returns. Diminishing returns occur as the factors of production are imperfect substitutes for one another.

In the process of production when all the inputs are varied in equal proportion then the relation between factor inputs and the output gives rise to returns of scale; which again can be increasing, constant or diminishing. Cobb-Douglas Production function based on manufacturing business in USA, indicates constant returns to scale.

The desired output can be achieved by using different combinations of factor inputs. The iso-quant is a curve, any point on which shows, that various combinations of factor inputs yield the same level of output. The iso-cost line shows different combination of factor inputs that can be availed with the same investment outlay for these factors. When the iso-quant map is super imposed on the iso-cost line, at a certain point they are tangential to each other. This point is called producer's equilibrium, where producer gets maximum output for given investment outlay.

When the producer increases investment outlay, a new iso-cost line is formed, this allows him to move to a higher iso-quant. This is called the expansion path or scale line.

As scale of operations increase the firm experiences internal and external economies and diseconomies which decrease or increase unit average cost respectively.

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Internal economies can be technical, managerial, commercial, financial or risk bearing. On the other hand diseconomies can be due to inefficiency, administrative difficulties, industrial unrest, increasing risks & costs. External economies are of concentration, information and disintegration. Excessive concentration causes external diseconomies.

8.12 SELF ASSESSMENT QUESTIONS

1. Explain the concept of "Production Function."

2. Distinguish between short run and long run production functions.

3. Distinguish between Laws of Returns and Returns to Scale.

4. State and Explain the Laws of Returns and Returns to Scale.

5. Explain clearly the Cobb-Douglas Production Function.

6. "Cobb-Douglas Production Function is a linear homogenous production function implying Constant Returns to Scale." Explain.

7. What is an Iso-quant?

8. State and explain the Properties of Iso- quant.

9. Explain the concept of Marginal Rate of Technical Substitution.

10. What is an Iso-cost line?

11. What is an Output-Expansion Path?

12. Derive the condition for producer's equilibrium with the help of iso-quant technique.

13. Distinguish between:
    i) Economies and Diseconomies.
    ii) Internal and External Economies.

14. Outline the Internal Economies and Diseconomies. Give examples.

15. Describe the External Economies and Diseconomies. Give examples.

16. Visit a few firms. Study the procedure adopted in selecting factor-combination within the given Investment Outlay.

17. How will you know that the firm employs labour-intensive or capital-intensive method of production?

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video1

Video2

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9

Market and Price Determination under Perfect Competition

Objectives:

After completing this chapter, you will be able to understand:

• What is Perfect Competition?

• Preconditions for Perfect Competition.

• How Supply and Demand Forces Determine Prices?

Structure:

9.1 INTRODUCTION

Market; Its classification: In ordinary language, the word market implies a particular place where the buyers and sellers assemble. In other words, an area, large or small, can be considered as a market where buyers and sellers are in easy contact with one another. The term thus indicates a geographical location. In economic jargon, however, market implies a contact either direct or indirect between buyers and sellers. Thus, **market is a network of dealings between buyers and sellers**.

With the development of communications and banking, the markets have widened and dealings in some commodities are now world-wide. Therefore, the essential feature of a market is that buyers should be able to strike bargains with sellers. According to **Wicksteed, "Thus market is the characteristic phenomenon of economic life and the constitution of markets and market prices is the central problem of Economics".**

Broadly, markets may be classified on the basis of area as local, national and world markets. But, the classification relevant for our purpose is based on the **extent of competition** prevailing in the market. Accordingly, there are **perfect** markets and **imperfect** markets. The essential characteristic of perfect market is the prevalence of uniform price for the commodity. On the other hand, different prices prevail for the product in imperfect markets.

Imperfect competition may have several forms, e.g. monopoly, duopoly, oligopoly and monopolistic competition.

Thus, markets are classified on the basis of number of sellers, nature of the product, degrees of competition etc.

9.2 PERFECT COMPETITION

Perfect competition is said to exist when the market possesses following characteristics or fulfils the conditions mentioned below:

a) **A large Number of Buyers and Sellers**: The fundamental condition of perfect competition is that there must be a large number of sellers or firms. The total number of sellers is so large that no individual seller is in a position to influence the price of the product in the market. In other words, the individual seller's decision to raise or lower the supply will have an

insignificant effect on the market price, because each one is selling a small portion of the total output. Therefore, Each Seller is just a Pricetaker and not a Price-Maker.

b) **Homogeneous Commodity**: This is the second fundamental condition of a perfect market. The products of all firms in the industry are homogeneous and identical. In other words, they are perfect substitutes for one another. There are no trade marks, patents etc. to distinguish the product of one seller from that of another. Under perfect competition, the control over price is completely eliminated because all firms produce homogeneous commodities. This condition ensures that the same price prevails in the market for the same commodity.

The two basic features, viz. large number of firms and homogeneous product make the demand perfectly elastic for an individual firm. As a result of this, the demand curve (i.e. AR curve) facing an individual firm becomes a horizontal straight line and MR curve coincides with AR curve. (Refer Chapter 10.)

c) **Free Entry and Free Exit**: Under perfect competition, there is complete freedom of entry for new firms and of exit for the existing firms. However, in short period, neither the new firms can enter nor the existing firms can leave the industry.

d) **Perfect Knowledge**: It is necessary to assume that the producers and consumers have full knowledge of the prevailing price. Hence, there is no need for the sales promotion or to incur expenditure on advertisement in respect of their preferences for commodities.

e) **Perfect Mobility**: There is complete mobility of the factors of production from one firm to another, or from one industry to another or from one occupation to another.

f) **No transport costs**: Another important condition of perfect competition is that producers work sufficiently close to each other. In other words, the differences caused by transport costs do not exist.

Activity A

Take any two conditions from above and prove how far they are applicable in the Industry with which you are associated.

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Pure Competition and Perfect Competition

Economists like **Chamberlin** and others often make a distinction between **pure competition** and **perfect competition**. The term **Pure Competition** is used in a restricted sense. It is also known as **atomistic** competition. In order that competition be pure it requires the fulfillment of three conditions of perfect competition, namely, the existence of a large number of buyers and sellers, homogeneity of the product, and freedom of exit and entry. These conditions together mean that no individual firm can exert any influence over the market price.

But the term **perfect competition is a wider concept**, in the sense, that it includes the features of pure competition and some additional conditions, such as perfect knowledge on the part of buyers and sellers, perfect mobility of factors of production and absence of transport cost.

This means that, **perfect competition requires that there should be no imperfections in the market.** Such imperfections arise due to imperfect knowledge or immobility of the factors of production.

In fact, pure competition is a part and parcel of perfect competition. American economists prefer to use the term pure competition, while the English

economists prefer the term perfect competition. However, both the terms are used to analyse the features of perfect markets.

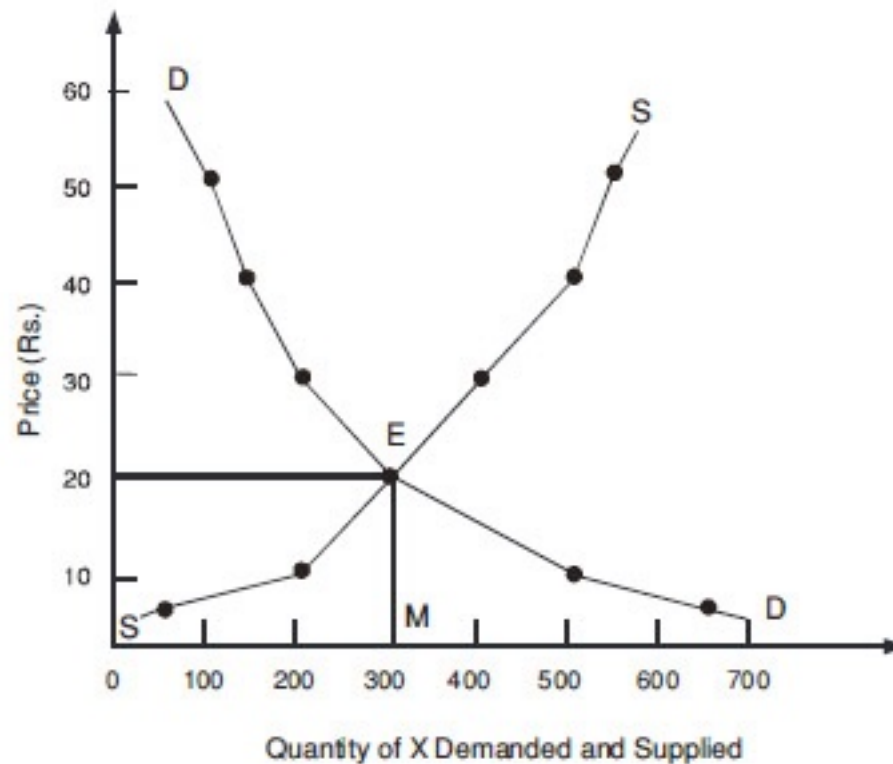## 9.3 PRICE DETERMINATION UNDER PERFECT COMPETITION

The forces underlying the determination of price under Perfect Competition are **Demand** and **Supply**. The interaction of demand and supply determines the price of a commodity in the market. Marshall has compared the Process of price determination to the cutting of cloth with a pair of scissors. As two blades are required to cut the cloth; so the two blades – demand and supply – are required to determine the price in the market, no matter one may be more active than the other and more effective than the other, but the existence of both is indispensable.

Now, demand comes from the buyers and the supply from the sellers. The demand from the buyers can be shown by the Market Demand Schedule and the supply from the sellers can be shown by the Market Supply Schedule.

Table 9.1

Demand and Supply Schedules		
Price Per Unit of Commodity (Rs.)	Quantity demand per week Units	Quantity supplied per week Units
50	80	530
40	120	480
30	200	400
20	300	300
10	500	180
5	650	70

From the above market demand and supply schedules, it is convenient to plot points on the graph and derive the demand and supply curves respectively. (Fig. 9.1).

(Fig. 9.1) Price Determination under Perfect Competition

DD represents the demand curve and SS the supply curve. The two curves intersect at point E. This point of intersection is called the point of equilibrium – because it is **at point E that quantity demanded equals quantity supplied**, viz. 300 units. The possible level of price at which QD=QS is Rs. 20/-. It is also called the **equilibrium price** or the market price, **because it is at this price that quantity demanded and quantity supplied are in equilibrium**.

At pt E, $Q^d{}_x = Q^s{}_x$ E is the point of equilibrium between $Qq^d{}_x$ and $q^s{}_x$ and OP is the Equilibrium Price because for OP as the price $Q^d{}_x = Q^s{}_x$. **Thus, the price of commodity X in the market under perfect competition is fixed at the point of intersection of demand and supply curves.**

9.4 TENDENCY TOWARDS ONLY ONE PRICE

We may further note that **there exists the tendency towards prevalence of only one price for the commodity in the market under perfect competition**. (Fig. 9.2). Let us assume that the price instead of being Rs. 20/- is Rs. 30/-. Then when the price is Rs. 30/-, the sellers are prepared to sell more. At Rs. 30/- as the price, supply is likely to expand to 400 units but at the same time, demand will contract to only 200 units. Thus, supply is in excess of demand when the price is Rs. 30/-. Sellers will compete with each other to dispose of their stock, and this will result in lowering of the price.

Therefore, when supply is in the excess of demand, the price will start falling from Rs. 30/- to Rs. 20/- at which point the quantity demanded will equal quantity supplied and the original equilibrium point will be restored.
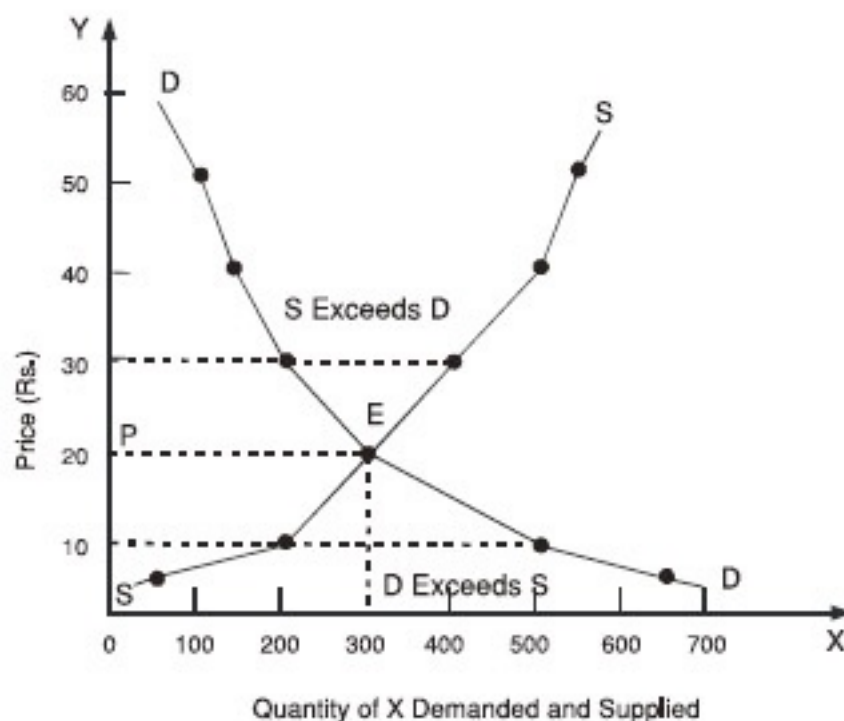

(Fig. 9.2) Prevalence of Only One Price

If the price were now to go below the original price, assuming the price to be Rs. 10/-, then at this price the buyers will demand more units of commodity X; the new demand at price of Rs. 10/- will go up to 500 units, but the sellers will be less prepared to sell commodity X at this low price. The supply will shrink to only 180 units. Hence when the price falls to Rs. 10/- demand will exceed supply and there will be competition among the buyer to buy readily the units of commodity X because it is going cheap in the market. This competition will lead to the pushing up of the price. Now, the price will start rising till it becomes Rs. 20/-; and where quantity demanded and supplied of commodity X once again become equal. This tendency towards the prevalence of only one price is the acid test of perfect competition.

## 9.5 EFFECTS OF SHIFTS IN DEMAND AND SUPPLY ON THE PRICE LEVEL

Why does the price rise? The price rises in the market because of two theoretical conditions:

i) **When demand increases** i.e., when the demand curve shifts to the right (Fig. 9.3). Let us assumed that the original equilibrium point is E and OP is the original market price. Now when the demand increases, the demand curves shifts to the right and new
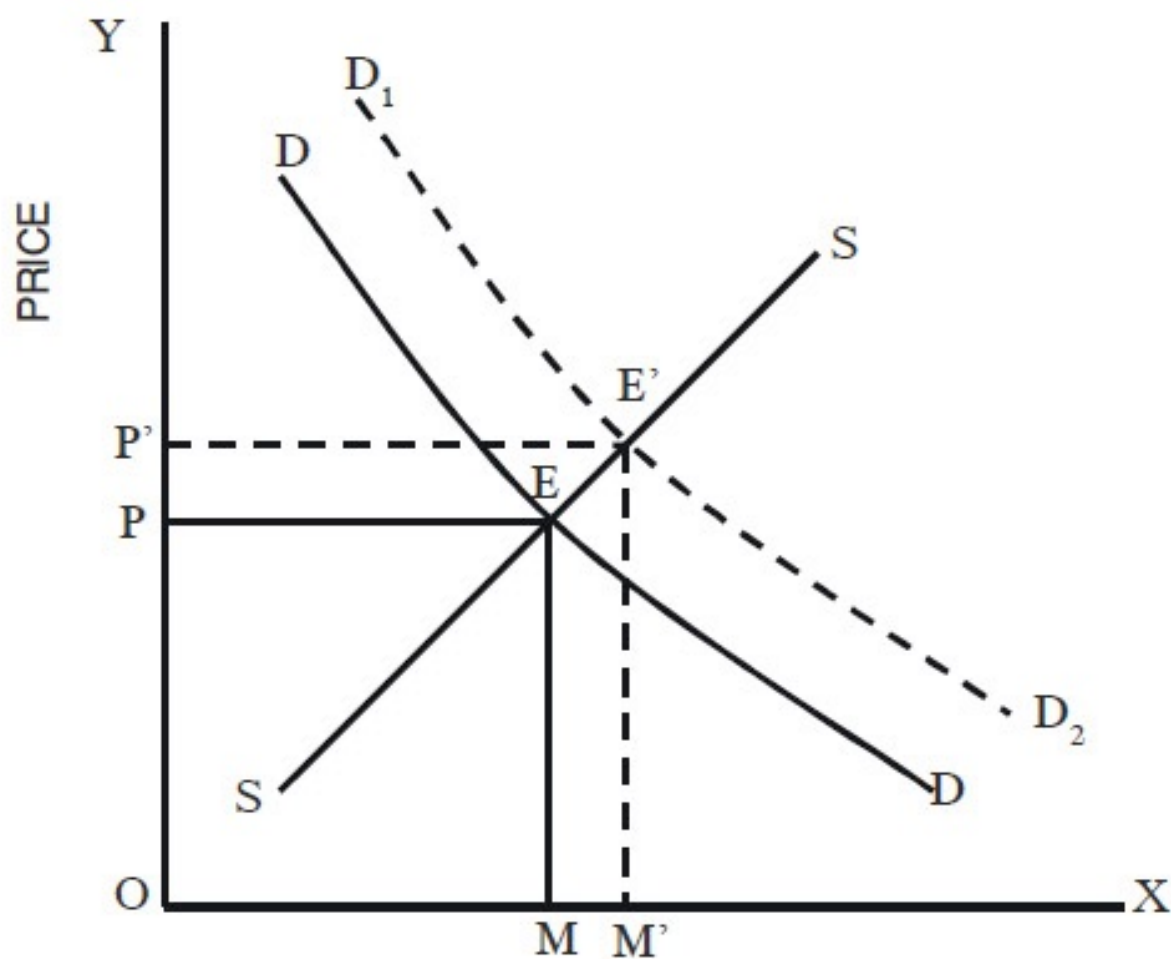
Quantity Demanded and Supplied
(Fig. 9.3) when Demand Curve Shifts to the Right

demand curve is D_1D_2. This curve intersects the supply curve at point E'. Thus E' is the new equilibrium point and the new price is now OP', which is higher than the original price OP, thereby showing that price rises when demand increases. (Fig. 9.3)
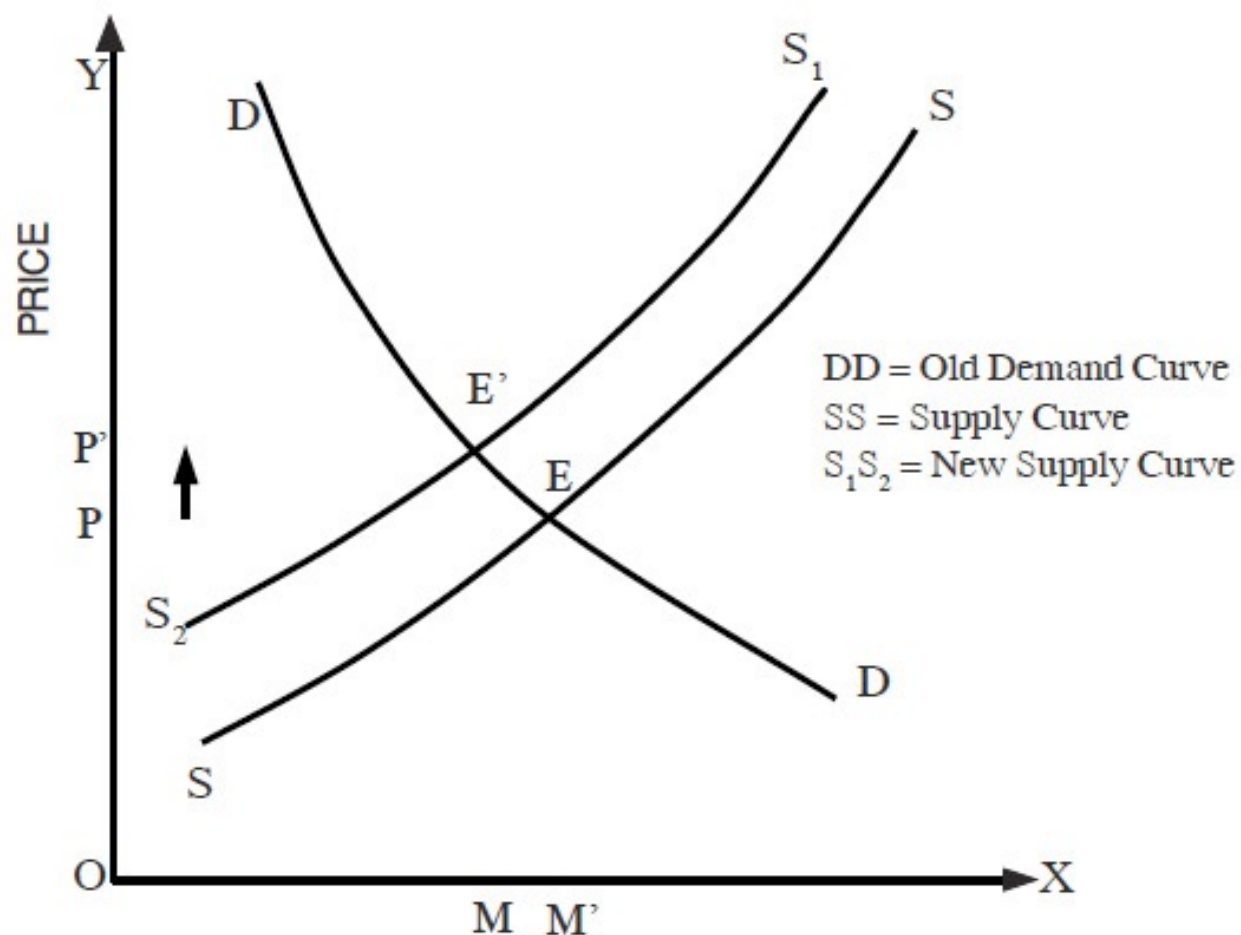
Quantity Demanded and Supplied of X

Fig 9.4 When supply curve shifts to the left

ii) **When supply decreases**, i.e. when the supply curve shifts to the left. (Fig. 9.4) Let us assume that E is the original point of equilibrium and OP is the original price level. Now when supply decreases, the supply curve shifts to the left and the new supply curve is S_1S_2. The new equilibrium points now becomes E' and the new price is OP', which is higher than the original price OP; thus when supply decreases, the price rises.

When will price fall?

The price will decline when:

i) **The demand decreases**, i.e. when the demand curve shifts to the left. (Fig. 9.5)

Fig 9.5 When demand curve shifts to the left.

Let us assume that E is the original point of equilibrium and OP is the original price level. Now when demand decreases the demand curve will shift to the left and D_1D_2 will be the new demand curve. E' will be the new equilibrium point and the new price will be OP' which is lower than the original price OP. Thus, when demand decreases, the price will.

ii) **The supply increases**, i.e. when SS curve shifts to the right. (Fig. 9.6)
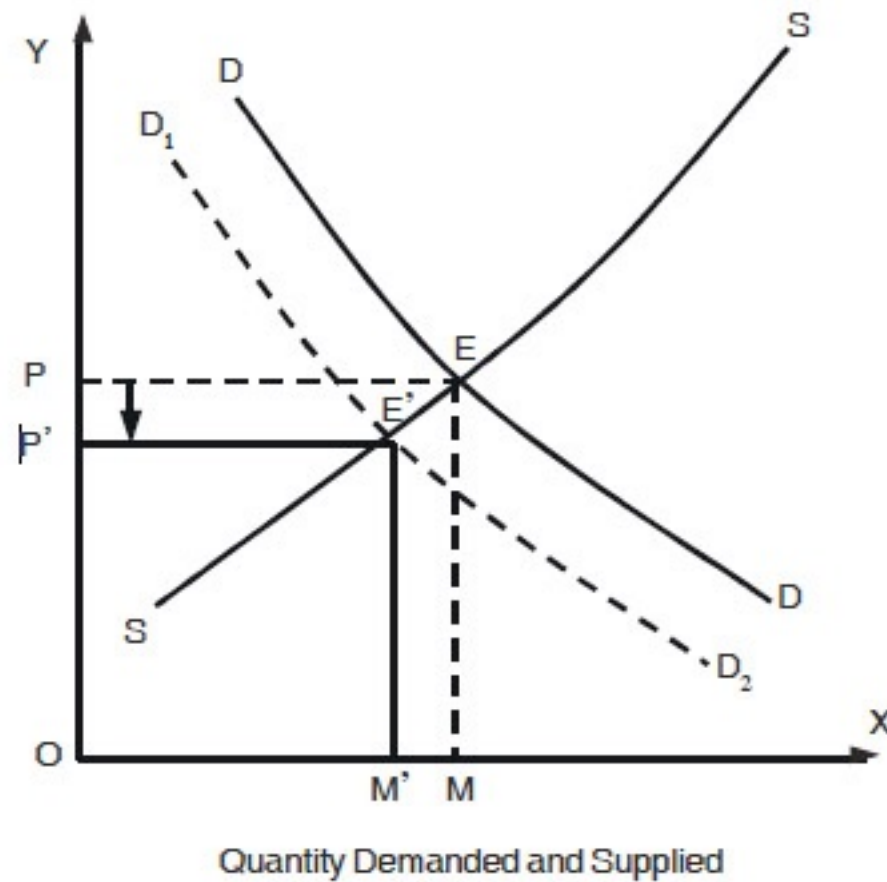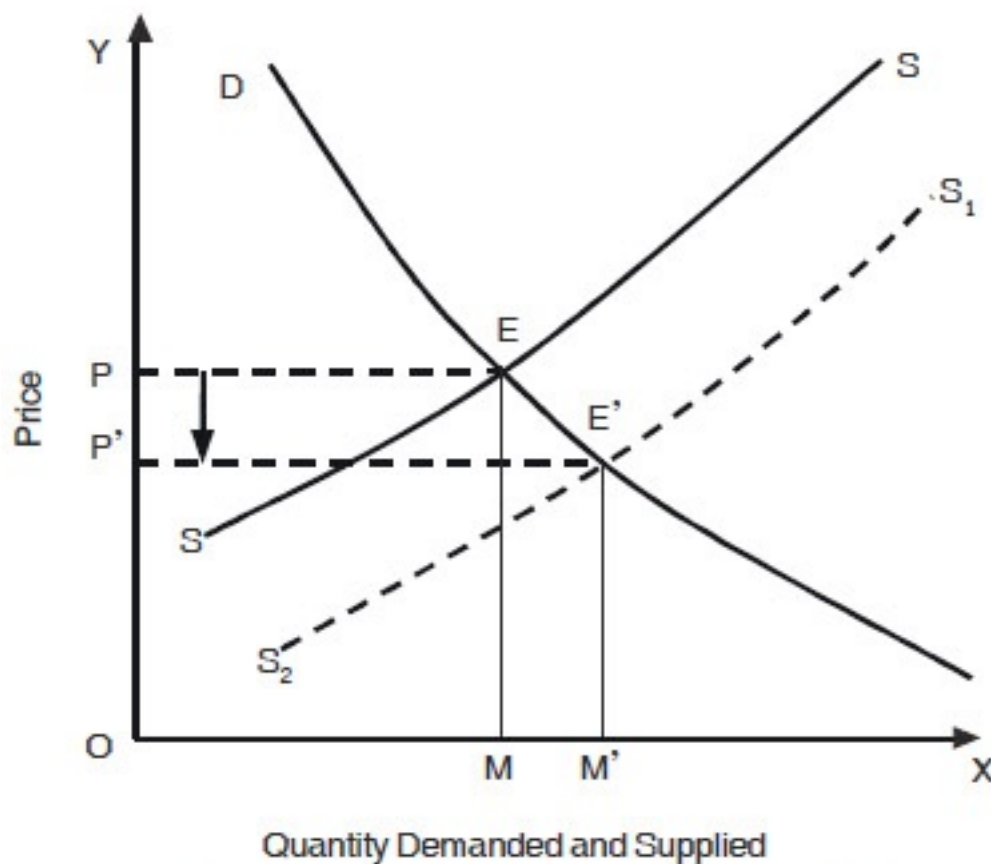
Fig 9.6 **When Supply Curve shifts to the right**

Let us assume that E is the original point of equilibrium and OP is the original price level. Now, when the supply increases, the supply curve will shift to the right. The new supply curve will be S_1S_2 and the new point of equilibrium will be E'. The new price will now be OP' which is lower than the previous price OP. Thus, the price will decline when supply increases. Thus shifts in demand and supply curve will influence the price.

9.6 ROLE OF TIME ELEMENT IN THE THEORY OF PRICE

(Marshallian Four Period Analysis)

Marshall assigned considerable importance to the element of time in determination of price.

Depending upon the period of time, supply can adjust itself either partly or fully or not at all to the change in demand, and will in turn influence the level of price. Hence Marshall has classified time period into four categories on the basis of the degree of responsiveness of the supply to adjust itself to changing market conditions.

i) **The very short period or the market period** is that period of time in which the supply is fixed or is perfectly inelastic. The very short period is so

short a period that **supply cannot adjust itself to the change in demand**, e.g. if the demand for fish, or milk, or any such commodity shoots up one fine morning, it would be difficult to increase their supply immediately to meet demand.

ii) **The short period** is that period in which the **supply can adjust itself only partly to the change in demand**; may be as a result of firms making full use of their plant capacity by varying the amounts of only variable factors. The short period is not long enough to enable the firms to expand their plant capacities.

iii) **The long period** refers to that period of time in which the **supply can adjust itself more fully or even fully to the change in demand**. The supply becomes more elastic and at times even perfectly elastic. The long period is long enough to permit new firms to enter or the existing firms to expand.

iv) **The Very Long Period** is that period of time for which we cannot predict with any degree of accuracy as to what will happen to forces of demand and supply. In fact, Keynes once said 'in the very long period we are all dead'.

We shall therefore limit the role of time element while analyzing the price theory to the very short, short and long periods.

Let us assume that E_1 is the original point of equilibrium and OP_1 is the original price prevailing in the market. Now, one day the demand for commodity X increases suddenly and the demand curve shifts to the right, the new demand curve being D_2D_3; but in the very short period supply will remain perfectly inelastic; shown by the Market Supply Curve (MSC); and the new equilibrium point will be E_2 and the new price will be OP_2. This will be the **very short period price which is considerably above the original market price, because the supply is perfectly inelastic.** (Fig. 9.7)
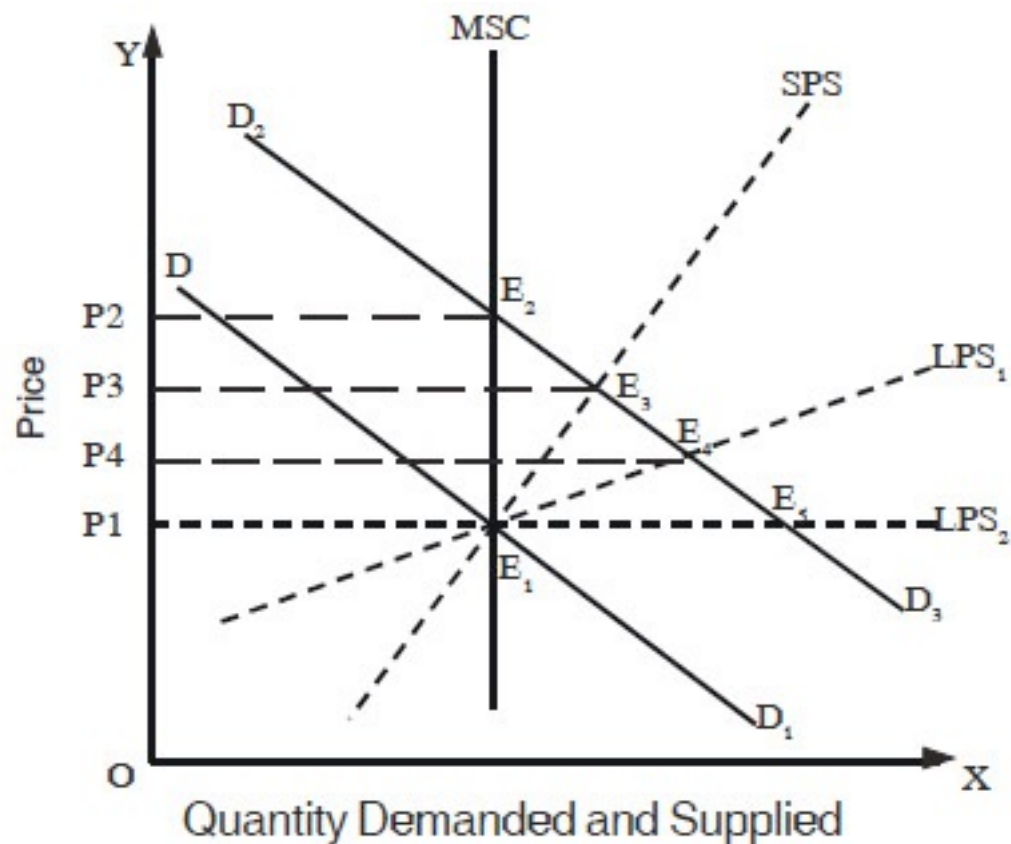
Fig 9.7 The Role of Time Element in the Theory of Price

However, **in the short period, supply will be able to adjust itself partly to the change in demand**, and the new supply curve will be SPS; and the new equilibrium will be at a point E₃ and the new price will be OP₃. The **price in the short period is now lower than the price in the very short period; although it is above the original market price.**

In the long period, the supply will be able to adjust itself more fully or even fully to the change in the quantity demanded. There will thus be two possibilities : (a) the supply curve may become more elastic and the new supply curve will be LPS; the new equilibrium point will be E₄ and the new price will be OP₄; (b) the supply may become perfectly elastic and may fully adjust itself to the change in demand. In this case, the new supply curve may become horizontal (LPS₂), the new equilibrium point will be E₂ and the new price will become OP₅, which has come back to the original price level. Thus, **depending on the period of time allowed to pass, the supply may partly, fully or not at all adjust itself to the change in demand and will influence the price.** This analysis highlights the role of time element in theory of price.

SUGGESTED READINGS

1. Alfred Marshall: Principles of Economics

2. E.H. Chamberlin: The Theory of Monopolistic Competition.

3. Paul Samuelson: Economics

4. Lipsey and Steiner: Economics

9.7 SUMMARY

Market is a network of dealings between buyers and sellers. If a single uniform price for a commodity is prevailing in a market, it is called a perfect market and there is perfect competition among sellers. Imperfect market is marked by different prices for the same product.

Perfect competition requires a large number of buyers/ sellers, homogeneous commodity, free entry & exit, no transport costs and perfect mobility and Knowledge.

As prices rise demand decreases but supply increases and it is other way round when prices fall. This mechanism provides a price at which quantities demanded equal supplies or quantity demanded and quantity supplied are in equilibrium.

This equilibrium price will increase if there is reduction in supply or increase in demand and it will fall if demand decreases or supply increases.

Depending upon period of time allowed to pass; supply may partly or fully adjust to the change in demand and will influence the price.

9.8 SELF ASSESSMENT QUESTIONS

1. What is Perfect Competition? How does it differ from pure competition?

2. How is price determined under perfect competition?

3. What is 'Equilibrium Price'? How is it derived?

4. 'Under perfect competition, there is always the tendency towards prevalence of Only one price'. Discuss.

5. How do shifts in demand and supply influence the level of price?

6. Explain briefly Marshall's Time Period analysis.

7. What is the role of time element in determination of price?

8. Think of examples of perfect competition.

9. Can you explain fluctuation of prices of vegetables w.r.t. demand and supply? You may undertake a case study to understand price variations.

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video

10

Revenue Structure, Objectives of a Firm and Break-Even Analysis

Objectives:

After completing this chapter, you will be able to understand:

• Concepts of Total, Average & Marginal Revenue.

• Objectives of a Firm.

• Price Movements under Monopoly.

• Break Even Analysis.

Structure:

10.1 Revenue Concepts : Total, Average and Marginal Revenues.

10.2 Relation between TR, AR and MR.

10.3 Relation between AR, MR and Elasticity of Demand.

10.4 Objectives of a Firm.

10.5 Break Even Analysis

10.6 Summary

10.7 Self Assessment Questions

10.1 REVENUE CONCEPTS : TOTAL, AVERAGE AND MARGINAL REVENUES

When a firm undertakes the task of production and purchases inputs it incurs cost. Having produced the output, on selling it the firm earns some income. **The income receipt by way of sale proceeds is the revenue of the firm**. Further, as we studied the concept of cost by distinguishing between total cost, average cost and marginal cost so also we can study the concept of revenue by distinguishing between total revenue, average revenue and marginal revenue.

Total Revenue

Total revenue is the sale-proceeds or the aggregate receipts obtained by the firm for selling its product. **Each unit of output sold in the market fetches a price and when this price is multiplied by the number of units sold we obtain the total revenue. Thus the total revenue depends on two factors**:

i) the price of the product (P)
ii) the units of output sold (Q)

Thus Total Revenue = Price x Quantity sold

TR = P x Q

For example, if the price of one text book is Rs.125/- and the publisher sells 1000 units then the total revenue of the publisher is Rs. 125 X 1000 = Rs. 1,25,000/.

Average Revenue

Average Revenue is the revenue derived by the firm per unit of its output sold. It is obtained by dividing the total revenue by the number of units of output sold.

$$\text{Average Revenue} = \frac{\text{Total Revenue}}{\text{Output Sold}}$$

$$\therefore AR = \frac{TR}{Q}$$

Now $TR = P \times Q$

$$\therefore AR = \frac{P \times Q}{Q}$$

$$\boxed{\therefore AR = P}$$

Thus, average revenue is nothing but the price of the product.

Marginal Revenue

Marginal revenue is the additional revenue from selling additional unit of output. For instance when a firm sells 10 units of chairs and earns Rs. 2000/- as total revenue and on selling 11 units of chairs earns Rs. 2200/- as total revenue then the 11th chair gets Rs. 200/- for the firm. This additional Rs. 200/- for the 11th chair is the marginal revenue of the firm.

Thus the Marginal Revenue of the 11th unit is obtained by subtracting from Total Revenue of 11 units, the total revenue of earlier ten chairs. In other words if

MR_{11th} represents Marginal Revenue of 11th unit

TR_{11} represents Total Revenue of 11 chairs

$TR_{11\text{-}1}$ represents Total Revenue of 10 chairs then

$MR_{11th} = TR_{11} - TR_{11\text{-}1}$

we can generalize this formula for any extra units "n" viz.

$$MR_{nth} = TR_n - TR_{n\text{-}1}$$

This formula is applied only when there is unit change in sale of the output, i.e. the number of chairs sold has been increased from 10 chairs to 11 chairs

but if the amount of change is more than one at a time then we used the following formula to calculate marginal revenue.

$$MR = \frac{\Delta TR}{\Delta Q}$$

10.2 RELATION BETWEEN TR, AR AND MR

When we are analyzing the revenue aspects of a firm it is necessary to know the nature and structure of the market under which the firm is operating. If the firm is operating under perfect competition then it is just one among infinite number of producers. It will not be able to exercise any influence on the market price which is determined by the forces of demand and supply in the market. In such a case the firm is a price-taker. The revenue structure is given to the firm under perfect competition. On the other hand if the market is dominated by a single producer, the firm enjoys monopoly and is able to fix its own price. It is thus obvious that the revenue structures will be different under different market categories. We shall first try to understand the nature of revenue structure in case of a firm under perfect competition and then discuss at length the nature of monopoly. In fact the revenue structure under oligopoly (that market category in which there is competition among few sellers) is quite distinct and possesses an element of uniqueness, which will be considered separately.

A. **Revenue structure of a Firm under Perfect Competition**

One of the distinguishing characteristics of perfect competition is the presence of an infinite number of firms producing homogeneous product. The number of firms is so large that a single firm's contribution to the total output of the product in the market is insignificant or microscopic. **The firm under perfect competition can neither influence the price nor the output in the market**. In fact, it has to take the going-market price, i.e. the price prevailing in the market as is determined by the forces of demand and supply. It is in this context that **the firm under perfect competition is referred to as price-taker and not a price maker**. The revenue structure of the firm under perfect competition is influenced by this characteristic of perfect competition.

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Let us assume that the price of the product X as determined in the market by the forces of demand and supply is Rs. 5/- per unit and that the firm, working under perfect competition has no other option but to sell its product also at the going market price i.e. Rs. 5/-. When it sells one unit it will get Rs. 5/- as total revenue. We can thus proceed to prepare the revenue schedule of the firm as follows:

Table 10.1

Revenue Schedule			
Units of x	TR	AR	MR
1	Rs.5	Rs.5	Rs.5
2	Rs.10	Rs.5	Rs.5
3	Rs.15	Rs.5	Rs.5
4	Rs.20	Rs.5	Rs.5
5	Rs.25	Rs.5	Rs.5

The revenue schedule indicates that as the firm goes on selling more and more units its total revenue goes on increasing. Each unit is being sold at Rs. 5/-. The price is given and constant and thus the AR (which is equal to price) remains the same. Besides every additional unit of X is also sold at Rs. 5/- the Marginal Revenue (additional revenue from additional unit) also remains Rs. 5/-.

Let us now translate the revenue schedule into revenue curves. The Total Revenue curve starts from the origin and slopes upwards from left to right. But the **AR curve is horizontal** and what is still more important is that the **MR curve coincides with the AR curve**. There is no difference between AR and MR. For a firm under perfect competition AR = MR. Thus, **the horizontality of AR curve is the acid test of a firm under perfect competition**. In other words if any firm is facing a horizontal AR curve then we can at once conclude that it is working under the condition of perfect competition. The **AR** curve explains the price and output relationship and **is thus also the demand curve of the firm's product**. It is important to note that the demand curve of the firm is different from the industry demand curve. The industry demand curve is downward sloping, i.e. it slopes downwards from left to right indicating that for the industry to sell more of its

output the price should be low. At lower price, more units of industry's product will be demanded in the market.
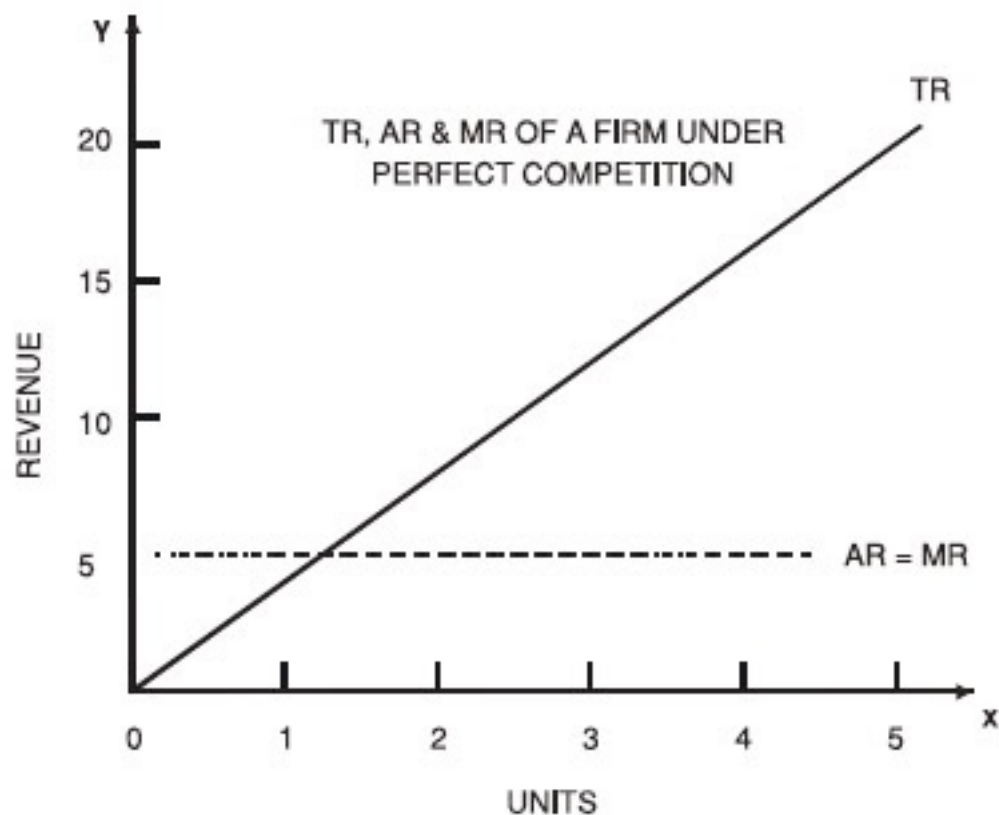
Fig 10.1 Revenue Curve

But the demand curve of a firm is horizontal, as explained above, as the firm under perfect competition is just a price-taker. Whatever number of units it sells it will have to sell it at the going market price for the industry's product which is determined by the interaction of the forces of demand and supply of the product of the industry in the market. It is obvious that the industry's demand curve represents a much larger quantity compared to that represented by the firm's demand curve.

Fig. 10.2 Demand Curve of Industry & Film

B. Revenue structure under Monopoly

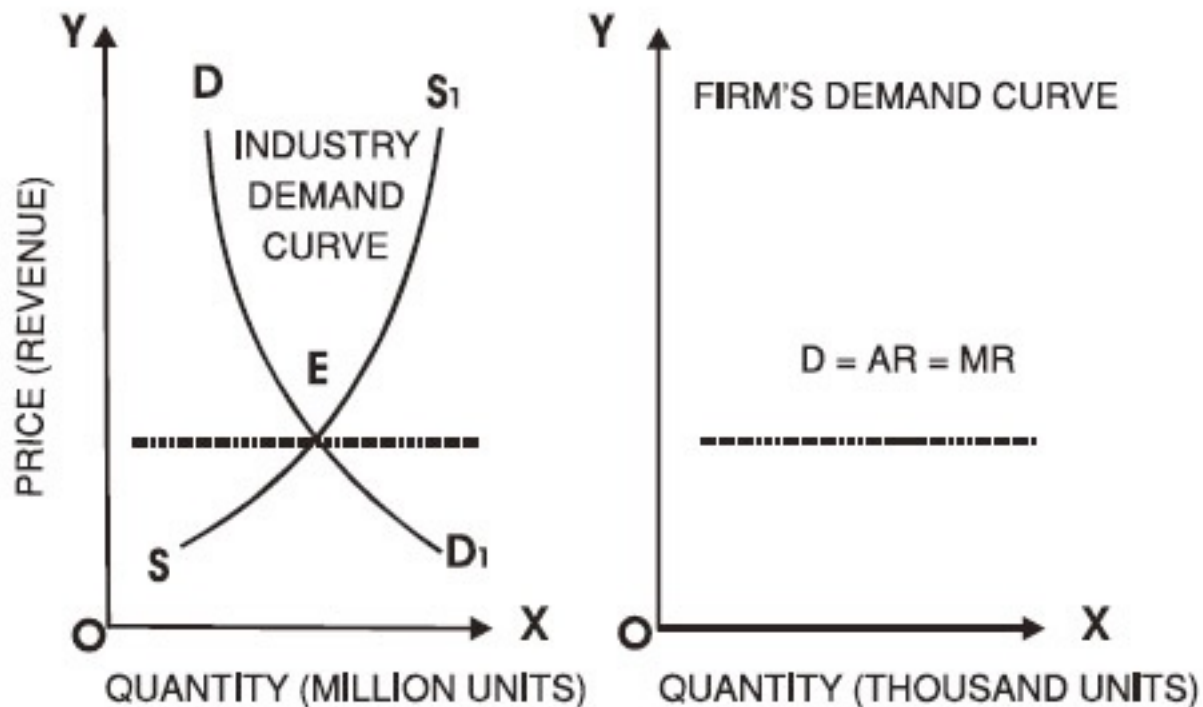**Monopoly is that market category in which a single seller dominates the market. There is only one producer (firm) and there are no substitutes for its product.** Since under monopoly there is just one firm producing a particular product there is no element of competition. Besides in the absence of any other firm producing homogeneous product the firm itself constitutes the industry. Hence it is futile to make any effort to distinguish between a firm and an industry under monopoly. **Under Monopoly, firm is itself an industry.**

The revenue structure under monopoly is bound to be different from that in case of a firm under perfect competition. Under perfect competition, the firm is a price-taker and not a price maker and its AR curve is horizontal denoted by perfectly elastic demand curve. But **a monopolist is not a price-taker; he is price-maker**. In order to sell more of his output he will lower the price. As the monopolist supplies more and more units of his product the price gets slightly reduced. The Total Revenue increases but a diminishing rate. The average revenue goes on falling. The marginal revenue too is falling.

Table 10.2

Revenue Schedule			
Units of x	Total Revenue	Average Revenue	Marginal Revenue
1	10	10.0	10
2	19	9.5	9
3	27	9.0	8
4	34	8.5	7
5	40	8.0	6
6	45	7.5	5
7	49	7.0	4

In fact the marginal revenue is falling at a rate faster than the average revenue. When we transform the average revenue and marginal revenue readings from the Revenue Schedule into a graph, we observe;
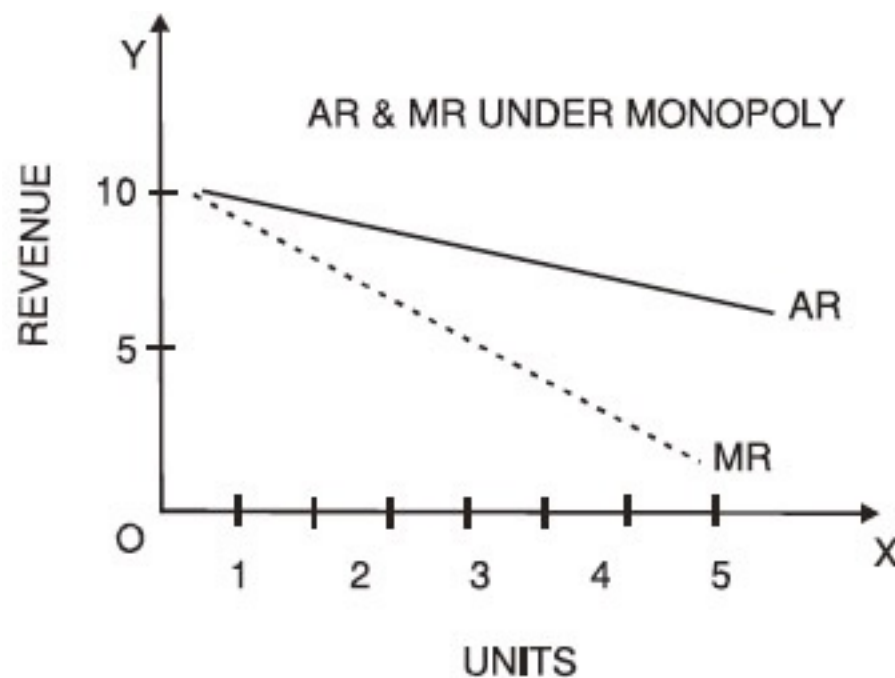
Fig 10.3 AR & MR Under Monopoly

ii) MR curve lies below AR curve and MR curve is steeper than the AR curve.

Besides this simple relation between AR and MR under monopoly there are a few significant observations which need to be highlighted.

I. The Average Revenue curve cannot cut X-axis, Marginal Revenue curve can. The explanation is rather simple. Average revenue, as we saw earlier, is nothing but the price. If the average revenue curve touches X-axis then the

price for every unit of total output is reduced to zero and if, even by mistake, the average revenue curve cuts the X-axis and goes below X-axis then the price would become negative. This would be absurd and irrational. Thus the average revenue curve cannot cut the X-axis. However, the marginal revenue curve can cut the X-axis. This is because by the very definition marginal revenue is the additional revenue from the additional unit of the output sold. The last unit could be given away free. This does happen in bulk purchases e.g. if a consumer purchases 100 units of X for Rs. 1000/- then he may be given 101st unit of X free. This implies that the Marginal Revenue of 101st unit is zero. Hence, it must be noted that the AR cannot cut X-axis, MR can.

II. Under Monopoly, if AR is in the form of a straight line then MR lies exactly halfway between AR and the Y-axis.
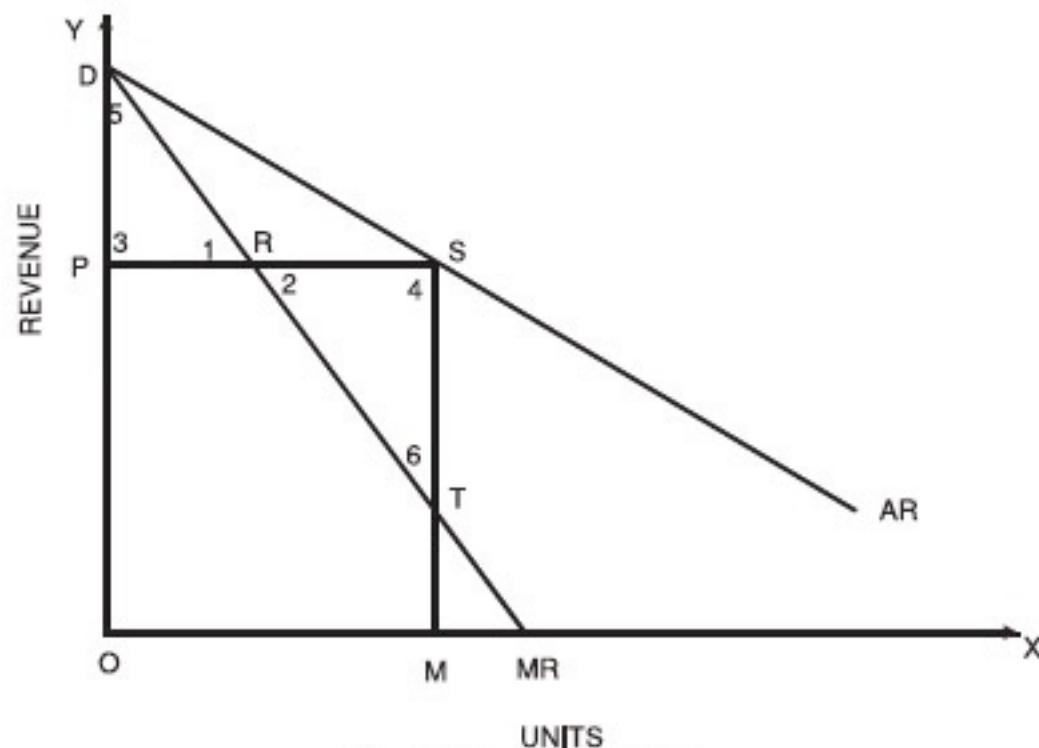
Fig. 10.4 Linear AR & MR Curves

There exists some unique geometrical relationship between AR and MR. In case when average revenue is in the form of a straight line i.e. if AR is a straight line then MR lies half way between AR and the Y-axis.

Let AR be the given average revenue curve. MR lies below it. Select the price OP and quantity of output OM. We may now proceed to show that since AR is a straight line, MR lies way between AR and Y-axis.

To Prove that: PR = RS

Proof: Total Revenue = P x Q

$$\therefore \quad TR \; = \; OP \times OM$$

| | = | area PSMO | ...I |

Similarly,

| Total Revenue | = | Sum of all MRs | |
| | = | area DRTMO | ...II |

From I & II we get,

area PSMO	=	area DRTMO
But PSMO	=	PRTMO + RST
and DRTMO	=	PRTMO + DPR
PRTMO + RST	=	PRTMO + DPR

area RST = area DPR

Now in the △s DPR and RST we observe :

1 = 2 (Vertically Opposite angles)

3 = 4 …. (Right angles) and

5 = 6 …. (Alternate angles)

Thus the three angles of one triangle are respectively equal to the three angles of the other triangle.

Hence the triangles DPR and RST are equal in all respects.

PR = RS

Thus when the AR is a straight line then MR lies 1/2 way between AR and Y-axis.

10.3 RELATION BETWEEN AR, MR, AND ELASTICITY OF DEMAND

Average Revenue, Marginal Revenue and Elasticity of demand are closely related concepts. Let us proceed to derive the formula to express their interrelationship.

Let us assume that linear demand function is represented by DD_1. Using the point elasticity method, elasticity of demand at point T on DD_1 is given as:

$$\therefore E_d \text{ at pt } T = \frac{D_1T}{DT}$$
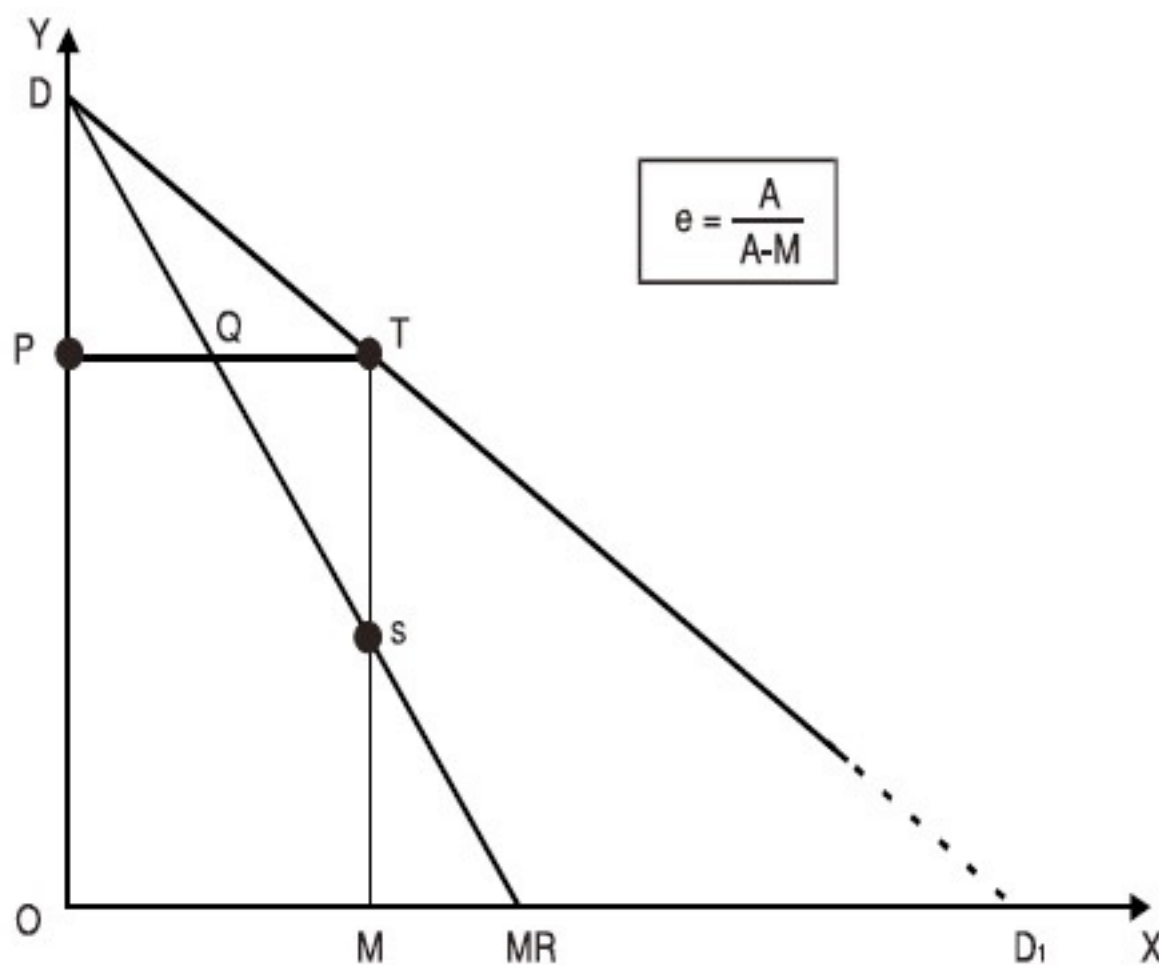
$$e = \frac{A}{A-M}$$

UNITS OF X

Fig. 10.5 AR, MR & Ed

$$\therefore e = \frac{D_1T}{DT}$$

Consider "DPT and "TMD₁. They are similer triangles and as in similar s the ratios of the sides are equal.

$$\therefore \frac{DT}{DT} = \frac{TM}{DP}$$

$$\therefore e = \frac{D_1T}{DT} = \frac{TM}{DP} \text{............I}$$

Further, the $\triangle$ s DPQ and QTS are equal in all respects

$$\therefore DP = TS$$

Substituting the value of DP $=$ TS in conclusion I, we get,

$$\therefore e = \frac{D_1T}{DT} = \frac{TM}{DP} = \frac{TM}{TS}$$

$$\therefore e = \frac{TM}{TS}$$

But TS = TM-SM

Now TM represents the Average Revenue and SM represents the Marginal Revenue.

$$e = \frac{\text{Average Revenue}}{\text{Average Revenue - Marginal Revenue}}$$

$$\boxed{\therefore e = \frac{A}{A - M}}$$

This is a very important relationship which we have obtained relating the average and marginal revenues with elasticity of demand.

Since $e = \dfrac{A}{A-M}$ We can express this formula in terms of M as follows:

$$e = \dfrac{A}{A-M}$$

$$\therefore eA - eM = A$$

$$\therefore eA - eM = eM$$

$$\therefore \dfrac{A(e-1)}{e} = M$$

$$\therefore M = \dfrac{A(e-1)}{e}$$

Further

$$A = M\dfrac{e}{(e-1)}$$

The above derivations have immense practical utility. We can use these interrelationships to work out some important exercises under monopoly.

10.4 OBJECTIVES OF A FIRM

Normally, the objective of the firm is to maximize profits. Any producer, who behaves rationally is assumed to be working for procuring maximum profits. Thus profit maximization has been the traditionally accepted objective of the firm.

Empirical observations, however, have shown that profit maximization is not the only objective nor is it the most important one for a firm. To quote **G. L. Nordquist, "Like an ill-fated ship, the theory of the firm came under fire almost immediately after being launched. The chief trouble with the traditional theory of the firm lies in the assumption that the firm is motivated by the objective of profit maximization. The criticisms for this conventional assumption range from the assertions that firms typically maximize something other than profit to claims that they do not maximize, cannot maximize and do not even care to maximize."**

Often it is found that the entrepreneurs do not care to maximize profits but strive to earn a satisfactory return. **Prof. Herbert Simon**, thus, indicates that instead of 'profit maximisation' the firm adopts goal of '**satisfactory return.**' This is more meaningful as it makes allowances for all kinds of '**psychic income**' derived by the entrepreneur from his business activity. How can one justify the creation of art films? What the producer gets here is the psychic income and not maximum monetary gain. **Gaining reputation as a good businessman** in eyes of the people more than compensates for not earning maximum profits. Similarly **serving quality product** and **maximizing sales** gives immense psychological satisfaction to the entrepreneur.

In fact, business goals which are manifold seem to vary from firm to firm. According to **K. Rothschild**, the primary objective of a firm is **long-run survival**. Thus business firms are interested in '**safety margins of profits**' rather than its maximization. **Peter Drucker** argues that; "the guiding principle of business economics… is not the maximization of profits, it is the **avoidance of loss**." Whereas **Prof. Hicks** maintains: "**the best of all monopoly profits is a quiet life.**" The objectives thus vary from time to time and from firm to firm. No one objective can be singled out as the only motive of the firm. Let us, therefore, analyse some of the important objectives of a firm.

A. Profit Maximization

Traditionally, profit maximization was assumed to be the only objective of a firm. The price-output policy of the firm will be so adjusted that the firm should earn maximum profits. Profits depend on the Cost and the Revenue structures of the firm. If π represents profit, then

$$= R - C$$

i.e. producer aims at maximizing the difference between revenue and the cost. (For detailed analysis regarding the conditions necessary and sufficient to maximize profit refer to the next section).

In practice, however, firms rarely work to maximize profits. This could be due to a number of **reasons**:

i) If the firm maximizes profits then it will attract many more such producers to enter that field of production. It may thus attract rival producers.

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ii) It may arouse public opinion against itself because the consumers may get the feeling that the firm is maximizing profits at their cost. The consumers may develop a feeling of being exploited.

iii) It may even attract the attention of the government. The tax-axe may be sharpened to fall heavily on such a firm or there is also a threat that the government may resort to nationalization or enter the same line of production.

iv) Profit maximization may imply that the reputation of the firm is at stake. It could be at the cost of personal reputation or shading off of the goodwill.

v) The producer who only chases profits, loses out perhaps on leisure. He invites risks and deprives himself of the pleasure of leading a quiet life. Thus he may rest content with safety margins of steady profits that should allow him to enjoy quiet-life.

B. Sales Maximization

Prof. W. J. Baumol, based on his experience as a management consultant, has suggested that the **firms strive to maximize sales revenue subject to the realization of some minimum level of profit**. 'Once a minimum profit level is achieved, sales rather than profits become the overriding goal.' By sales maximization Baumol does not mean the maximum sales of physical units of output but he implies the maximum total revenue from the sale of the output. To quote Baumol, "**Sales maximization under a profit constraint does not mean an attempt to obtain the largest possible physical volume. Rather, it refers to maximization of total revenue which, to the businessman, is the obvious measure of the amount he has sold**."

One of the implications of Baumol's sales maximization theory is that price will be lower and output greater under sales maximization than under profit maximization. Thus the oligopolists' behaviour, motivated by Baumol's principle will increase consumer's welfare because in the market larger output will be sold at lower price. Attempts have been made to criticize the sales maximization model yet despite criticism, Prof. William Baumol's Sales Maximization Hypothesis has emerged as one of the most realistic objectives of the firm.

C. Quiet-Life and Stable Profits

Prof. J. R. Hicks has been one of the first to express doubts about the firm's desire to maximize profits especially under monopoly conditions. He believes that people in monopolistic positions are likely to exploit their advantage much more by not bothering to get very near the position of maximum profit, than by straining themselves to get very close to it. **The best of all monopoly profits is a quiet life**. It may also be pointed out that instead of just maximizing profits once in several years and then under the uncertainty conditions suffering losses or struggling to keep up positive profits it would be worthwhile if the firm aims at stable and secured profits over a long period of time. **Prof. K. W. Rothschild** in his analysis on Price Theory and Oligopoly states "**there is another motive which cannot be so lightly dismissed and which is probably of a similar order of magnitude as the desire for maximum profits : the desire for secure profits**." His contention is that profit maximization no doubt is the master key motivating the firm under perfect competition, monopoly and monopolistic competition but under oligopoly he argues that secure and stable profits should be emphasized.

D. Long-Run Survival and Growth

Some firms which aim at long-term survival and gains prefer to keep their prices down in the short-run. Some companies keep down the prices in order **to retain the 'goodwill' of the customers**. It is assumed that such good-will is worthwhile from the point of view of long-run gains. The best way to long-run profit is to survive in the short-run. The firms must have a sufficiently large clientele. It may have to undertake publicity, spend on advertisements, build up a goodwill, offer hire-purchase facilities etc. After overcoming the teething trouble of mere survival, the firm then derives growth. The long-run survival and growth have been regarded as other alternative objectives of the firm.

E. Growth Maximisation

Growth maximization as the prime objective of a firm was originally mentioned by **E. T. Penrose**. A more systematic argument elaborating the objective of growth maximization was developed by **Robin Marris**.

The manager of a large firm **aims at maximizing the growth and promoting security of his firm**. The high salary of the manager in a large

firm provides incentive to enhance the size of the firm beyond the profit maximizing size.

Marris has introduced a **steady-state growth model**. Under this, managers decide upon a constant rate of growth at which the sales, profits, assets etc. of the firm should grow. A choice of a higher growth rate necessitates increasing expenditure on advertisement, research and development etc. Such growth promoting activities will be financed through retaining higher proportion of profit. A consequent decline in dividend causes a reduction in the market value of shares. Hence, the managers prefer to achieve that rate of growth at which the market value is enhanced.

F. Other Alternative Approaches

i) Balance-sheet Homeostasis: Boulding tried to revise the theory of the firm by introducing the ideal of 'balance-sheet homeostasis'. The concept of homeostasis supposes that there is **some desired set of accounting ratios** that management attempts to maintain, for an equilibrium of the balance sheet. **Stability gains prime consideration** and thus quest for 'profit max' assumes a secondary role.

ii) Behavioural Theory: In recent years, a movement to develop a theory of the firm on **'behavioural' lines** has received considerable attention. The names of **R.M. Cyert** and **J. G. March** are associated with this approach. The theory assumes full understanding of **internal operations of the firm as well as its external environment**. Unlike the conventional theory of the firm with a single goal of profit maximization, the behavioural theory does not assume that the firm has a single goal of profit maximization. The Behavioural theory does not assume that the firm has only a single goal to achieve. Instead, according to **Cyert and March, a business firm has several goals**; (1) production goal; (2) inventory goal; (3) sales goal; (4) market share goal and (5) profit goal. To achieve these goals an organizational coalition is presupposed.

iii) The Utility Index Theory: Some economists like **Higgins, Scitovsky**, feel that the objective function of the firm be defined in terms of **an ordinal utility index** rather than profit. **J. Encarnacion** points out that in modern business, management behaves rationally to **achieve a set of well defined ordered preferences and tries to maximize a multivariate preference function subject only to certain constraints which inhabit the effort.**

Thus, the desire for leisure, the need for liquidity and the quest for profit are all incorporated in management's generalized problem of constrained maximization. The Utility Index Hypothesis has the advantage of placing the theory of the firm on an equal footing with the theory of consumer choice. In this connection let us consider satisfaction maximization and staff maximization axioms.

a) Satisfaction Maximization: Scitovsky, Higgins and others attach greater significance to **satisfaction maximization** as an objective of the firm in place of profit maximization. It is suggested that, like any other individual, an entrepreneur is also influenced by the motive to maximize satisfaction.

Maximization of satisfaction does not come from profit but involves a **comparison between work and leisure. According to Hicks, leisure or 'quiet life'** is an essential aspect of an individual's welfare. As the income increases an entrepreneur is observed to **prefer leisure to more work**. The greater the activity, efforts and work to maximize the profit, the less will be the leisure enjoyed. It is necessary to incorporate the preference for leisure while analyzing the behaviour of the entrepreneur for maximizing satisfaction to more work for maximization of profits.

b) Staff Maximization: In modern times, large corporations are run by professional managers. A firm is not necessarily one-man managed concern. There is now separation between ownership and control. Under such circumstances **Berle and Means** indicate that **the managers instead of maximizing profits try to justify their own utility by employing more than necessary staff**. Under such circumstances the managers may trade-off some profits for employing more staff. This is the utility maximization theorem.

To conclude in words of **Gerald Nordquist; "Neither of these approaches, however, has yet produced an alternative which has sustained enough recognition to replace the traditional theory of the firm. Despite the scores of assaults on it over a period of more than twenty years, the battered and bruised neo-classical theory somehow manages to stand as the principal model of the firm's output, cost and price behaviour."** As long as a suitable replacement of a workable dynamic framework for analyzing business decision is developed, the conventional theory of firm with all its shortcomings is not likely to be totally discarded.

Activity A

Review published accounts of a renowned firm, and list its objectives as apparent in the schedules and reports.

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10.5 BREAK-EVEN ANALYSIS

The traditional objective of a firm is to maximize profits. Maximum profit and Minimum cost do not necessarily coincide. Profit maximization output cannot be known beforehand and even if it is known, it cannot be achieved at the outset. Thus, often in practice the firms begin their activity even experiencing a loss so as to gain the anticipated profit in future.

Break-even analysis has to do with the understanding of the concepts of Total Revenue and Total Cost. It so happens in the process of production that the firm may have to start incurring costs even before actual production begins; most of these costs are in the nature of fixed cost and hence the Total Cost Function will be an intercept on the y-axis. Even when output is zero some cost element will exist. But when no unit is sold then revenue is zero. Thus cost is higher than the revenue. There is an element of loss. But as unit after unit of the product gets sold, revenue starts accruing. The producer experiences a situation where he heaves sigh of relief. i.e. the TR will just cover TC. i.e. TR = TC. The output at the level of which TR = TC, after having experienced losses earlier in the working of the firm is indicative of Break-even point. In other words, the **Break-even point is defined as that point where the level of output is so reached that TR = TC; and hence the net income equals zero**.

For a firm producing a single product, the BEP may be computed either in terms of units of product or in terms of total rupee sales. The **Break-even volume is the number of units of product that must be sold in order to generate enough Revenue just to meet all expenses, both fixed and variable.**

We can explain the Break-even point concept with the help of the following diagram:
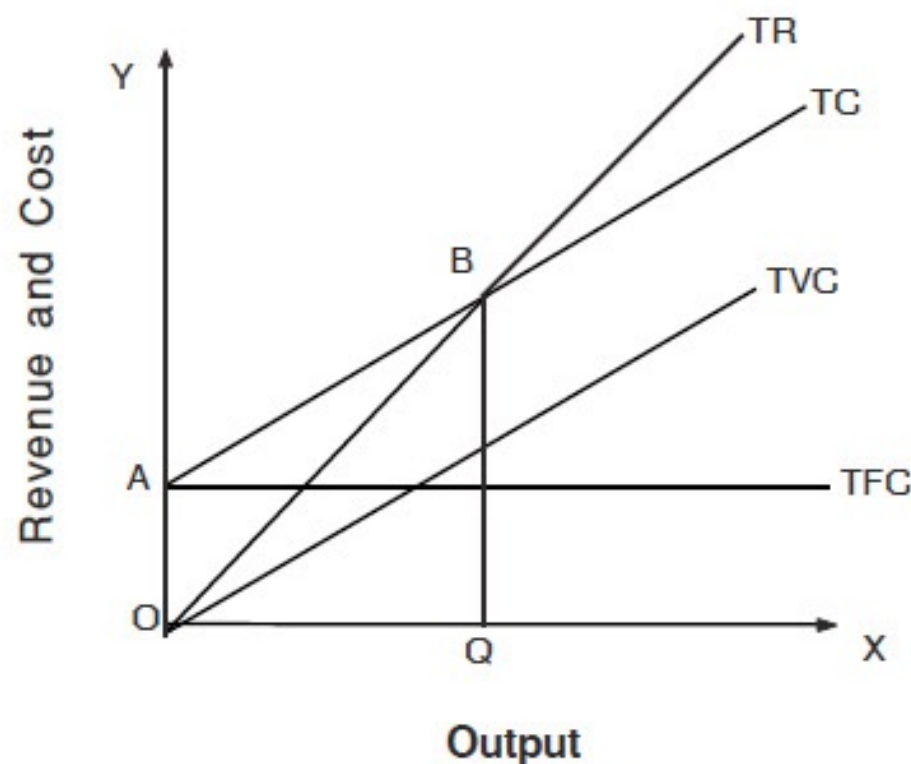
Output

Fig. 10.6

On the X-axis let us represent the output and on Y-axis we have the Revenue and Cost. TFC represents total fixed cost; making an intercept on y-axis. TVC represents total variable cost. TC represents the total Cost. TR is the Total Revenue Curve. Till the output level is OQ, the total cost is more than total revenue and therefore the area ABO indicates the area of losses. But as output reaches OQ, TR = TC at pt. B. Once the output goes beyond OQ, TR is more than TC and hence the area of profit begins. Thus, **point B is called the breakeven point**.

Algebraically, the Break-even volume is given by the formula:

$$\text{Break - even volume} = \frac{\text{Total Fixed Cost}}{\text{Price - Variable Cost}}$$

$$\text{Break - even product} = \frac{\text{Fixed Cost}}{\text{Marginal Contribution per unit}}$$

Let us consider an illustration:

If the fixed cost of a firm is Rs. 14,000.

Variable cost per unit is Rs. 30/-

Price per unit is Rs. 100/-

At what level of output will the firm break-even?

$$BEP = \frac{Fixed\ Cost}{Price - Variable\ Cost}$$

$$= \frac{14,000}{100 - 30}$$

$$= \frac{14,000}{70}$$

$$= 200\ units$$

In accounting sense,

Sales Value is Rs. 100 X 200 = 20,000

Cost is : FC Rs. 14,000

VC Rs. 30 X 200 = 6,000

Total Cost is Rs. 14,000 + Rs. 6,000

TC is Rs. 20,000

Thus Sale value of Rs. 20,000 = Cost of Rs. 20,000.

TR = TC

i.e. Rs. 20,000 = Rs. 20,000

Total Profit is nil.

Thus 200 units is Break-even level of output.

Activity B

Scan Income Statement of a firm known to you, select certain expenses and construct Break Even point. State assumptions required for this exercise.

_____

_____

_____

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Assumptions underlying Break-even analysis

i) The behaviour of Costs and Revenues can be reliably determined and remain linear over the relevant range.

ii) Costs can be classified into fixed and variable components.

iii) FC must remains constant over the range of the output.

iv) VC vary proportionately with the volume of output.

v) Selling prices do not alter.

vi) Prices of factors remain unaltered.

vii) Productivity and efficiency remain unchanged

viii) Volume is the only factor affecting cost.

ix) There is uniformity in the value of Rupee at production point and at sales point.

x) The volume of sales and the volume of production are equal.

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Limitations of Break-even analysis

According to Joel Dean:

The limitations of BEA arise from various sources such as "errors of estimating the true Static Cost function, over-simplification of the Static Revenue function, dynamic forces that shift and modify these static functions and managerial adaptations to the altered environment."

a) With costs the analysis is weak because the linear relationships do not hold good for all levels of output.

b) With increase in sales, the firm uses the plant and equipment beyond capacity.

c) New plant added or O.T. done increases costs sharply.

d) Over period of time the product undergoes changes in quality.

e) Depreciation estimates are quite arbitrary.

f) Matching time of output and cost is a serious limitation because output in a particular period may not be the result of cost of that period. It becomes tedious to synchronise such costs with the output.

g) The linear break-even analysis assumes selling price constant over the range of output.

h) Changes in pattern of demand, concessions, mix product impair the accuracy of the analysis.

i) Break-even analysis is essentially static in nature. Dynamic forces impose added restrictions of break-even analysis. It assumes technology, scale of plant and efficiency constant and does not make adjustments to provide for changes in factor prices.

j) Break-even charts are based on the assumption that profit is the function of output and has nothing to do with sales effort.

k) The simple type of BEA does not consider elements of uncertainty due to changes in tax structure.

Uses of BEA

1. BEA is a useful tool of managerial planning and decision-making.

2. It is a simple and inexpensive device.

3. It is useful as a frame of reference and a vehicle for expressing the over-all performance in situations where no such information is available.

4. It is useful to management because it provides information for decision-making.

SUGGESTED READINGS

Stonier and Hague: A Textbook of Economic Theory.

Cooper W.W.: Theory of the Firm.

E.A.G. Robinson: The Structure of Competitive Industry

G.L. Nordquist: The Break-Up of the Maximization Principle

W.J. Baumol: Economic Theory and Operations Analysis

Joel Dean: Managerial Economics

10.6 SUMMARY

The income receipt by way of sale proceeds is the revenue of the firm. Price of the Product multiplied by units of output sold provides Total Revenue (TR). TR divided by units sold provides Average Revenue (AR) of the firm. Additional revenue from selling additional unit is firm's Marginal Revenue (MR).

Under perfect competition there are many players and only one price for the product. Hence AR is equal to MR.

In monopoly market there is only a single seller dominating the market and there are no substitutes to the product sold. The firm itself is an Industry. If monopolist wants to sell more, the price has to be dropped. Hence AR curve moves downwards from left to right. MR curve lies below AR curve and is steeper.

Some of the important objectives of the firm are Profit maximization, Sales Maximization, Stable Profits, Long Run Survival & Growth.

Break-even volume is the number of units of product that must be sold in order to generate enough revenue just to meet all expenses, both fixed and variable. Break-even analysis is based on several assumptions and has certain limitations. It is simple tool of managerial planning and decision making.

10.7 SELF ASSESSMENT QUESTIONS

1. Explain the concepts of TR, AR and MR

2. 'Horizontality of AR curve is the acid test of a firm under perfect competition'. Discuss.

3. Show that in case of a firm under Perfect Competition AR = MR.

4. Explain the relation between AR & MR under Monopoly.

5. 'Under monopoly AR cannot cut X-axis, MR can'. Explain.

6. If A represents Average Revenue, M represents Marginal Revenue and e represents elasticity of demand then
    i) e = ….…..?
    ii) M = ….…..?

7. Show that AR is nothing but the price.

8. 'Profit Maximization is the only objective of a firm'. Do you agree? Give reasons.

9. Outline the various objectives of a firm.

10. "The best of all Monopoly Profits is a quiet life." Explain.

11. Do you think that a firm can achieve all the important objectives simultaneously? If yes, how? If no, why?

12. Practical Work: Visit a few firms. Find out the objectives of these firms. Have their objectives changed from time to time ? If yes; Why?

13. Illustrate graphically the concept of Break-Even point.

14. How will you proceed to determine the Break-Even volume?

15. What are the assumptions of Break-Even analysis?

16. Narrate the limitations of BEA.

17. Outline the uses of BEA.

18. Visit a few firms. Collect information from them about their knowledge of Break-Even Point.

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REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video

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11

Equilibrium Condition under Profit Maximization

Objectives:

After completing this chapter, you will be able to understand:

• Computation of Equilibrium Point Using TR & TC or MR & MC.

Structure:

11.1 Introduction

11.2 Maximum Profit

11.3 Summary

11.4 Self Assessment Questions

11.5 Activity

11.1 INTRODUCTION

The term equilibrium in the context of the Theory of the Firm is used to denote that stage which is attained by the firm where it has no inclination to either expand or contract its output. Such a stage is reached when the firm is maximizing its profits. Thus **a firm is in equilibrium at that point where it enjoys maximum profits**. The point of profit maximization is, therefore the point of equilibrium of the firm.

Now profit depends on two factors : viz

1. The Revenue Structure and
2. The Cost Structure.

We must, therefore, consider both the revenue and the cost structures simultaneously in order to determine the extent of profit. We have studied the various concepts of revenue as well as costs; viz. total revenue, average revenue, marginal revenue, total cost, average cost and marginal cost. We can derive total profit comparing either total revenue with total cost, or average revenue with average cost or Marginal revenue with Marginal cost.

Therefore,

1. Total Revenue – Total Cost = Total profit

2. Average Revenue – Average Cost = Average profit and if we multiply the average profit by the units of output sold we will derive total profit. AP x Q = Total Profit.

3. Marginal Revenue – Marginal Cost = Marginal profit and the aggregate of Marginal profits = Total profit.

$$\mathcal{E}\, MP_s \;=\; \text{Total profit}$$

11.2 MAXIMUM PROFIT

A firm is not just concerned with finding out its total profit but its objective is to maximize total profit.

I. Total Revenue - Total Cost Method

Since TR – TC = Total profit, then the total profit will be maximum at that level of output where the difference between total revenue and total cost is maximum. If Total Profit is denoted by π Total Revenue is denoted by R and Total Cost is denoted by C.

then π = R - C

and Maximum π = Maximum difference between R and C

i.e. π Maximum = (R - C) Maximum.

Let us derive the condition for profit maximization in case of a firm under conditions of both perfect and imperfect competition, with reference to TR and TC.

A. The Case of a Firm under Perfect Competition

Let us represent the units of output produced by the firm on the X-axis and total revenue and total cost on the Y-axis. As seen earlier the Total Revenue curve in case of a firm under perfect competition will be a straight line TR, as each unit of output sold fetches successively the same price in the market. e.g. if one unit fetches Rs. 5/- then two units will fetch Rs. 10/- and three units will fetch the total revenue of Rs. 15/-.

The total cost is represented by the normal type of Total Cost Curve. It should be noted that TR must start from the origin because when the number of units sold is zero, the total revenue will also be zero. But the total cost curve need not start from the origin because total cost comprises of total fixed cost and total variable cost. Thus even when the output is zero the firm might have incurred some total fixed cost. Hence, the total cost curve for zero output can be an intercept on Y-axis; i.e. it starts from point F. Let us now pitch the total cost curve against the total revenue curve. For the output OZ the total cost is above the total revenue curve. For the output OZ the total cost is above total revenue and therefore the firm suffers a loss. But once the output goes beyond Z then the total revenue is above total cost and from the

point B onwards the firm starts enjoying profits. Point B is thus regarded as the break-even point. The vertical distance between total revenue and total cost is maximum when the output is OM. If the output is either more than OM or less than OM, the total profit will not be maximum. Hence OM alone is the profit maximizing output and the firm will be in equilibrium when the output produced is OM, under given conditions of total revenue and total cost.
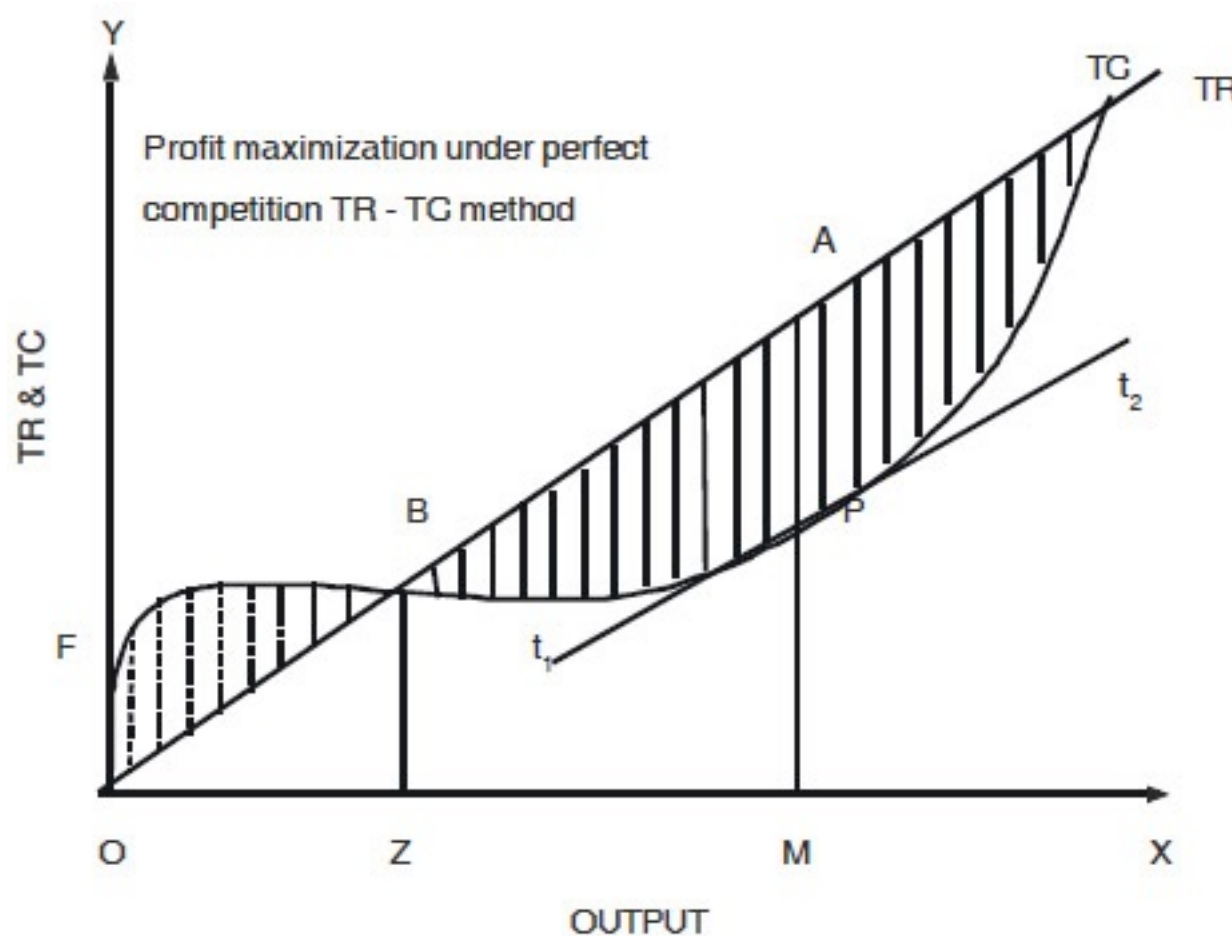

Fig. 11.1 Profit Maximisation Under Perfect Competition

B. The case of Firm under Imperfect Competition

Let us now consider the case of a firm under monopoly. Under monopoly the total revenue curve slopes upwards from left to right. It starts from the origin and it rises at a diminishing rate, bearing in mind that price per unit of output gets reduced as more and more of monopolist's output is sold in the market. The total cost structure rises and rises at a relatively faster rate as production increases. The total cost consists of total fixed cost and total variable cost. Even when output is zero, some fixed costs are incurred and thus the total cost curve is an intercept on the Y axis. Upto the output OZ,

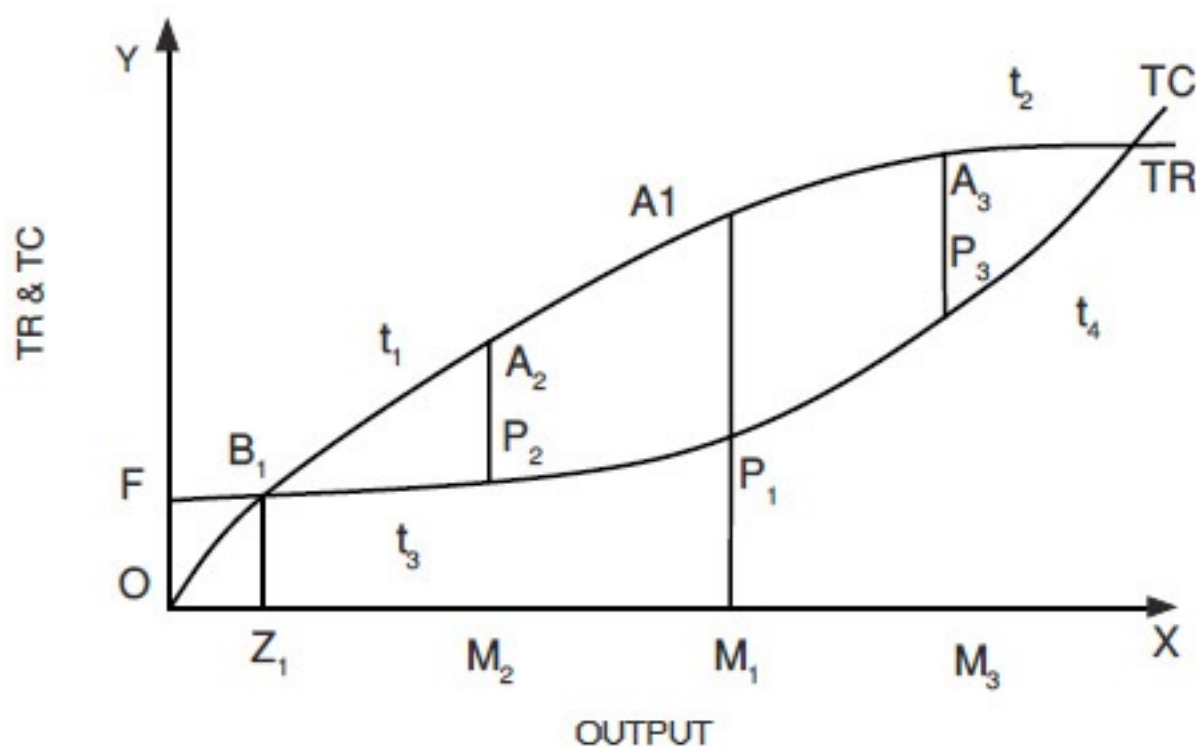## PROFIT MAXIMIZATION UNDER PERFECT COMPETITION
TR – TC METHOD

Fig. 11.2 Profit Maximisation Under Monopoly

the total cost is higher than the total revenue and hence the monopolist incurs a loss. Beyond OZ output the total revenue is higher than the total cost and the vertical distance between TR and TC curves indicate the amount of profit at different levels of output. It is only when the output level is OM, that the distance between total revenue and total cost is maximum. i.e. A_1P_1. The vertical distance between parallel tangents t_1t_2 and t_3t_4 (A_1P_1) is maximum between TR_1 and TC_1 and hence OM_1 alone is the profit maximizing level of output. Thus the profit maximizing output is obtained when the tangents to the total cost and total revenue curves are parallel.

II. Marginal Revenue-Marginal Cost Method

A more informative and more useful method of determining the equilibrium point of the firm is by comparing the marginal revenue with marginal cost. Let us, therefore, derive the equilibrium condition of the firm by applying this more useful method. The firm will be in equilibrium at that point where Marginal Revenue equals Marginal Cost **(MR = MC)**. This principle implies that a firm will go on producing the output as long as every additional unit produced adds more to its total revenue than what it adds to its total cost. The firm shall not produce any extra unit which adds more to its total cost than what it adds to its total revenue. Thus, the firm will maximize its profit by producing that level of output where MR = MC. Let us understand this profit

maximizing principle by considering a firm working under the condition of perfect as well as imperfect competition.

A. The case of a firm under Perfect Competition

Let us first consider a firm working **under condition of perfect competition.** The average revenue curve is given AR = MR. Suppose the Marginal cost structure is represented by the curve MC. Upto the level of output OQ the MC is higher than MR and thus the firm is incurring a loss. When the output is OQ, then MR = MC. But this is not the condition for equilibrium or profit maximization because so far the firm has not enjoyed any profit.

**PROFIT MAXIMISATION PERFECT COMPETITION
MR = MC METHOD**
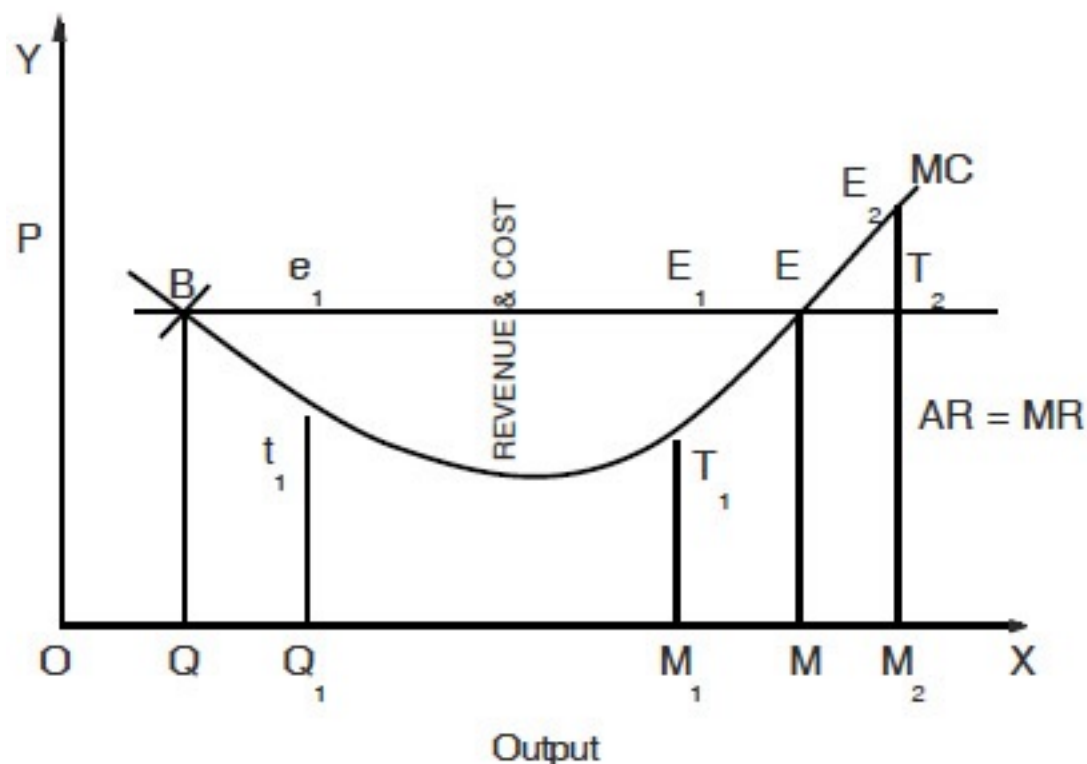
Fig 11.3 MR = MC Condition Under Perfect Competition

When the firm produces Q_1 unit of output, the profit for unit Q_1 is e_1t_1. And for subsequent units of output produced the firm continues to go on adding profit till unit M is produced. For the Mth unit of output MR equals MC. If the firm goes beyond OM units and produces one more unit, say M_2, then MC is M_2E_2 and MR is M_2T_2. M_2E_2 is higher than M_2T_2. Therefore E_2T_2 will be the loss. Hence the firm cannot hope to earn maximum profits by producing any unit beyond OM. If it stops producing at M_1 then it will miss the opportunity of earning extra profit of the area E_1T_1E. Thus to maximize profit the firm produces OM units of output. E is the point of equilibrium and at point E, MR = MC. MR = MC also at the output level OQ. But that is not the profit maximizing output; because beyond the output OQ, the marginal cost is

falling. There is scope for profit and more profit. When output is OM, we again have the situation where MR = MC. Output M is the profit maximizing output. At this stage the MC cuts MR from below.

Thus in terms of marginal revenue and marginal cost we derive the following conditions for Profit Maximisation under perfect competition.

> 1. MR = MC; (the necessary condition)
>
> 2. MC must cut MR from below; (the sufficient condition).

B. The case of a firm under Imperfect Competition

We may now consider the case of Imperfect Competition in order to derive the condition for profit maximization. Given the MR and MC curves, for producing "a" unit of output the monopolist incurs a cost of aa_1. When the firm sells this "a" unit it earns a return of aa_2. Therefore a_2a_1 is the profit for "a" unit. When they film produces b unit of output, the cost for producing the b unit is bb_1 and revenue from selling it is bb_2. Therefore b_2b_1 is the profit for b unit. The total profit from the two units a and b is $a_2a_1 + b_2b_1$. Upto M unit of output the revenue exceeds cost and thus each unit is profitable. But for the

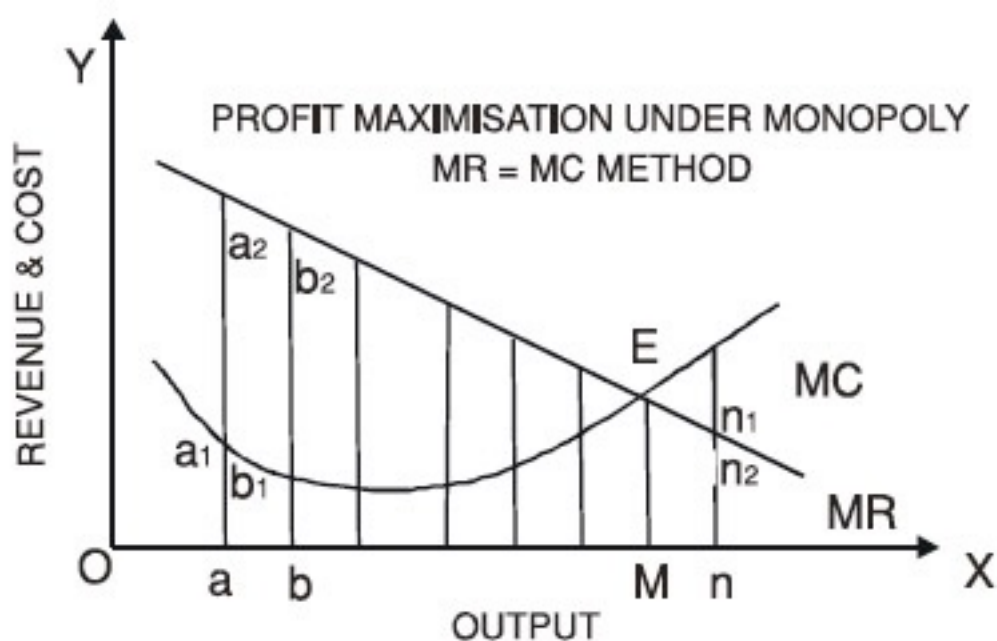

Fig. 11.4 MR = MC condition under monopoly

Mth unit MR = MC. If one more unit n is produced then MC exceeds MR and thus the producer incurs a loss o n_1n_2. Hence if the monopolist wants to maximize his profits he must produce the output only upto OM units. If he produces either less than OM or more than OM then profit will not be

maximized. E is the point of equilibrium. At point E, MR = MC. Hence the **Golden Rule for Profit Maximisation**:

$$MR = MC$$

Although we have considered these two alternative methods to derive the condition for equilibrium we can establish a mathematical identity between the two conclusions. Through the total revenue-total cost method we derived the condition that the profit maximizing output is where the vertical distance between tangents to total revenue and total cost is maximum. In other words, where the tangents to total revenue and total cost curves are parallel. Now tangent at a point determines the slope. Since the tangents at TR and TC at the profit maximizing output are parallel, the slope of TR = slope of TC. The slope of total revenue is the marginal revenue and the slope of total cost is nothing but he marginal cost.

Thus for profit maximizing level of output
Slope of Total Revenue = Slope of Total Cost
Marginal Revenue = Marginal Cost.

Hence only where MR = MC that profit is maximum. Thus, **equality between MR and MC is the necessary condition for equilibrium of the firm**

SUGGESTED READINGS

Stonier & Hague: A Text book of Economic Theory

Cooper W.W.: Theory of the Firm

Michael White: Theory of Firm

E.A.G. Robinson: The Structure of Competitive Industry.

Lipsey and Steiner: Economics

11.3 SUMMARY

Under Theory of Firm, a firm is in equilibrium at that point where it enjoys maximum profits. This point can be determined by using either Total cost & Total revenue method or alternatively by comparison of Average Revenue and Average Cost. Points of profit maximization vary under conditions of perfect and imperfect competition.

11.4 SELF ASSESSMENT QUESTIONS

1. Derive the condition for profit maximization given :
   i) TR and TC curves
   ii) MR and MC curves

2. Show that a firm is in equilibrium at that point where MR = MC.

3. MR = MC is a necessary condition for profit maximization under perfect Competition but it is not the sufficient condition. Explain.

4. In case of a firm under perfect competition equilibrium is attained at that point where MC cuts MR from below. Explain.

11.5 ACTIVITY

A. Visit a few firms. Find out the most common objectives of these firms. Arrange them in the order of priorities. Which is the objective that gets top priority?

B. Consider the case of a firm. Find out the total cost and total revenue of this firm for some levels of output. Plot the TR curve. Do you think that the firm is producing profit maximizing level of output? What advice will you give as an economist to this producer ?

C. Confirm from the producers whether they apply the theoretical considerations for determining the point of maximum profits i.e. are their policies in conformity with our theory?

<u>REFERENCE MATERIAL</u>
Click on the links below to view additional reference material for this chapter

<u>Summary</u>

<u>PPT</u>

<u>MCQ</u>

<u>Video</u>

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12

Equilibrium of the Firm under different Market Categories

Objectives:

After completing this chapter, you will be able to understand:

• Equilibrium under Perfect Competition & Monopoly.

• Profits, Output under Perfect Competition & Monopoly.

• Price Discrimination and Dumping.

• Monopoly & Oligopoly.

• Characteristics of Selling Costs

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Structure:

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12.1 EQUILIBRIUM OF A FIRM UNDER PERFECT COMPETITION IN THE SHORT-RUN

A firm is in equilibrium at that point where it maximizes its profit. The profit of the firm essentially depends on two factors, viz.

i) The Revenue structure and
ii) The cost structure

The Revenue Structure

Under Perfect Competition i.e. under perfect competition, **the average revenue curve is horizontal** because each firm under perfect competition is a price-taker and the **marginal revenue curve coincides with the average revenue curve**. Thus **AR = MR in case of firm under perfect competition**.

The Cost Structure:

The cost structure can be illustrated by the **U – shaped Average Cost curve**. i.e. the average cost curve is U – shaped and **the marginal cost curve cuts the average cost curve at the lowest point of the average cost curve**. i.e. when AC is falling, MC < AC; when AC is Minimum MC = AC; when AC is rising, MC > AC.
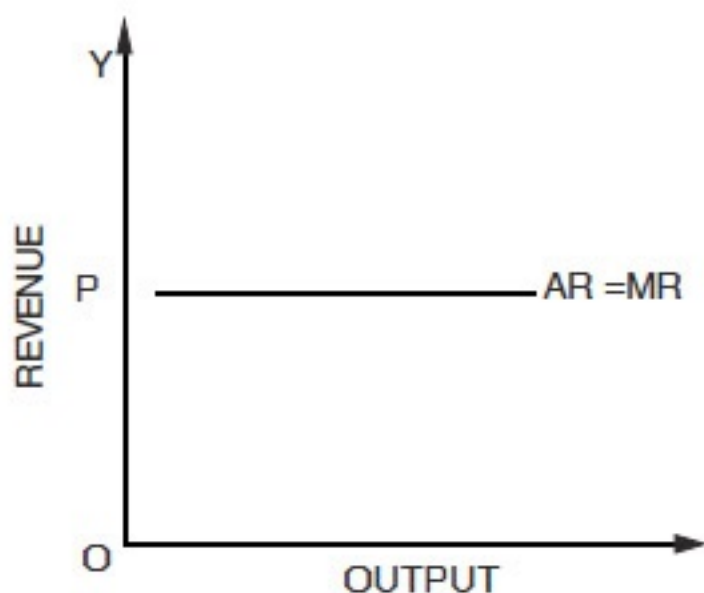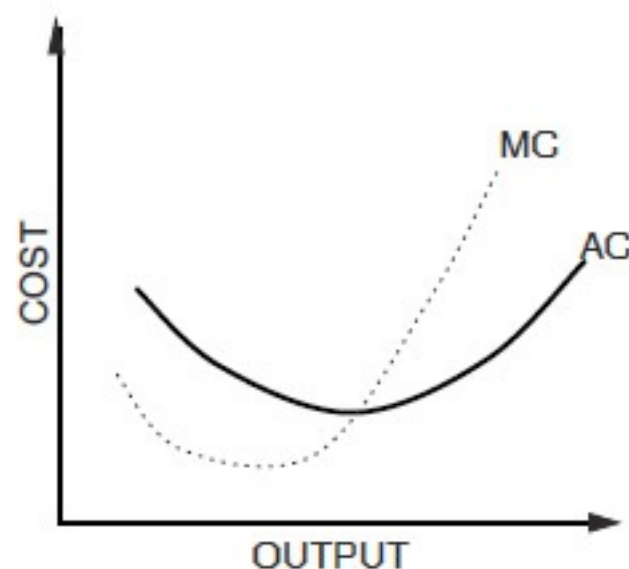

Fig. 12.1 AR = MR   Fig. 12.2 AC & MC

Necessary condition for equilibrium of a firm under perfect competition in the shortrun (MR = MC)

Fig. 12.3 MR = MC

In order to obtain the necessary condition for equilibrium of a firm under perfect competition in the short-run let us consider the revenue and cost structures simultaneously.

The average revenue curve is horizontal and marginal revenue curve coincides with the average revenue curve. Thus $P = AR = MR$. Let us also consider initially the given marginal cost curve, MC. Given these curves we may embark upon our analysis to locate the point of **profit maximization**. Let us assume that the firm produces 'a' unit of output. For the 'a' unit of output the marginal cost is aa_1 but the marginal revenue is aa_2. The marginal revenue is less than marginal cost and therefore a_1a_2 is the loss for unit 'a'. But the firm does not stop production at this stage because for the additional unit produced the marginal cost is less. Let us consider the unit b. For b unit, the marginal cost is bB and marginal revenue is also Bb. Thus for the b unit there is neither any profit nor any loss. The firm then produces c unit. For the c unit the marginal cost is cc_1 whereas marginal revenue is cc_2. Therefore, c_1c_2 is the profit for c unit. Similarly for d unit the profit is d_1d_2. For e unit of output the marginal cost is ee_1 and marginal revenue is ee_2. Therefore e_2e_1 is the profit for e unit. The profit from c, d and e units will be $c_1c_2 + d_2d_2 + e_1e_2$. Let us now consider the f unit. For the f unit the marginal cost is ff_1 and marginal revenue is $f f_2$. Therefore the profit for f unit is f_1f_2. The total profit from units c, d, e and f now is $c_1c_2 + d_1d_2 + e_1e_2 + f_1f_2$. Let us now consider

the unit g. For g unit the marginal cost is g g_1 and marginal revenue is g g_2. Thus for g unit the profit is g_1g_2. You will observe that g_1g_2 is less than f_1f_2. Therefore the profit for the g unit is less than profit from f unit, nevertheless it is an addition to the total profit. The firm goes on producing till unit M. For unit M the **marginal cost = marginal revenue** i.e. ME. If the firm produced even one unit more than OM, say n unit then the marginal cost for n unit is nn_1 and marginal revenue from n unit is nn_2. The cost exceeds revenue and there will be a loss. Hence when the output goes beyond OM, the profit cannot be maximum Thus in order **to maximize profit the firm must produce OM units of output, neither more nor less than OM**. When the output is OM, the Marginal revenue equals Marginal cost. Thus **equality between marginal revenue and marginal cost is the necessary condition for equilibrium**.

Sufficient condition for Equilibrium of a firm under perfect competition in the Shortrun (MR = Rising MC).

MR = MC not only at point E. If you observe very carefully then marginal revenue is equal to marginal cost even at point B; but B is not the point of equilibrium because upto that point the firm has not enjoyed any profit. It has only incurred losses. Therefore B can not be the point of equilibrium. Besides the firm starts enjoying profits only after this point because then the marginal cost is below the marginal revenue. Hence between B and E, the only point of profit maximization is E, although MR = MC at both B and E. The main factor which distinguishes point E from B is that at point E, the marginal cost is rising. Given the marginal revenue as horizontal straight line and since at point B the marginal cost is falling the cost will be below the revenue for an additional unit of output. This will yield profit to the firm. Whereas at point E, as the marginal cost is rising it will be higher than marginal revenue for an additional output beyond OM units and subsequently result in loss. Hence although MR = MC is the necessary condition for equilibrium it needs to be modified to derive the sufficient condition. The **sufficient condition for equilibrium of a firm under Perfect Competition is not just that MR = MC but MR must equal rising MC. i.e. for a firm to be in equilibrium under perfect competition in the short-run, the marginal cost curve must cut marginal revenue curve from below**.

12.2 EQUILIBRIUM OF A FIRM UNDER PERFECT COMPETITION IN THE LONG- RUN

Given the original average and marginal revenue (AR = MR) and the marginal cost curve (MC), let us assume that E is the original point of equilibrium where MR = rising MC. OM is the equilibrium level of output.
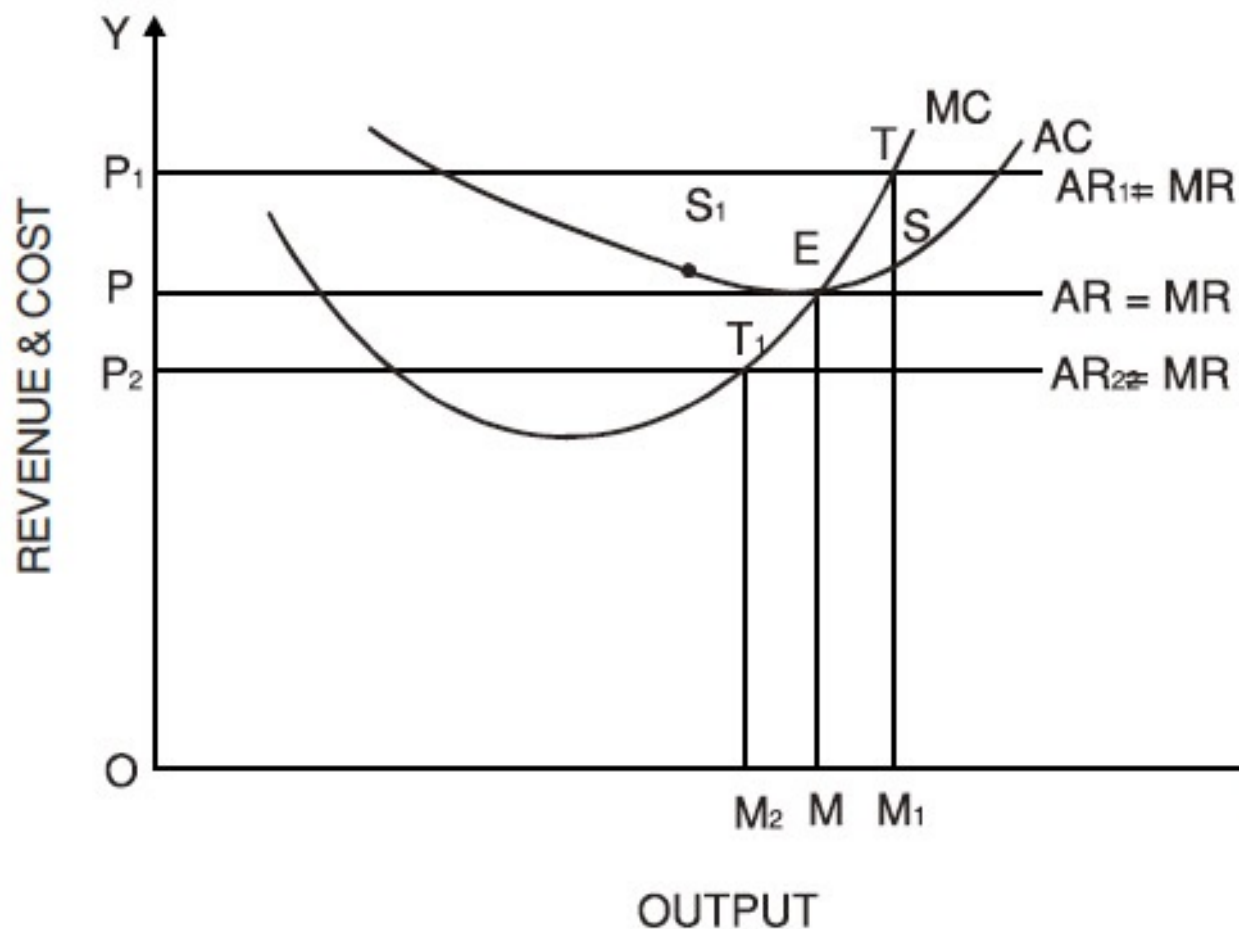
Fig 12.4 AR = MR = ↑ MC = MIN AC

Now let the price be OP_1. The revenue structure will now be represented by $AR_1 = MR_1$. The marginal cost cuts the new marginal revenue from below at point T. Thus T is the new point of equilibrium and the new equilibrium output is OM_1. Let us now introduce the average cost curve (AC) and as discussed earlier let us assume that the average cost includes normal profit. For the new equilibrium output OM_1, the average cost is M_1S and the new price is $OP_1 = M_1T$. Since average revenue is M_1T and average cost is M_1S and as $M_1T > M_1S$ the firm enjoys super-normal profit. **TS is thus the** super-normal profit. Now if the firm enjoys supernormal profit it tempts other firms to enter the industry. Free entry, i.e. entry without any restriction is an important characteristic of perfect competition. Thus new firms enter. More or new firms implies that the supply of the product in the market will increase and when the supply expands, the price of the product in the market will decline. Therefore, the price will move down from OP_1 to OP and **the original equilibrium will be restored at point E**. The super- normal profits of the

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firm will disappear and once again only normal profit will be enjoyed. **T was the point of only temporary equilibrium**.

Now let us consider the price to be OP$_2$. When the price is OP$_2$ the new equilibrium is at point T$_1$. The new equilibrium output is OM$_2$. Now when the output is OM$_2$, the average revenue is M$_2$T$_1$ and the average cost is M$_2$S$_1$. The average cost is higher than the average revenue.

The firm is incurring a loss; and if the firm can not enjoy even normal profit then it takes an exit. When firms begin to step out of the industry, the industry supply of the product falls, and as the supply shrinks, the price begins to rise. It goes up from OP$_2$ to OP, and once again the original point of equilibrium E is restored.

Now observe this point E very carefully. Just see how many things are equal at this point. At point E we find that the price, average revenue, marginal revenue, rising marginal cost and the minimum average cost are the same.

i.e. at point E,

$$AR \ = \ MR \ = \uparrow MC \ = \ Min \ AC$$

This is the condition for equilibrium of a firm under perfect competition. The point where MR = rising MC is also the point where the horizontal AR is a tangent to the AC at the minimum point of AC curve and the point where **Price = AR = MR = MC = Min AC** is the point of equilibrium of the firm under perfect competition.

12.3 THE SHUT-DOWN POINT OF THE FIRM

At this stage one very important question arises i.e. will a firm take an exit as soon as it incurs a loss? The answer will be in the negative. No doubt the aim of the firm is to maximize profit and when it incurs a loss it must try to **minimize its loss**. This implies that a firm should remain in production at least as long as its loss is minimized. To understand the shut-down point of the firm we shall have to reconsider the cost structure. When the average revenue is below the average cost then the firm is not enjoying profit but is incurring a loss. But the average cost itself is made up of average fixed cost

and average variable cost. Now, as long as the average revenue of the firm can cover its variable cost then the firm will continue to remain in production with the hope that it will be able to minimize its loss. **But if the revenue is not enough to cover even its variable cost then the firm must take an honourable exit.** It must shut-down at this stage and hence such a situation is called the **shut-down point** of the firm.

We can very conveniently elucidate the shut-down point graphically. Let us assume that the average revenue, marginal revenue, average and marginal cost curves are given. E is the original point of equilibrium of the firm where AR = MR = MC = Min AC.
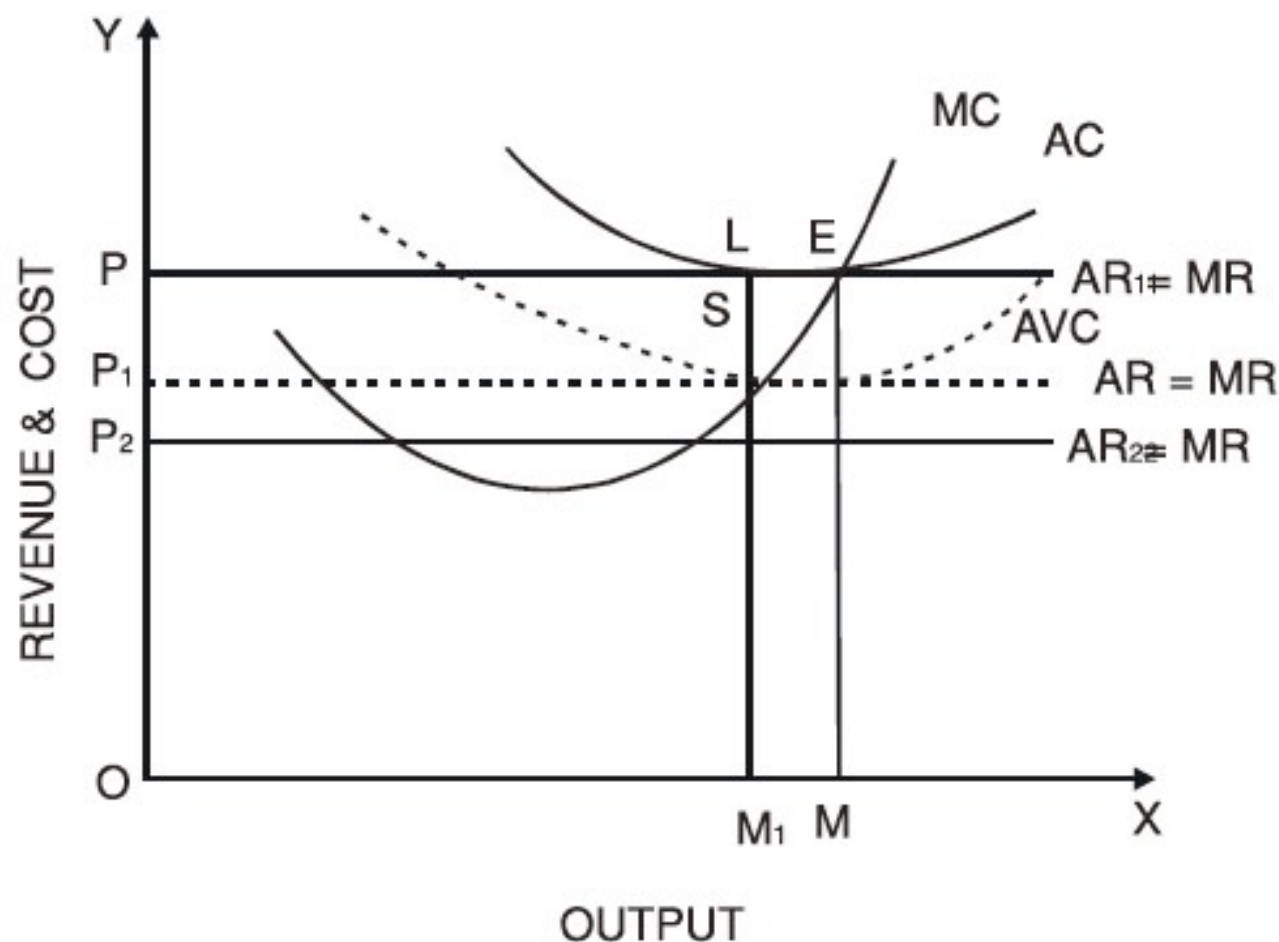
Fig 12.5 The Shut -down Point

Let the new price be OP_1 represented by $AR_1 = MR_1$. The new equilibrium point is S and the new equilibrium output is OM_1. At this level of output the average cost is M_1L and average revenue is M_1S. The cost exceeds revenue and thus LS indicates the loss. At this stage we consider the average variable cost curve. Let us suppose that AVC is the average variable cost curve. At point S, the AR just covers AVC. This is the maximum possible loss a firm can bear. If the price is even slightly lower than OP_1 say OP_2 then the average revenue will not be able to cover even the average variable cost and thus the firm will have no option left but to take an exit. Hence **point S may**

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be considered to be the shut-down point of the firm. It is therefore clear that under condition of loss, the firm tries to minimize its loss and thus continues to remain in production as long as the revenue can cover at least its variable cost. But even if the variable cost is not covered then the firm has to shut-down.

12.4 EQUILIBRIUM UNDER MONOPOLY

The Monopolist is in equilibrium at that point where he maximizes his profit. Profit of the monopolist will depend, as usual, on two factors; (i) the Revenue structure and (ii) the Cost structure.
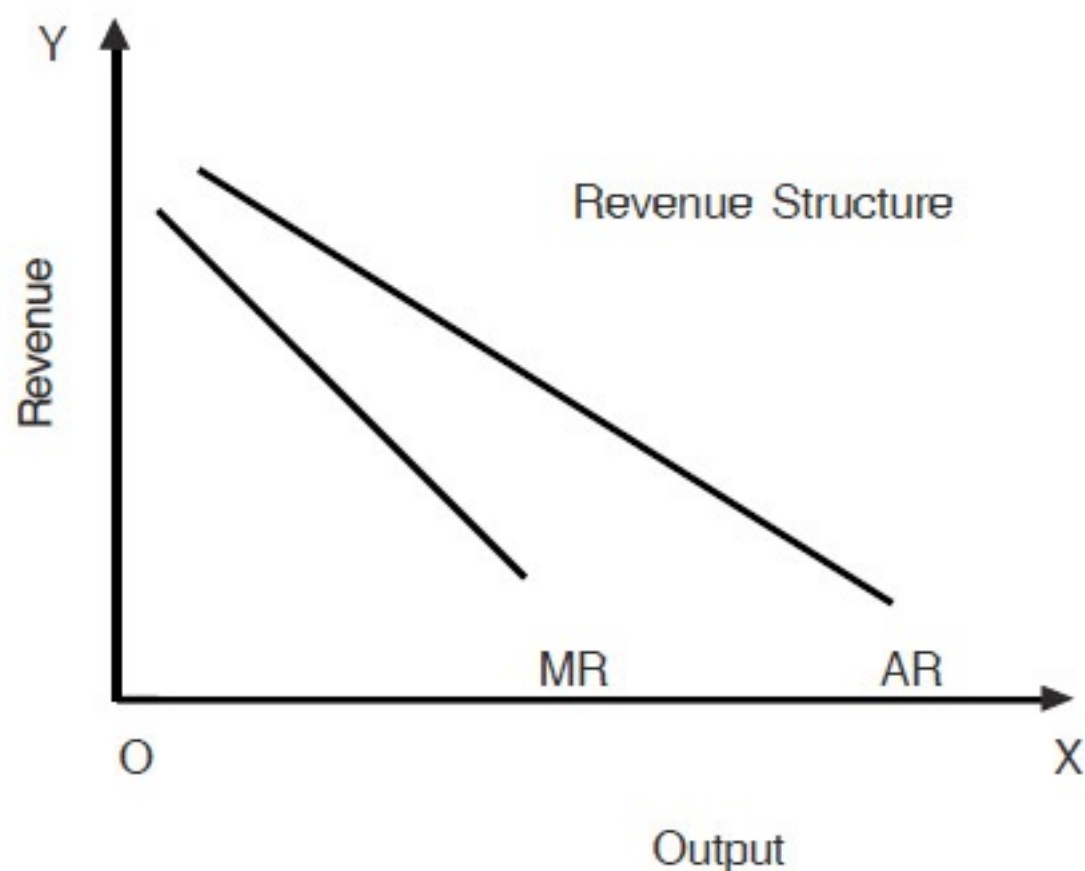
Fig 12.6 AR & MR Curves

In case of monopoly the average revenue curve slopes downwards from left to right and the marginal revenue curve lies below it. This implies that the monopolist can sell more only at lower price. Besides, as the average revenue is falling, the marginal revenue falls faster than average revenue.

The Cost Structure
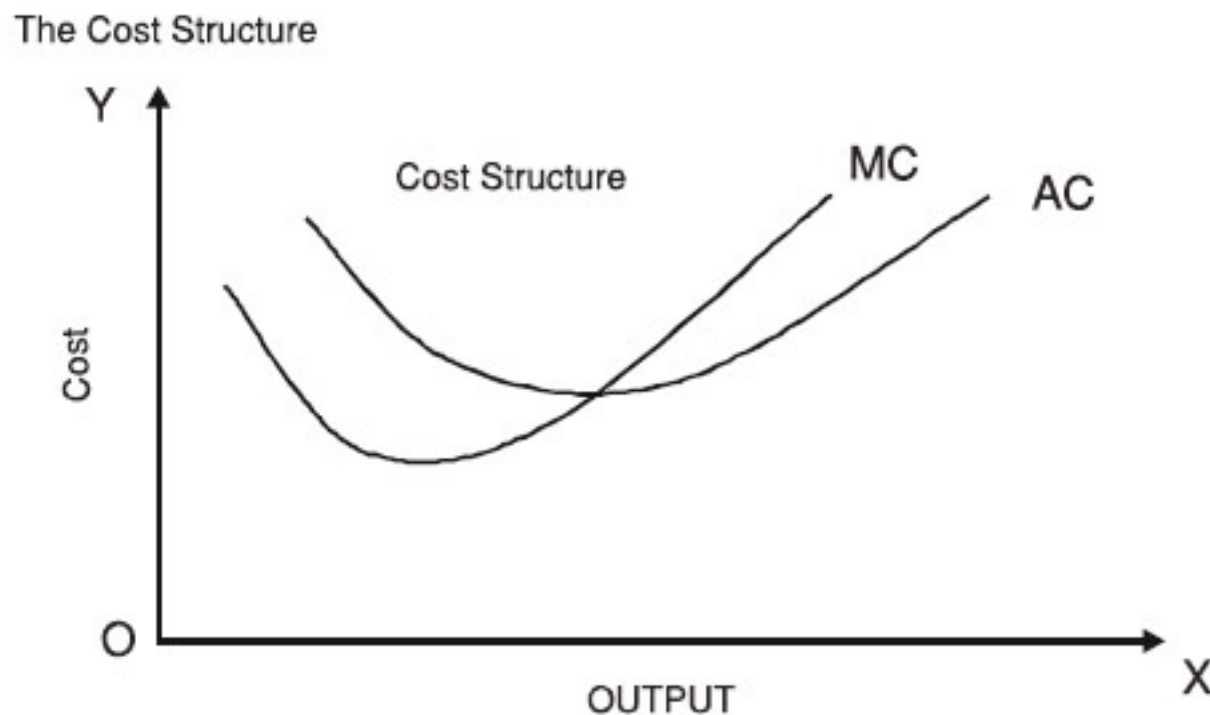
Flrg 12.7 AC & MC Curves

The cost structure under monopoly has no element of uniqueness. In the sense that just as under perfect competition the average cost curve under monopoly is also Ushaped in the short-run and the marginal cost curve cuts AC at the lowest point of the average cost curve.

The Golden Rule for Profit Maximization : MR = MC

To keep our analysis simple, to start with, let us consider only Marginal revenue and Marginal cost curves. MR is the Marginal Revenue curve and MC is the Marginal cost curve. Let the Monopolist produce 'a' unit of output. The marginal cost for producing 'a' unit is aa_1. When he sells this 'a' unit he gets the revenue aa_2. The marginal revenue aa_2 from unit 'a' is higher than the marginal cost aa1 and therefore a_2a_1 is the profit for 'a' unit. Now let the monopolist produce b unit. The cost for producing b unit is bb1 whereas the revenue from b unit is bb_2. Hence the profit from b unit is b_2b_1. Adding up the marginal profits from a and b we get $a_2a_1 + b_2b_1$. The monopolist will go on producing the output upto M unit. For the M unit, MR = MC. If the monopolist produces nth unit then for nth unit, the marginal cost is above marginal revenue and therefore the monopolist will incur a loss for the nth unit. Hence to maximize profit the monopolist will produce OM units, neither more nor less. E is the point of equilibrium. At point E, MR = MC and thus **the Golden rule for equilibrium under monopoly, MR = MC is established.**
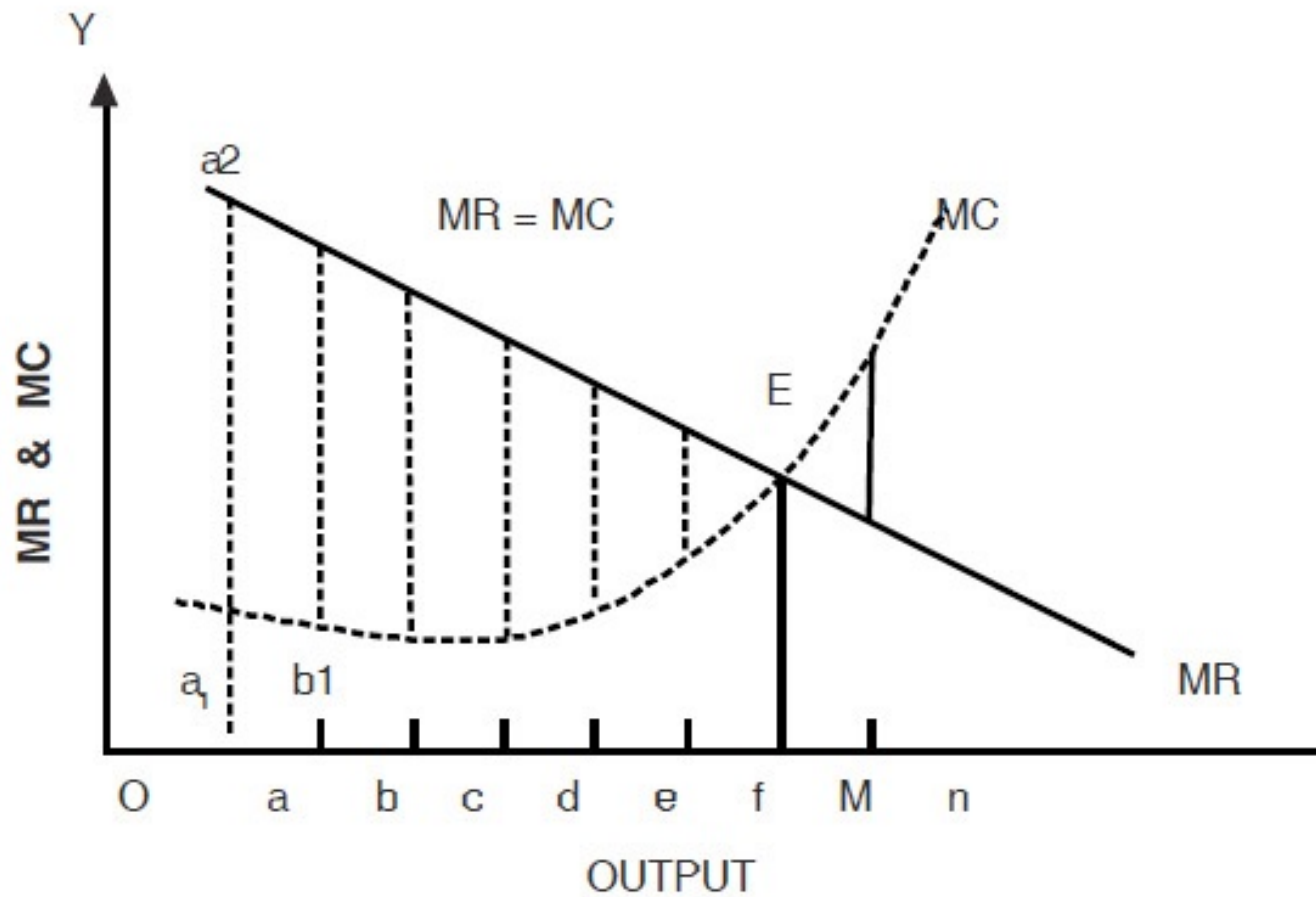
Fig. 12.8 MR = MC

Let us now introduce the Average Revenue and Average Cost curves in a similar diagram:
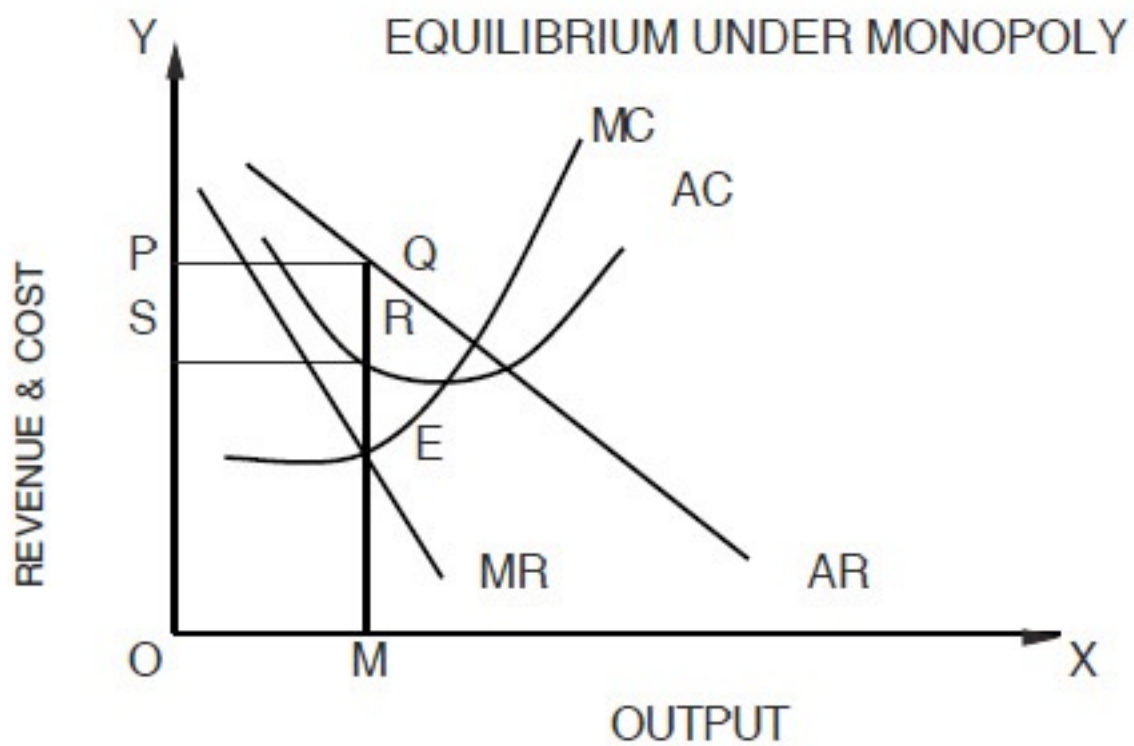
Fig 12.9 Equilibrium Under Monopoly

Given the Average Revenue and Marginal Revenue curves and the Given the Average Revenue and Marginal Revenue curves and the Average and Marginal cost curves, E is the point of equilibrium where MR = MC. **OM is the equilibrium output. The price is shown by the average revenue curve** and therefore corresponding to the equilibrium output OM, the price as shown by average revenue is OP. Now when the output is OM, the average revenue is QM and QR is the extent of average profit. The product of average profit (QR) and output (OM) is the total area of profit. Thus **PQRS is the area of supernormal profit of the monopolist**.

ELASTICITY OF DEMAND AND MONOPOLY EQUILIBRIUM

The concept of elasticity of demand has an important bearing on monopoly equilibrium. **A monopolist cannot be in equilibrium where elasticity of demand is less than one**. The monopolist will be in equilibrium at the point where he maximizes his profit. The condition for profit maximization which we have just derived is MR = MC.

We have also derived a formula which interrelates AR, MR and elasticity of demand.

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

$$e(A - M) = A$$

$$eA - eM = A$$

$$eA - A = eM$$

$$A(e-1) = eM$$

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

Now if e is greater than 1, then M is positive and if e is equal to 1, then M is zero. But if e is less than 1, then M becomes negative. When marginal revenue is negative, the profit cannot be maximum and if profit is not maximum then the monopolist cannot be in equilibrium. Thus **a monopolist cannot be in equilibrium where elasticity of demand is less than one**.

Activity A

Review companies included in BSE Sensex list and classify them into competitive & monopolistic firms. Provide reasons for your selection.

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12.5 COMPARISON BETWEEN PERFECT COMPETITION AND MONOPOLY

Having analysed at length the price-output policy and conditions of equilibrium under perfect competition and monopoly, for the sake of complete understanding we may now venture to compare these two market categories with respect to price, output, profit, revenue and cost considerations.

Given the diagrams depicting equilibrium of a firm under perfect competition and monopoly let us consider the various aspects for comparison.
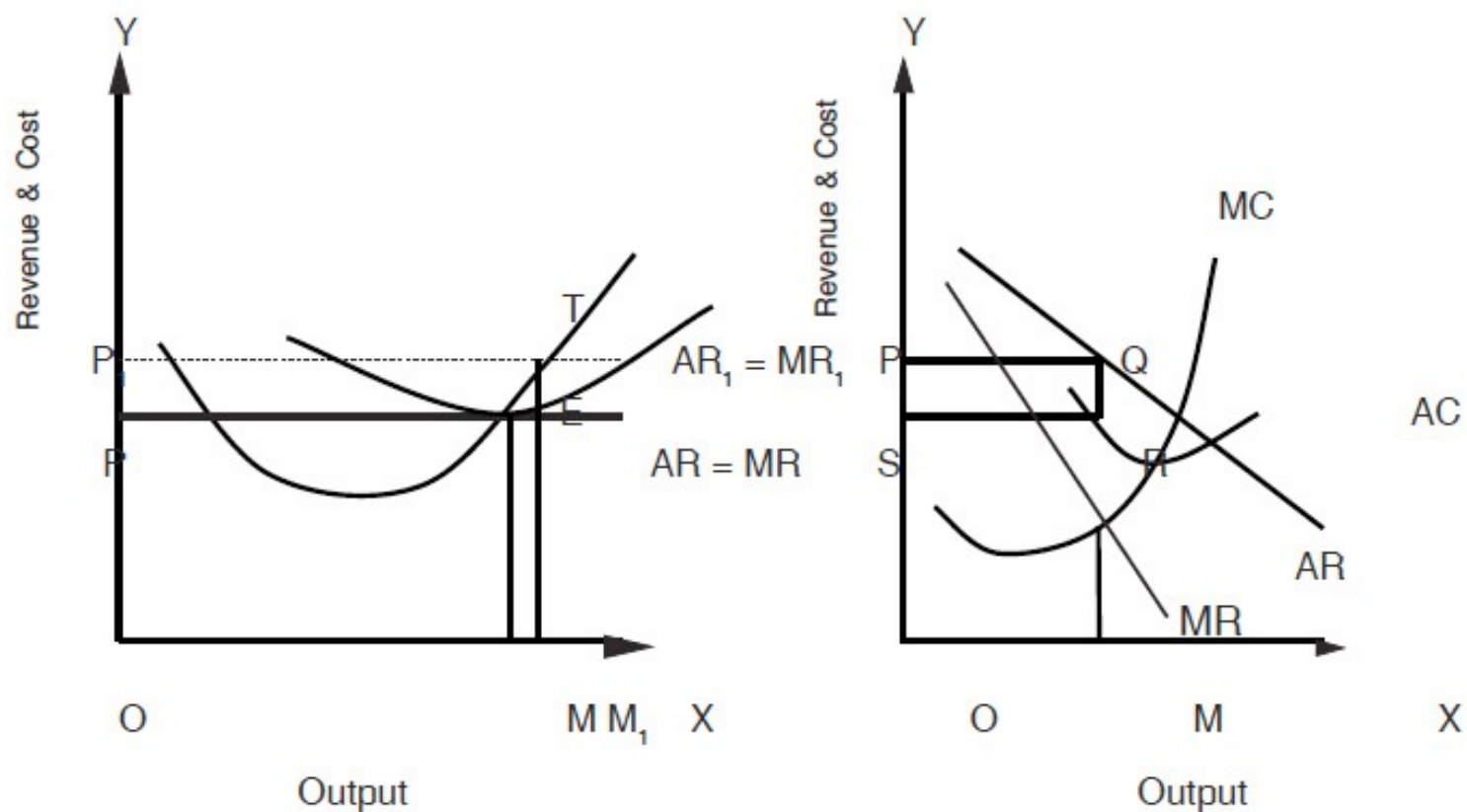
Fig 12.10 Perfect Competition & Monopoly Compared

1. **Price**: A firm under perfect competition is a **price-taker**. It has to take the price which prevails in the market whereas a monopolist is a **price-maker**. Besides in case of a firm under perfect competition the equilibrium condition demands that price = AR = MR = rising MC = Minimum AC. Whereas Price under monopoly is denoted by the AR curve and at the point of equilibrium the AR is above AC, MR and MC. Hence one is normally tempted to conclude that **price under monopoly is higher than price under perfect competition**.

2. **Output**: The firm under perfect competition is producing the output upto the point where average cost is minimum. This implies that output of a firm under perfect competition is optimum. The output is produced where AR = Minimum AC. The monopolist, on the other hand does not cease to produce the output upto the point where AC is minimum. He stops producing where MR = MC, because if he were to produce more than OM and upto the point where AC is minimum then his profit will not be maximum. Hence **under monopoly the output is restricted whereas under perfect competition the output is optimum**.

3. **Profit**: **A firm under perfect competition enjoys only normal profits in the longrun**. When it enjoys super normal profits new firms enter the industry. Supply increases; price comes down and super normal profits

disappear in the long-run. **But a monopolist normally enjoys super normal profits even in the long-run**.

4. **Revenue**: A firm under perfect competition is facing a **horizontal revenue curve**. Besides the Marginal revenue curve coincides with the average revenue curve. Thus AR = MR. **But in case of monopoly the AR curve is downward sloping and MR curve falls faster than the average revenue curve**.

5. **Cost**: In case of perfect competition a firm cannot be in equilibrium under condition of falling cost. **Thus falling cost are not compatible with equilibrium of a firm under perfect competition whereas a monopolist can be in equilibrium under conditions of rising, falling and constant cost**.

12.6 PRICE-DISCRIMINATION OR DISCRIMINATING MONOPOLY

Often do we come across situations when we find that a single producer sells his product at different prices to different buyers or in different markets. This practice of charging different prices to different buyers or in different markets for the same product is called Price discrimination. According to **Mrs. Joan Robinson, "the act of selling the same article, produced under a single control, at different prices to different buyers is called Price discrimination."** The person or firm practicing price- discrimination is the **Discriminating Monopolist**.

Price discrimination may take any of these three forms :

i) **Personal Price-discrimination**: i.e. different prices may be charged to different buyers for the same product, may be depending upon the individuals ability to pay.

ii) **Regional Price-discrimination**: i.e. different prices may be charged for the same product in different local markets. Local or regional price-discrimination depends on the differences in elasticities of demand for the product in different markets.

iii) **Trade Price-discrimination**: i.e. different prices may be charged for the same product depending upon the use to which the product is applied. e.g. a relatively lower price is charged for a unit of electricity when used

for industrial consumption purpose as compared to the price charged for the same unit of electricity for the purpose of domestic consumption.

12.7 CONDITIONS UNDER WHICH PRICE-DISCRIMINATION IS POSSIBLE

Price-discrimination is possible under following conditions:

i) **Imperfect Competition**: Price-discrimination is not possible under perfect competition because under perfect competition each firm is a price taker and we also assume perfect knowledge on the part of buyers about market conditions. Hence a producer cannot charge different price for the same product to different buyers. Therefore pricediscrimination can only be practiced under imperfect competition.

ii) **Absence of Resale possibility:** The fundamental condition which must be fulfilled if discrimination is to take place is that there should be no possibility of resale from one consumer to the other. Now if the same commodity is sold to Mr. A at Rs. 10/- and to Mr. B. at Rs. 9/- and if the buyers are interrelated then B will buy both the units at the price of Rs. 9/- each and resell it to A. In that case the monopolist will not be able to practice price-discrimination.

iii) **Differences in Elasticity of demand:** Perhaps the most important factor which promotes price discrimination is the prevalent differences in elasticity of demand for the product. It is due to differences in elasticity of demand for the product displayed by different consumers or in different regional markets that price-discrimination has become possible. In a market where demand for the product is relatively inelastic, the monopolist will charge a relatively higher price. **According to Mrs. Joan Robinson**, "the submarkets will be arranged in ascending order of their elasticities, the highest price being charged in the least elastic market and the lowest price in the most elastic market".

iv) **Relative immobility of buyers:** There should prevail no possibility of transferring the unit of demand from the high priced market to the low priced one or else it will be difficult for the monopolist to practice price-discrimination.

v) **Consumer's Peculiarties**: Price-discrimination takes place due to some of the peculiarities of the consumers:

a) **Ignorance**: The consumer may be ignorant of the price charged by the monopolist for the same product to the other consumers.

b) **Indifference**: The consumers do display the tendency to ignore minor price differences e.g. if Mr A is asked to pay Rs. 50/- for the product and Mr. B has paid Rs. 51/- then B may not bother much about this price difference. This attitude of indifference with regard to different prices charged for the same product to different buyers encourages the monopolist to practice price-discrimination.

c) **Illusion**: The consumers entertain some false notions. i. e. there is the tendency to believe that different price implies inherent qualitative differences in the product. Such beliefs encourage the policy of price-discrimination.

vi) **Personal Services**: In case of services which require personal touch and which are not subject to resale it is easy to practice price discrimination e.g. doctors, lawyers, hair-dressers, beauticians, auditors etc. can very conveniently practice price discrimination.

vii) **Regional distances and frontier barriers**: Regional distances account for transport cost and so also inter-regional exchanges involve tariffs and duties . These factors enable the monopolist to charge different prices in different regional markets for the same product and encourage price-discrimination.

12.8 PROFIT-MAXIMISATION UNDER PRICE-DISCRIMINATION

(When is price-discrimination profitable?)

The aim of the discriminating monopolist is to maximize profits. We can thus derive the condition of profit maximization under price-discrimination by extending the normal theory of the firm to a case where there are two or more markets instead of just one market. We can build up the theory of profit maximization on the basis of certain assumptions:

Let us assume that:

i) **There are two markets A and B**.

ii) The aim of the monopolist is to maximize profits.

iii) He enjoys monopoly position in both the markets.

iv) The elasticity of demand for the product in the two markets is different (This is perhaps the most essential condition for price discrimination to be profitable). Price discrimination, according to **Stonier and Hague** "will be profitable only if elasticity of demand in one market is different from elasticity of demand in the other. In general, it will pay a monopolist to discriminate between two markets only if elasticity of demand in one market is different from elasticity of demand in the other." Let us assume that the demand is relatively inelastic in market A and relatively elastic in market B.

v) We also assume that conditions do prevail for practicing price-discrimination.

vi) We also assume that the buyers in one market are not able to trade profitably by selling the good to the buyers in the other market.

Let us now analyse how the monopolist will determine the size of his total output and on what basis will he decide to distribute the output between the two markets A and B. What will be the price that he will charge in the two markets and how will he maximize his profits.

The condition for profit maximization is that the Marginal Revenue should equal Marginal Cost. However, the complication arises here because the producer is selling this product not in just one market but in two markets. Hence he is faced with the revenue structure in two markets. Given the marginal cost curve he aggregates the marginal revenue from market A and Market B and produces the output upto the point where **combined MR = MC**. He then distributes his output between the two markets in such a way that marginal revenue from both the markets will be the same, for if the marginal revenue from one market is more than the marginal revenue from the other then he will sell more in the former market till the marginal revenue in that market equalizes the marginal revenue in the other. Once the output gets distributed in the two markets on the basis of equal marginal revenue

from both the markets the price in each market is shown by the respective average revenue curves. Obviously the price in the market where demand is relatively inelastic will be higher than the price in the market where demand is relatively elastic. Hence price-discrimination will be profitable only when elasticities of demand are different in the two markets. There is no incentive for price discrimination if the elasticity of demand is the same in both the markets.

Let us now **assume that elasticity of demand is different in the two markets** A and B. If the elasticity of demand is low **in market** A; i.e. **demand is relatively inelastic**, the price can be raised in market A. Since the demand is relatively inelastic it is insensitive to rise in price and hence if the price is raised it will not cause much fall in demand. If the **demand is relatively elastic in market B** it will pay the monopolist to lower the price in B and increase the sales substantially. Now as in Market A since elasticity of demand is low, a decrease in sales will reduce revenue insignificantly, whereas in market B a reduction in price will add significantly to the total revenue. It will be profitable for the monopolist to transfer goods from Market A to market B. He will continue to transfer units from market A to market B till that point where marginal revenues are equal in both the markets. "It is also essential that not only the MR should be the same in each market but that the **MR should also be equal to MC of producing the whole output**." This then is the condition for equilibrium under discriminating monopoly.
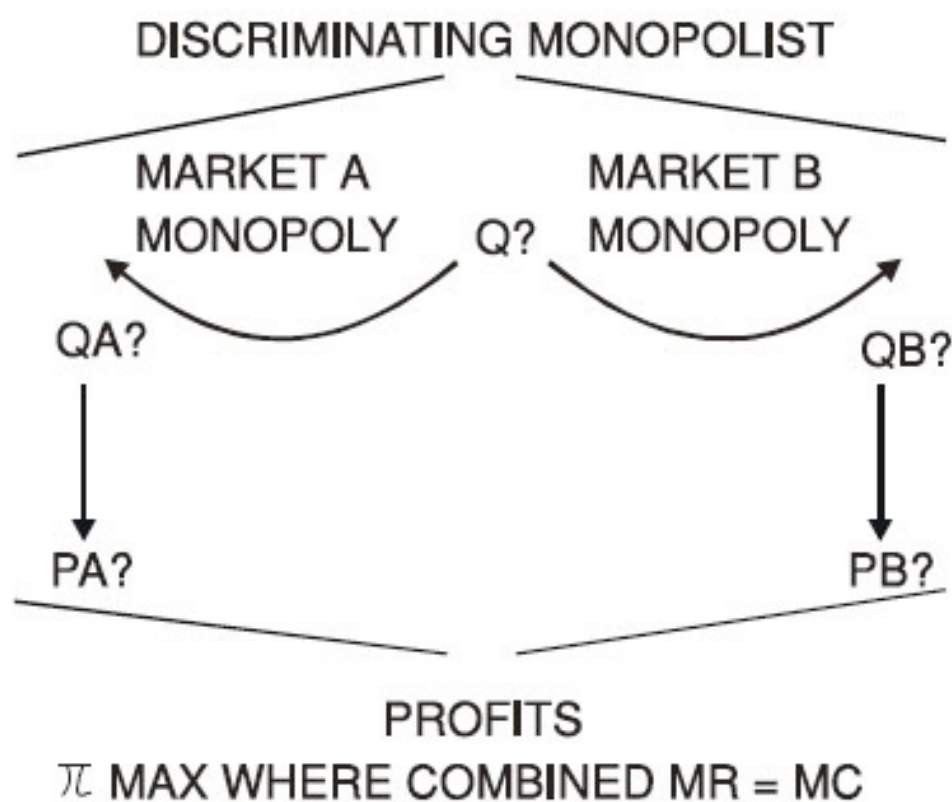
Fig 12.11 Issues Of Discriminating Monopoly

We can translate the entire explanation in the form of pictorial presentation. Let us consider the two markets A and B. In both the markets our producer enjoys monopoly. Hence the AR Curve is down-ward sloping and the MR curve lies below the average revenue curve. However, the **elasticity of demand for the product in the two markets is different**. In market A, the demand for the product is relatively inelastic and in market B the demand is relatively elastic. This is shown by the steepness in the average revenue curve in the respective markets and corresponding to the average revenue curves we have the respective marginal revenue curves.

In the third panel we have summed up the marginal revenue from the two markets. Given the marginal cost curve the producer will produce the output upto OM units where **combined MR = MC**. If he produces either more or less than OM then his profit will not be maximum. He now distributes his total output OM between the two markets A and B in such a way that the marginal revenue from the two markets is the same and that marginal revenue equals the marginal cost for the whole output. Thus he sells **OMa in market** A and **OMb in the market** B. The price in two markets are shown by the point on the average revenue curves corresponding to the level of output in each market. i.e. **in market A the price is OPa and in market B the price is OPb. It is quite obvious that the price in market A is higher than price in market B because the demand for the product is relatively inelastic in market A**. The total profit is indicated by the area ZTEG.
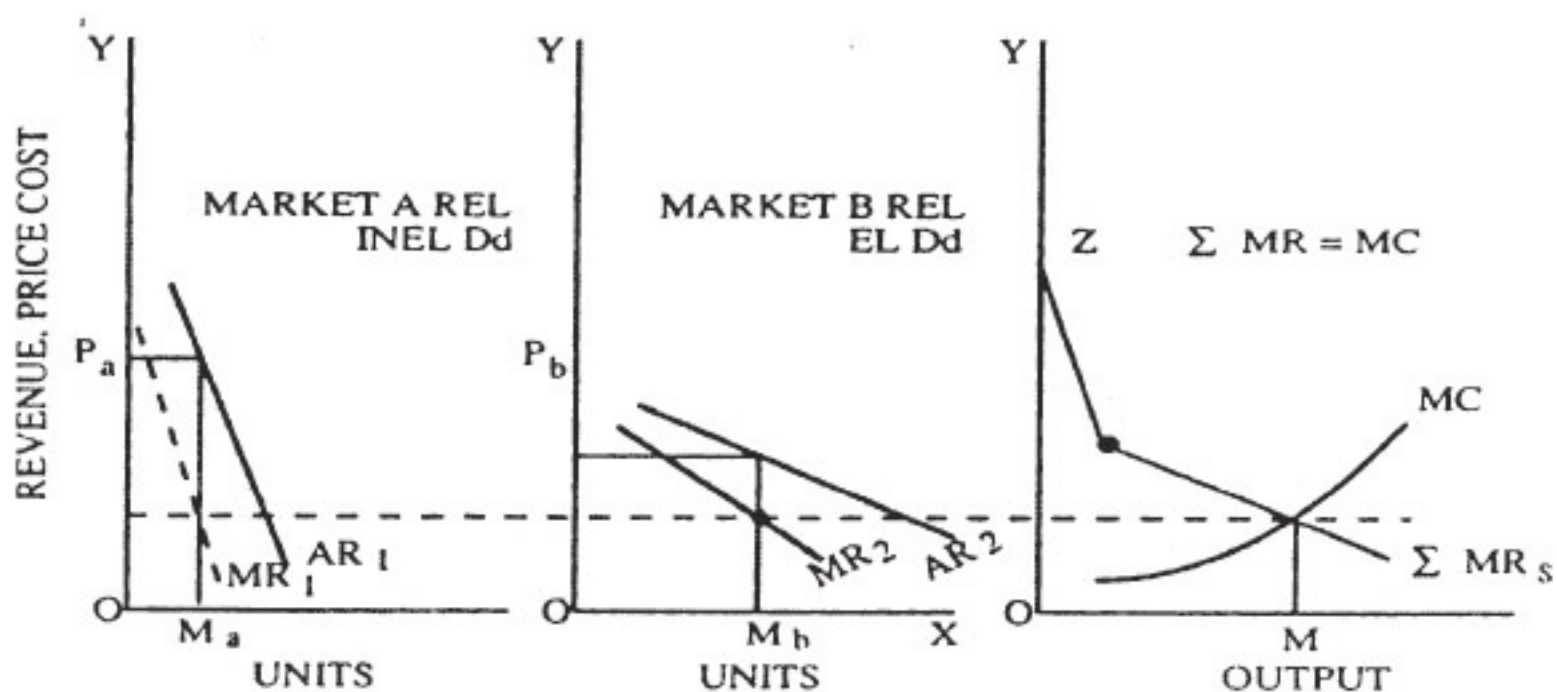
Fig 12.12 Monopoly in both Market

12.9 DUMPING

The term **Dumping means selling our product in foreign market at a price lower than in the home market**. Let us elaborate 'dumping' by considering the following illustrations:

Suppose the producer is selling in two markets; viz, the **home market** and the **world market**. In the **home market** he is saddled as a **monopolist but in the world market there is perfect competition**. Let us therefore analyse the price-output policy of the producer under this peculiar situation.

Since there is perfect competition in the world market, the producer has to take the price which prevails in the world market. This is represented by the horizontal average revenue curve ARW and the marginal revenue curve coincides with the average revenue curve. Thus ARW = MRW. However, in the home market he is a monopolist and therefore average revenue curve slopes downwards and the marginal revenue curve lies below it, both represented by ARH and MRH respectively. Given the MC curve the producer is in equilibrium at point E where **combined MR = MC**.

The **total profit maximizing output is OM. He sells OH in the home market and HM in the world market**; because upto H unit of output the marginal revenue in the home market is higher than the marginal revenue from the world market. But beyond the H unit he sells in the world market to enjoy higher marginal revenue from the world market. **OH + HM exhausts his total output OM**. Regarding the price, the producer
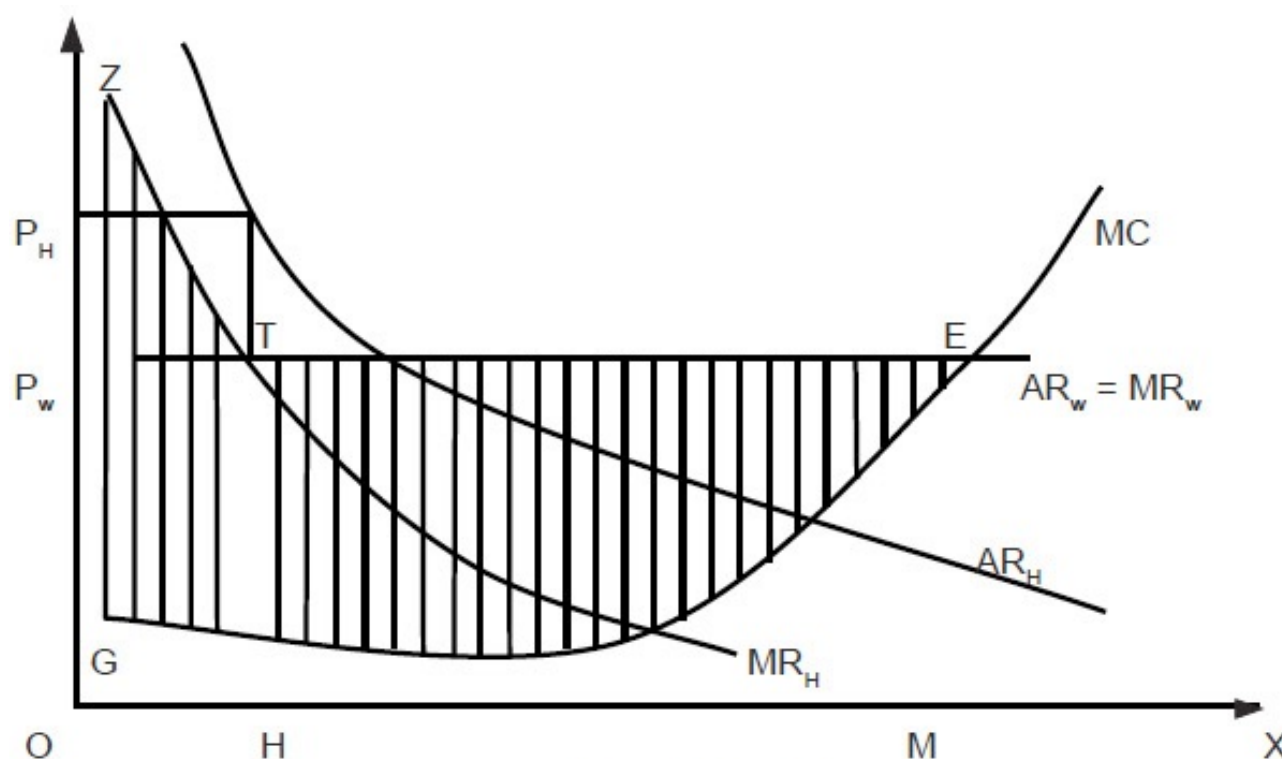
Fig 12.13 Dumping

is helpless as far as the world market is concerned because there is perfect competition and he is only a price-taker. He has to take OPW as the price in the world market. However, in the home market the price is OPH corresponding to the output OH. **The price in the home market is higher than the price in the world market**. i.e. OPH > OPW. This implies that the producer is selling his product in the two markets at different prices. In other words, he is practicing price-discrimination. The total profit is shown by the area ZTEG.

This act of selling the product in a foreign market at a price lower than in the domestic market is called **Dumping**. Dumping may be either **persistent** in nature i.e. over a long period or **intermittent** in nature, i.e. only for a temporary short period.

Dumping takes place due to following (technical) and (financial) reasons:

i) The aim of the discriminating monopolist is **to maximize profits**. Initially he earns higher MR for his product when he sells in the home market. But if he continues to sell more in the home market then the MR from home market will be much lower than MR from the world market and hence to maximize profits he cuts short his sales in the home market to OH and prefers to sell HM in the world market. Thus, he can sell larger output and also hope to maximize profits.

ii) There is the possibility that as the producer goes on producing more units, **he enjoys economies of scale** which would help him in lowering the average cost. To minimize cost and optimize output he will produce upto the point where AC is minimum. Now all that he produces may not be demanded in the home market and therefore he will sell as much is needed to be sold at home and the remaining could be sold (dumped) in the foreign market even at a little lower price than the price at which it is sold in the home market.

iii) Thirdly the producer wants **to penetrate the foreign market** and hence sells his product there at a relatively lower price.

iv) An important reason for dumping is that the producer may not just want to enter the foreign market but even try **to capture the foreign market**. This will be disadvantageous to these foreign markets where the product is dumped. The buyers there may then turn to buy the foreign product which

is being sold at a lower price than the product of their home industry. The infant-industries there tend to suffer. Due to fall in their domestic demand industries have to close down. There will be threat of unemployment and all this may lead to recession and even depression. The country where the product is dumped will resort to imposing tariffs on imports as an important anti-dumping measure.

12.10 MONOPOLISTIC COMPETITION

According to **Prof. E.H. Chamberlin**, "Economic literature affords a curious mixture, confusion and separation of the ideas of competition and monopoly". In reality we neither have perfect competition nor pure monopoly. We hardly come across a situation in which an indefinite number of firms produce identical or homogeneous product. Similarly a situation in which only one firm regulating the entire supply of a product is hard to come by. In reality, we come across a market structure in which elements of both, the Competition and Monopoly are interwoven.

Monopolistic Competition is that market category in which there is keen competition, though not perfect, among a group of monopolists producing same, though not identical product e.g. soaps, watches etc.

FEATURES OF MONOPOLISTIC COMPETITION

1. **Large number of firms**: Monopolistic competition is characterized by large number of sellers. In this respect it is close to perfect competition. The number may not be as large as that under perfect competition but it is also not very small.

2. **Absence of interdependence**: Since the number of firms is sufficiently large and the size of individual firm is small enough no appreciable interdependence exists among the different firms. No single firm can influence or is influenced by the others in the market. It means different firms cannot produce any significant impact on market by changing their price policies.

3. **Freedom of Entry**: Like perfect competition, monopolistic competition also grants unrestricted entry, to rivals in the market. It means there are no restrictions. This leads to occurrence of only normal profits in the long run.

However, the nature of this feature is not the same as that under perfect competition. Under perfect competition new firms enter the market with an identical product while under monopolistic competition the new firm may produce only similar but not identical product.

4. **Product-Differentiation**: Under monopolistic competition, the different firms produce similar (but not homogeneous) products. It means the different firms produce what may be properly described as a differentiated product. Thus, product differentiation is the core of monopolistic competition. The firms produce a product belonging to a particular class, say tooth-paste; but individual product is differentiated from other rival products. It is because of such product differentiation that firms enjoy some monopoly power, that is, the power to control the price in a narrow circle, but in the wider circle, it faces the competition from the rival firms. Hence, the firms may be called as "competing monopolists" and the situation may be rightly described as monopolistic competition.

5. **Selling Costs**: Another feature of Monopolistic Competition is the existence of Selling Costs; i.e. the costs incurred in order to create demand and push up the sales of the product; such as advertising costs and publicity expenses. Selling costs are not incurred under Perfect Competition nor under Monopoly. In case of Perfect Competition we assume perfect knowledge on the part of buyers about the market condition; and in case of monopoly there is no close substitute in the market. Therefore selling costs are peculiar to monopolistic competition.

6. **Concept of Group**: Chamberlin introduced the concept of 'group' in place of industry. Industry referred to a collection of firms producing homogeneous product; whereas group comprises of firms producing differentiated product. The group may be 'small' or 'large'. A small group consists of few sellers whereas large group consists of many sellers. A small group consisting of few sellers is associated with a market category called Oligopoly whereas in Monopolistic Competition we are concerned with large group having sufficiently large number of firms producing differentiated product.

12.11 SELLING COSTS

Broadly, selling costs refer to those expenses which are incurred for popularizing the differentiated product and increasing the demand for it. Selling cost is a special feature of monopolistic competition. Under perfect competition due to homogeneous product and under monopoly because of absence of substitute, the selling costs become unnecessary.

The most important instrument by which a firm can convince its buyers about the differentiating nature of its product is **advertising**. Such expenditure which is incurred by a firm under monopolistic competition to persuade customers to prefer its product to that of its rivals is known as 'selling costs'. **According to Chamberlin, Selling Costs are Costs incurred in order to alter the position or shape of demand curve for a product.** Such selling costs may be incurred in any form such as advertising, sales promotion, samples to potential customers etc. Whatever be the form, selling costs aim at raising the demand for the product and changing the position and the shape of demand curve.

Production Costs v/s Selling Costs	
Production Cost	**Selling Cost**
1. Incurred under all types of market category	1. Peculiar to Monopolistic Competition
2. Influence supply side	2. Influence demand side
3. To meet demand	3. To create demand
4. Some element of proportionality between production cost sales and output	4. No definite proportionality between selling cost and promotion.
5. Need not be considered as items of waste.	5. May be considered as items of waste.

Are selling costs to be considered as items of waste?
We can prepare a case on both sides;

a) Selling Costs as wasteful
b) Not necessarily wasteful.

Selling costs may be considered as items of waste for following reasons:

a) **Retaliation**: i.e. when one firm incurs selling cost to push up the sales of its product, the other firms will also resort to advertisement to push up their sales. This almost leads to advertisement warfare which would be considered as an item of waste.

b) **Rise in price**: Selling costs are items of cost. When cost is incurred it will have to be covered. This could be through rise in price.

c) **Misleading**: Selling costs may mislead the consumers about the nature of quality of product. This would be considered socially undesirable.

d) **Cross-transport**: It may lead the consumers from one region to go to other region to purchase the product of his choice being guided by its advertisement.

e) **Not effective**: A firm may keep incurring selling cost without promoting sales. This is wasteful.

However, selling costs need not necessarily be considered as items of waste for following reasons:

a) Selling costs are of two types viz. **Informative** and **Persuasive**. Informative selling costs make the consumers aware about the entry of new firm, new product or any change in the product. This is educative role of selling cost and should not be considered as an item of waste.

b) Selling costs involve advertisement, publicity, salesmanship etc., all these have become industry on their own. **They create large scale employment** and hence cannot be treated as an item of waste.

c) Selling costs create demand. To meet the demand the firm has to produce more. When production expands, the average cost of production falls and hence **prices need not be raised because of selling cost**. Thus selling costs need not be considered as items of waste.

12.12 EQUILIBRIUM UNDER MONOPOLISTIC COMPETITION
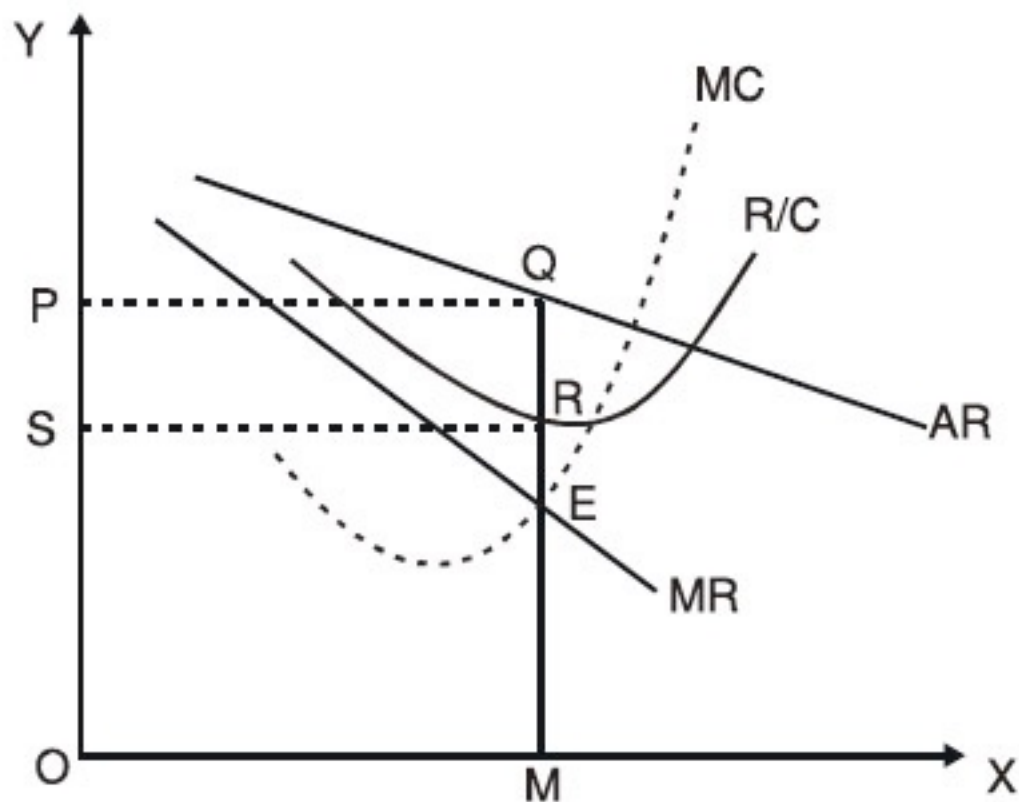
Fig. 12.14

As we know, a firm will be in Equilibrium at that point where it maximizes profits. Profits happen to be the function of Cost and Revenue. Since every producer is a monopolist in his own way under monopolistic competition, therefore, both AR and MR curves will be downward sloping as under monopoly; MR lying below AR and falling at a rate faster than AT. The cost structure, as usual, will be that AC curve is U-Shaped and MC curve cuts AC curve where AC is minimum. Given AR, MR, AC and MC as in fig. 12.14, the firm is in equilibrium at pt E where MR=MC. The equilibrium output is OM; price is given by AR curve and hence for output OM, price will be OP; and area of profit is PQRS. Thus in the short-run the firm enjoys supernormal profits, under monopolistic competition.

Later Prof. E. H. Chamberlin proceeds to analyse equilibrium of a firm under monopolistic competition in the long-run. In order to analyse this problem Chamberlin makes an assumption. He assumes cost conditions to remain the same in long-run as in the short-run and hence proceeds with 'identical cost curves'. This is also called the 'Heroic assumption' of Chamberlin. Now as the firm enjoys supernormal profits in the short-run, new and more firms are likely to enter in the long-run, the element of competition will increase and the Revenue Structure will shift downwards to the left till AR becomes a tangent to AC. New equilibrium will be at E_1. New price will be OP_1 and if you observe carefully as AR is a tangent to AC for the output level OM, the

supernormal profits disappear in the long-run. (Fig. 12.15), and the firm under monopolistic competition, like the firm under perfect competition enjoys only normal profits in the long-run.

Fig 12.15
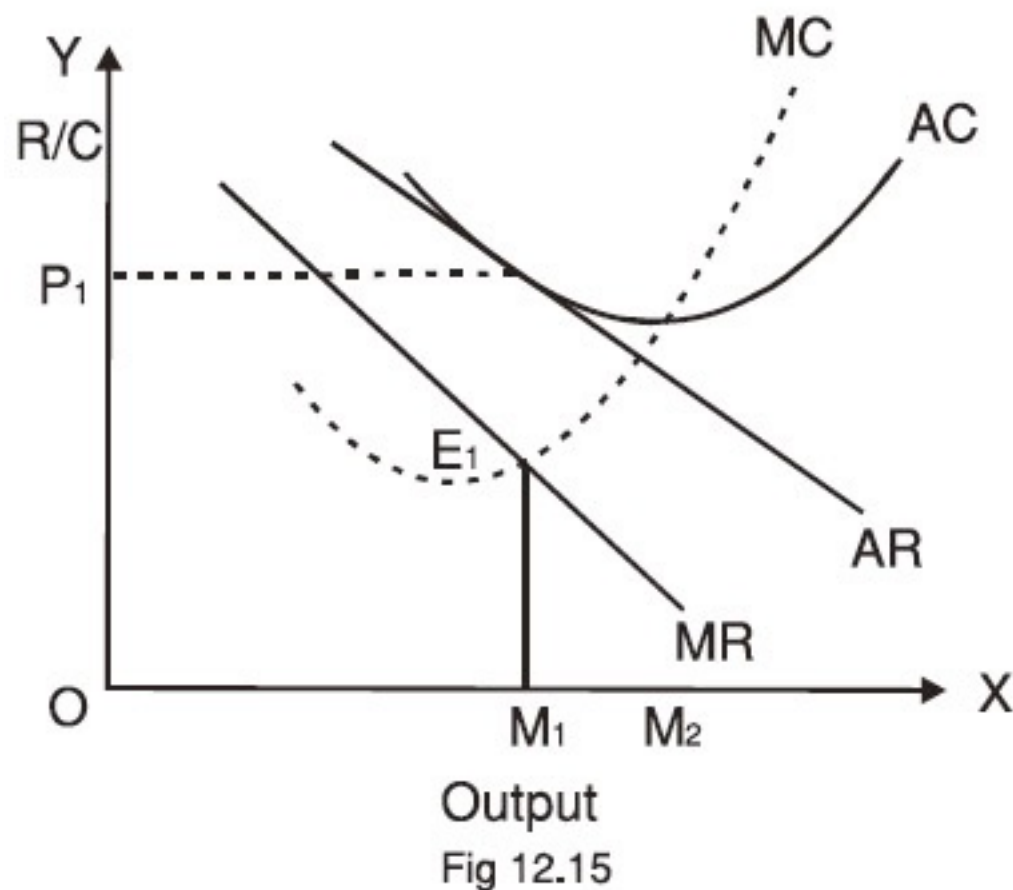
12.13 OLIGOPOLY

Oligopoly is that market category in which we have few sellers competing with each other. **Fellner** thus defines Oligopoly as '**Competition among the Few**'. In the words of **Robert Y.Awh, "Oligopoly is that market structure in which a few sellers who clearly recognize their mutual interdependence produce the bulk of the market output"**. Oligopoly differs from other market categories in that, under monopoly we have only one seller, under perfect competition we have many sellers, under monopolistic competition we has a sufficiently large group of small monopolists whereas under oligopoly we have a few sellers constituting a small group. In an Oligopolistic market the firms may be producing either homogeneous or differentiated products. Besides, the element of interdependence among rival firms in the group makes it difficult for us to have a general theory of the oligopoly. In oligopoly the action of one firm depends not only on the reaction of the consumers but also on the reaction of rival firms. Thus decision-making becomes a complicated phenomenon. Before a firm makes any decision it has to take into account the probable reaction of the rival firms.

Classification of Oligopoly

Oligopoly can be classified into a number of categories on the following basis:

1. **On the basis of product differentiation**, we can have either pure oligopoly or differentiated oligopoly. **In case of pure-oligopoly**, the products of different firms in the group will be identical. There is no element of product differentiation. **In case of differentiated oligopoly**, the competing firms produce products which are not identical. There is product-differentiation.

2. **On the basis of entry of firms** we may classify oligopoly as open oligopoly and closed oligopoly. **In open oligopoly** the firms are free to enter the market. There is no restriction of any kind for a firm to enter the group producing very close substitute. This implies absence of any barriers to entry of a new firm. **In case of closed oligopoly** there are barriers to the entry of a new firm. No new firms are able to enter the existing group.

3. **On the basis of the presence or absence of price-leadership**, we may classify oligopoly into partial or full oligopoly. **In case of partial oligopoly** there is one priceleader. He takes the decision regarding prices and the rest of the firms 'follow the leader'. **In case of full oligopoly** there is no leader and no follower. Every producer takes his own decision regarding the fixation of price.

4. **On the basis of deliberate agreement**, oligopoly may be classified as collusive oligopoly and non-collusive oligopoly. **Under collusive oligopoly** firms establish a virtual monopoly by agreeing upon one common uniform price in the market. They, combine together in order to avoid any cut-throat price competition. This is called collusion. This practice of collusion has been quite an illegal practice. If firms do not formally agree to get one price, the same result may be worked out through 'Understood' informal collusion. **In case of non-collusive oligopoly** the firms do not take a common uniform decision regarding price-policy. Each firm takes its own decision.

12.14 CHARACTERISTICS OF OLIGOPOLY

1. **Competition among the Few**: There are just a few sellers under oligopoly. The number could be more than one but not very many. In case there are only two sellers then such a market category is called Duopoly. Duopoly is perhaps a special case of oligopoly.

2. **Interdependence among rival firms**: Interdependence is an integral part of Oligopoly. In case of perfect competition, a firm is a price-taker. Each firm has to take the price which prevails in the market. Under oligopoly the situation is quite different. Each firm has to take into account the actions and reactions of other firms while formulating its price policy. Before an oligopolist decides to fix or change the price of his product he must study the 'moves' which his rivals are likely to make in the market.

3. **Possibility of Collusion**: In order to avoid any cut-throat retaliation among the firms through price-cutting, the firms decide to come together and unanimously agree to adopt a uniform price policy. Thus collusion is normally likely to be practical under oligopoly.

4. **Rigidity in Pricing**: Even in the absence of collusion of any type, there is resistance to price changes among oligopolists. For if one oligopolist lowers the price of his product to increase its demand by taking away his rival's clientele then the rival oligopolist will also resort to the policy of scaling down the price of his product to win back and attract more of the other's customers. Thus a price-war starts. This retaliation in price-cutting would reduce the profits of all the oligopolists. Thus the inevitable threat of price-cutting leads to price-rigidity.

5. **Barriers to Entry**: One of the essential features of oligopoly is the difficulty on the part of new firms to enter the market. Entry barriers resulting from mergers, ownership and control of key factors of production and the advantage of having been 'established' and enjoying scale economies are significant elements in maintaining the dominance of the existing few firms in the oligopolistic market.

6. **Excessive Expenditure on Advertisement**: Advertising and selling costs are of strategic importance to oligopolists. To quote Baumol. "It is only under oligopoly that advertising comes fully into its own."

7. **Indeterminateness**: Interdependence of the firms and the firm's reaction against each other's policy formulation poses several problems in the determination of price and output. There is a wide spectrum of oligopolist behaviour. To quote Baumol, 'Rivals may decide to get together and co-operate in the pursuit of their objectives, at least so far as the law allows or, at the other extreme, they may fight each other to death. Even if they enter into an agreement it may last or it may break down. The agreements may follow a wide variety of patterns."

As a result of this interdependence the demand curve of the oligopolist firm itself displays an element of indeterminateness. Once the oligopolist decides to alter the price of his product it will influence the demand for it in the market. But the rivals will also retaliate (or at times remain docile), which in turn will affect the demand of the firm which earlier charged its price. Thus the demand curve of the firm is indeterminate and therefore there creeps in an element of indeterminancy regarding the price-output policy of an oligopolist.

8. **The Kinky Demand Curve**: One of the most distinguishing features of Oligopoly is the Kinky demand curve. The concept of the Kinky demand curve is more associated with the name of Paul M. Sweezy.

We had earlier studied the slopes of the AR Curve under perfect competition and under monopoly and also established the interrelation between AR and MR curves under the market categories. However, under Oligopoly the AR curve has a peculiar shape and AR and MR bear some unique relationship. We may proceed to understand the slope of the AR curve or demand Curve under oligopoly by considering the firm's expectation about the behaviour of the rivals in the market.

(i) The firm feels that if it lowers the price of the product then the rivals too will lower their prices. Thus the demand for the firm's product will not rise significantly. In other words when the firm lowers the price then demand for its product will remain relatively inelastic. Let us assume that the original price of the firm's product was OP. Now if it lowers the price below OP then others too will lower their prices. Thus demand for this firm's product will not show any sizeable increase. This would be shown by the relatively inelastic demand curve; i.e. portion KD'.

KINKY DEMAND CURVE

Output

Fig. 12.16
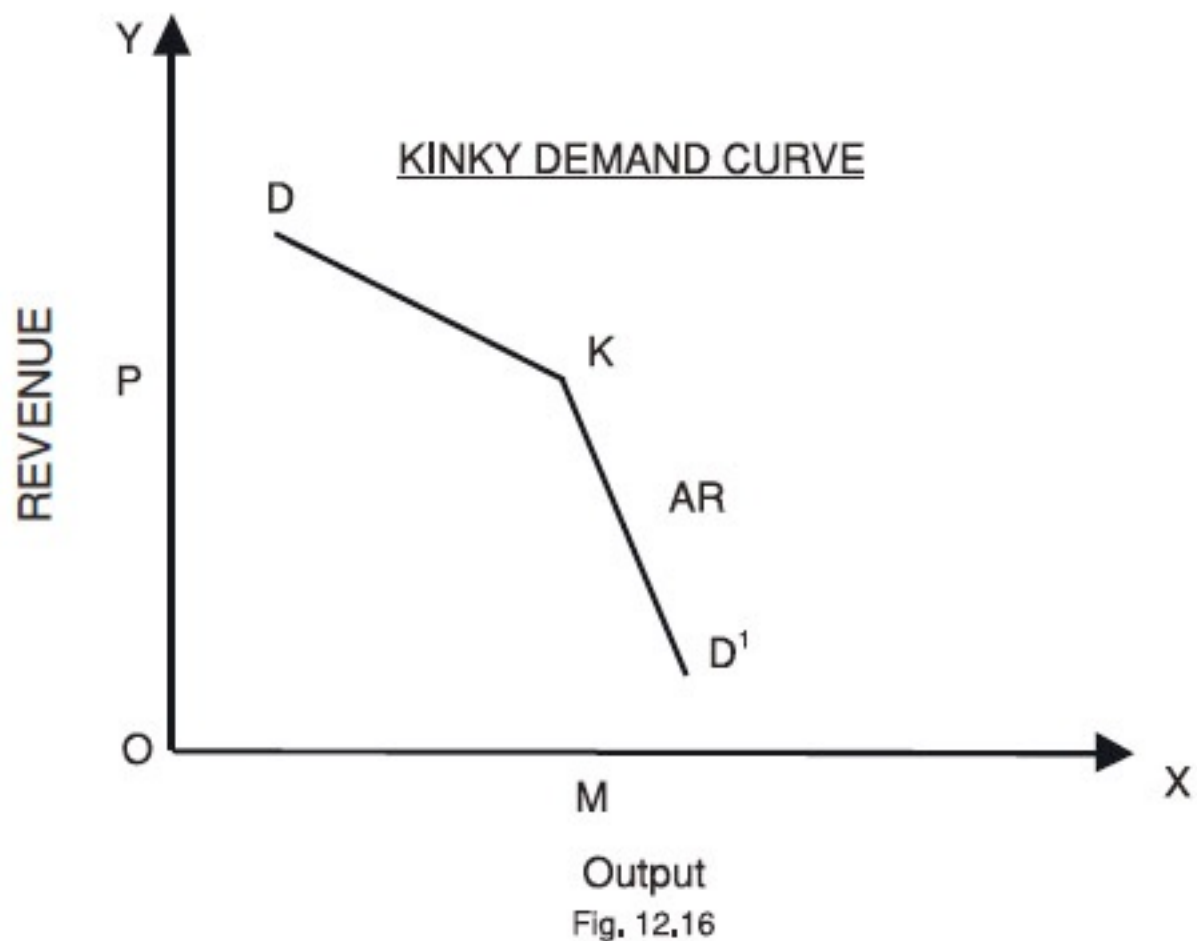
(ii) Now when the firm raises the price of its product but the rivals do not raise their prices then the demand for the firm's product will fall off considerably. It will face a relatively elastic demand curve. This is shown by the portion KD above the original price OP.

Thus from D to K the firm has a relatively elastic demand curve and from K to D' the firm faces a relatively inelastic demand curve. This implies that there is a sudden bend in the slope of the AR curve of the firm at point K. This sudden bend is technically called a 'Kink'. Thus demand curve under oligopoly has a 'kink' or we say that under oligopoly we have a 'kinky' demand curve.

Thus the market situation contemplated by Sweezy is one in which rivals will quickly match price reductions but only hesitantly and incompletely (if at all) follow price increase and this leads to the kinky demand curve.

If AR curve has a kink, the question that instantaneously arises is what should be the slope of the MR curve, or how to derive the MR curve.

KINKY DEMAND CURVE
DISCONTINUOUS MR CURVE

Fig 12.17
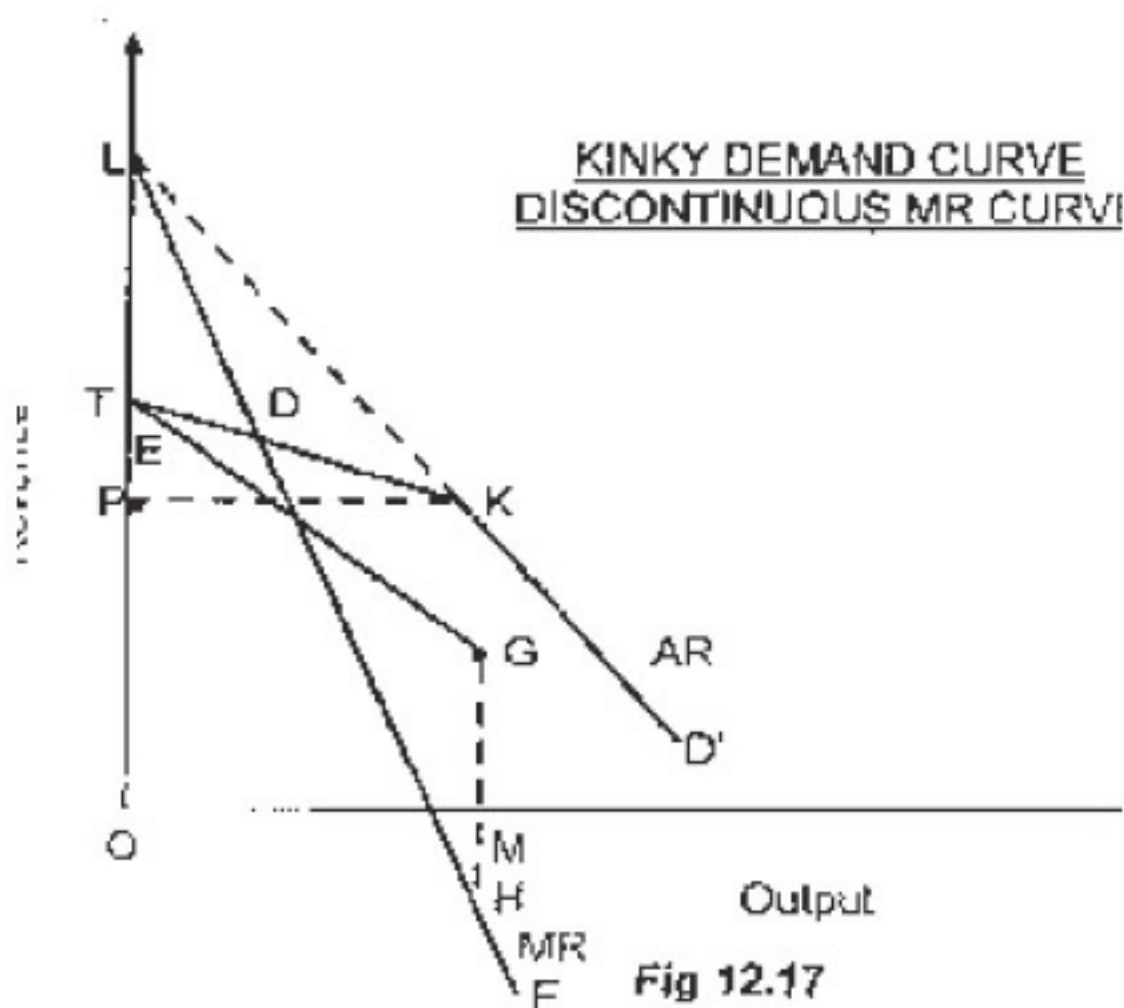
Let us suppose that the demand curve viz. the average revenue curve DKD' is given, having a kink at point K. Now, to draw MR curve corresponding to the Kinky average revenue curve, let us produce KD to meet Y-axis in pt. T. Thus we have the curve TDK, a straight line. This is the slope of AR curve above price OP. Now since AR curve is a straight line. MR curve will lie half-way between AR and Y-axis. Thus let us draw TEG as the MR curve corresponding to TDK as the given AR curve. The marginal revenue curve will go upto point G, and G is in a vertical line with K. We cannot produce this curve TEG any further, because at point K, the AR curve changes its slope. It has a bend which we technically call a Kink.

Now we must draw the MR curve corresponding to the slope KD' or the AR curve. To do this, we produce D'K to meet Y-axis in L. Since LD' is now a straight line AR curve; therefore, MR curve corresponding to LD' average revenue curve will lie half-way between LD' and Y-axis. This is shown by the line LF. However, we are only concerned with the portion HF of marginal revenue curve because we want to have marginal revenue corresponding to average revenue portion KD'. Hence HF would be the marginal revenue curve portion under consideration corresponding to KD' portion of AR curve.

This implies that from G to H there is a gap in the marginal revenue curve. **Thus where average revenue has a Kink, the marginal revenue curve becomes discontinuous**.

Now setting high prices will induce the entry of new producers and thus to keep them away the group of oligopolists will not venture to set high prices. Nor will the oligopolist think of price cutting because this may ignite a price-war and consequently all the oligopolists would suffer. In this context there is either a move towards explicit or implicit collusion. However, explicit collusion being proclaimed as illegal in many countries there prevails 'tacit collusion'. **To quote Samuelson** " 'experience suggests that they (few large firms)—without meeting, phoning, winking or corresponding—arrive at a tacit mode of behaviour that avoids fierce price competition. With or without a price leader, the sellers may be quoting rather similar prices."

SUGGESTED READINGS

1. Frederic Benham : Economics

2. Joan Robinson : The Economics of Imperfect Competition

3. E.A.G. Robinson : Monopoly

4. R.G.Lipsey : An Introduction to Positive Economics

5. E. H. Chamberlin : The Theory of Monopolistic Competition

6. A. L. Meyers : Elements of Modern Economics

7. Paul M. Sweezy : Demand Under Conditions Of Oligopoly, Journal of Political Economy, Vol 47

8. George J. Stigler : The Kinky Oligopoly Demand Curve And Rigid Prices'; Journal Of Political Economy, Vol Lv

9. William J. Baumol : Economic Theory And Operations Analysis

10. Paul Samuelson : Economics

12.15 SUMMARY

Under perfect competition condition of equilibrium exists when MR is equal to MC. It is however possible that MR can be equal to MC where MC is falling with rise in output giving rise to more profits. Therefore for equilibrium it is necessary to determine that point at which MR = Rising MC.

If there is an increase in price, in the short term MR is greater than MC at the equilibrium point giving rise to super normal profits. In the long run, these super normal profits attract more firms in the Industry as entry under perfect competition is free. This increases the supply, brings down the price and firm makes normal profit.

When AR is below AC, firm incurs loss, but it can continue to operate with the hope of minimizing losses as long as MR is more than MC. But when MR cannot even cover the MC, it will only make losses and, therefore, must shut down.

A firm under competition is price taker while one under monopoly is price maker. Output under competition is optimum as the firm is producing upto level where MR = Minimum AC. In monopoly the firm does not produce output where AC is minimum. It stops at the level where MR = MC. This results in restricted output under monopoly. Firm in competition enjoys only normal profits in the long run, while monopolist can enjoy super normal profits even in the long run.

Monopolist can charge different prices for the same product to different buyers, or in different regions or for different uses. This is known as price discrimination. Such discrimination is possible when competition is imperfect, resale possibilities are absent, or due to inelasticity of demand, immobility of buyers, consumer peculiarities etc.

One form of discrimination exercised by exporters is when they charge higher price in domestic market and lower in overseas market. This is known as Dumping. This is resorted when foreign markets are to be penetrated or when firm wants to avail of economies of scale but domestic market cannot absorb full output.

Monopolistic competition is that market category in which there is keen competition; though not perfect, among a group of monopolists producing same, but not identical product like soaps, watches etc. Selling costs are

peculiar to monopolistic competition and are incurred in order to alter the position or shape of demand curve for a product. On positive side these costs are informative, create employment and demand. Negatively they are wasteful, lead to price rise, mislead customers and may not be effective.

Oligopoly is competition amongst the few. It is marked by interdependence among rivals, possibility of collusion, rigid pricing, restricted entry excessive advertisement etc.

12.16 SELF ASSESSMENT QUESTIONS

1. Derive the necessary and sufficient conditions for equilibrium of a firm under Perfect Competition in the short-run.

2. "MR = MC is a necessary condition but not a sufficient condition for equilibrium of a firm under perfect competition." Explain.

3. Explain the concept of Normal Profit. What will happen in case the firms enjoy supernormal profits?

4. Explain fully the concept of "shut-down" point.

5. "Although each firm is a price-taker yet profit of all firms are not the same'. Do you agree?

6. a) Visit a few firms. First find out if they are facing perfect competition.
   b) Obtain the Revenue and cost estimates of a firm under perfect competition.
   c) Represent the result graphically.
   d) Do you derive the same condition for profit maximization in this case as is derived theoretically?

7. Track down a firm which has just 'shut down'. Find out the reasons for its shutting down.

8. Derive the condition for equilibrium under monopoly.

9. 'Under monopoly, price is higher and output is restricted'. Discuss.

10. 'A monopolist cannot be in equilibrium where elasticity of demand is less than one.' Discuss.

11. Distinguish between price, output and profit under perfect competition and monopoly.

12. Is Monopoly necessarily an evil? Give reasons for your answer.

13. What is Price Discrimination? Give examples of personal, regional and trade price discrimination.

14. When is Price-Discrimination possible?

15. If a producer sells in two markets A and B in both of which he enjoys monopoly. How does he determine the output and price of his product in these two markets?

16. Show that the discriminating-monopolist maximizes his profits where combined marginal revenue equals marginal cost for the whole output.

17. Explain the following statements:
    i) Differences in elasticity of demand in different markets is the necessary condition for price-discrimination.
    ii) The discriminating monopolist so distributes his output between different markets that MR from all markets must be the same.

18. If the producer is a monopolist in the home market and faces perfect competition in the world market explain the following.
    iii) Condition for profit maximization
    iv) How much he sells in world market and how much in the home market?
    v) At what price does he sell in these two markets?

19. What is Dumping? Why does it take place?

20. Do a case study in 'Dumping'.
    i) Select two countries for your example.
    ii) Select the product to be considered.
    iii) Why dumping of this product takes place?
    iv) Find the actual price at which it is sold in the two markets under consideration.
    v) How do the firms in the country where product is dumped react?
    vi) What role does the Government play to discourage dumping?

21. a) Define the following:
            i) Monopolistic competition

      ii) Selling cost
      iii) Product differentiation

  b) Distinguish between
      i) Perfect competition and Monopolistic competition
      ii) Production costs and Selling costs
      iii) Monopoly and Monopolistic competition.

  c) State giving reasons, whether the following statements are TRUE or FALSE:
      i) Monopolistic competition is a real market structure.
      ii) Selling costs are unavoidable under monopolistic competition.

22. What are the characteristic features of Monopolistic Competition?

23. What are Selling Costs? Explain the significance of selling costs under monopolistic competition.

24. Distinguish between Production Costs and Selling Costs.

25. Are Selling Costs necessarily items of waste? Give reasons for your answer.

26. For a case study:
    i) Select a firm under Monopolistic Competition.
    ii) Does it satisfy all the features of Monopolistic Competition?
    iii) Does it incur selling-cost? If yes, how much? And with what intention?
    iv) Establish some link between Selling Cost and sales promotion.
    v) Do these Selling Cost lead to advertisement warfare?
    vi) Are Selling Costs regularly incurred by the firm?

27. Define 'Oligopoly'. In what way is it different from other market categories?

28. Mention the salient features of Oligopoly

29. (a) What is the peculiarity of the AR Curve under Oligopoly ?
    (b) Establish the relation between AR and MR curve under oligopoly.

30. Why does an Oligopolist firm face a kinked demand curve ?

31. What is the reason for the normal trend towards price-rigidity under oligopoly ?

32. Under Oligopoly, 'MR curve is discontinuous. Explain

33. For case study: Select a few firms under Oligopoly. Study them with respect to pricing of their product.

34. What do you understand by 'Collusion'? Have you come across this situation of Collusive Oligopoly in any of your case study? Please elaborate your finding giving reasons.

REFERENCE MATERIAL
Click on the links below to view additional reference material for this chapter

Summary

PPT

MCQ

Video1

Video2

‣we school

13

Pricing Decisions, Policies and Practices

Objectives:

After completing this chapter, you will be able to understand:

• Pricing Decisions.

• Pricing Methods.

• Approaches in Setting Prices.

• Administered Prices.

Structure:

13.1 Introduction

13.2 Pricing Methods in Practice

13.3 A Variety of Approaches in Setting Prices

13.4 Administered Prices & Price Control

13.5 Summary

13.6 Self Assessment Questions

13.1 INTRODUCTION

Price-fixation is an important managerial function in all business enterprises. If the price set is quite high, the seller may not find enough number of consumers to buy his product. If the price fixed is too low, the seller may not be able to cover his cost. Thus, **fixing appropriate price is a major decision-making function of any enterprise. Price- decisions, no doubt, need to be reviewed from time to time**.

As per the traditional Economic Theory price is determined by the interaction of demand and supply. Thus, the buyers and sellers determine the price. However, in practice some other parties and several other factors are involved in fixation of the price. The two main parties are the Competitors and the Government. Competitors are in the form of potential rivals who manufacture and sell related products; these may be in the form of close substitutes. In such cases the price fixed by one producer may influence the price fixation policy of the other. The Government influences prices through the imposition of taxes or providing subsidies and also through measures of direct controls.

Determinants of price of a commodity:

1. Cost of production

2. The demand for the product

3. Its elasticity of demand

4. The objective or the goal of the producer

5. The nature of competition in market (market structure) and

6. Government policy pertaining to the product.

Pricing under different objectives

Pursuit of different objectives will lead to different pricing decisions. Traditional Economic Theory assumes that a firm sets the price and quantity of its product so as to maximize its current profit. **Baumol** argued that the objective of the firm is to maximize sales in money terms subject to a profit constraint. The objective of some other firms is to provide useful service to the customers by charging reasonable price. Some firms would like to take care of the goodwill of the company and hence will charge fair price etc.

Pricing under different market structures

A firm operates in a market and not in isolation. We have earlier elaborately discussed the Theory of Price Mechanism and Price Determination under different market categories. Under **Perfect Competition** price is determined by the forces of demand and supply. The point of intersection between demand and supply curves is the point of equilibrium which determines the equilibrium price. Each firm under perfect competition is a price taker and not a price maker. The Average Revenue Curve of a firm under perfect competition is horizontal and that **AR = MR**. Further there is always a tendency towards the prevalence of only one price under Perfect Competition; the respective changes in the forces of demand and supply alone influence the price.

In case of **Monopoly** the situation is slightly different. A monopolist can be a price maker. He can fix the price of his product, initially through a process of trial and error, by balancing losses and gains. He is in equilibrium at a point where **MR = MC** and corresponding point on the Average Revenue Curve determines the price that he would charge so as to earn maximum profit. As there are barriers to entry and no close substitutes, the monopolist will charge a high price and subsequently enjoy monopoly profits.

The monopolist may also practice **price-discrimination** i.e. he may charge different prices to different buyers and in different regions for the same product depending upon the elasticity of demand for the product. In case of dumping also different prices will be charged for the same product. In fact selling his product in foreign market at a price lower than his own market is itself referred to as Dumping.

In case of, **Monopolistic Competition** each producer is a monopolist of his product and a group of producers producing same, though not identical product compete with each other in the market. They differentiate their product and instead of having a price war with each other they practice product-differentiation. However, the prices charged are quite competitive in nature.

Under **Oligopoly** there are few sellers competing in the market. They may be rivals or may form collusion. The price policy of one producer is affected by the price policy of the others. Each producer before he fixes the prices of his product tries to understand the price behavior of other producer in the

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market. For instance producer A thinks that if he lowers the price of his product and others don't then, he will be able to capture wider market, But it may so happen that if he lowers the price of his product and others also lower their prices then he will not be able to get more buyers and therefore all the producers may subsequently suffer. On the other hand, he may feel that if he raises the price of his product and others also raise their prices he may not loose out on many customers but it may so happen that when he raises his price and others don't raise their prices, then demand for his product will go down. Therefore under Oligopoly there prevails the phenomenon of price rigidity. They may prefer to resort to non-price competition leaving each other to follow their own policies.

13.2 PRICING METHODS IN PRACTICE

1. FULL COST PRICING

This method is also known as **Cost Plus Pricing**. In this method the producer calculates per unit cost of production and adds a margin of profit to it, which he considers fair and thereby arrives at a price which is acceptable to the consumer. In fixing the price, the firm calculates the average variable cost, adds to it the average fixed cost and to that adds the amount of fair profit. Fair profit is normally taken as 10% to 15% of the cost.

Price = Average Variable Cost + Net Profit Margin + Average Fixed Cost

The rationale of Full Cost Pricing lies in its simplicity and apparent fairness. It appears reasonable that price based on cost is a just price.

Limitations of the Full Cost Pricing

1. The main criticism against Full Cost Pricing is that it disregards demand, as also the purchasing power of the buyers.

2. One of the weaknesses of the full cost pricing is that it tends to diminish the interest of the sellers in cost control i.e. the seller will not make any effort to minimize cost because the price fixed will automatically cover the cost.

3. In such pricing, historical cost is considered. This leads to over-pricing under decreasing cost and under-pricing under increasing cost conditions.

4. Such type of pricing is difficult in case of wide fluctuations in variable cost.

5. It does not take account of the forces of competition.

   In a dynamic market situation characterized by change and uncertainty, full cost pricing is not a sound policy. It may be a useful starting point provided the sellers are willing to deviate over a period of time.

2. MARGINAL COST PRICING

In case of Marginal Cost Pricing we have to consider the **incremental cost of production**. Fixed cost is not taken into consideration. Marginal cost is the additional cost for producing additional unit of output. In this method the price is related to marginal cost. The main difference between Full Cost Pricing and Marginal Cost Pricing is that in Marginal Cost Pricing the fixed cost component is not included. The Marginal Cost Pricing is useful in the short period whereas Full Cost Pricing is mainly for the long period. As long as the marginal cost is covered there is a sort of guarantee that the firm will not shut down.

Advantages:

1. It encourages aggressive price policy.

2. To keep the prices low the firm is encouraged to keep down the marginal cost.

3. Under Marginal Cost Pricing the competitive price is maintained.

4. It is useful for multi-product, multi-process and multi-market firm.

5. This method of pricing is useful for pricing over the lifecycle of the product.

   The firm generally follows Marginal Cost Pricing when it enters into a new market, when the firm is having unutilized capacity and when there is high degree of competition in the market.

Limitations:

1. This policy is useful only in the short-period and does not provide a long-run stable price policy.

2. Under increasing cost conditions it may lead to higher price and under decreasing cost conditions it will lead to lower price.

3. It may lead to frequent price changes which are not liked by the consumers. The buyers prefer stable prices and not erratic price fluctuations.

It needs to be noted that the Marginal Cost Pricing provides the upper and lower limits of prices whereas Full Cost Pricing clings to the middle points. In fact while fixing the price both the theories should be taken into account as both the systems of pricing reinforce each other.

3. MULTI PRODUCT PRICING

Often we find that firms produce more than one product. Even the specialized firms produce different sizes, models and styles of the product. The products are so differentiated that the consumers look upon them to be separate products. The multiproduct firms may produce joint products. For example soap manufacturing company may be producing also glycerin, cosmetics etc. Some firms may produce related products such as a ready-made garment manufacturing company. Some firms may produce unrelated products. For example soaps, powder, steel cupboards, lockers, refrigerators etc. While determining prices such firms have to consider whether the products are complimentary or substitutes, whether production functions are fixed proportion or variable proportion and whether there exists unutilized capacity in the firm. In most of these cases the fixed costs can get distributed over the nature of the product.

Following factors may be considered while pricing in a multi-product firm:

1. If the products are totally independent pricing is like single product pricing.

2. If a firm is engaged in production of joint product the pricing principle should be that total cost must be covered by pricing of the main and the by-product taken together.

3. When a firm is producing substitutes the market gets separated on the basis of degree of elasticity of demand.

4. A multi-product firm is more like a discriminating monopolist fixing prices of different products on the basis of their respective elasticities of demand.

4. PRICING OF A NEW PRODUCT

The new product may be either an entirely new one or it is one of the varieties of the existing products. If there are many substitutes for the new product in the market then competitive price will be charged. If the product is entirely new then through the process of trial and error the price will be fixed not only to cover the cost of production but also to cover the cost of promotional strategy. Two types of pricing methods are adopted in pricing of a new product.

i) **Skiming Price**

ii) **Penetration Pric**e

i) **Skiming Price**: In case of Skiming Price the producer makes an effort to fix the price in such a way to skim away the consumers' surplus i.e. the firm learns about the maximum possible price which the consumer will be prepared to pay, rather than go without the commodity, and then quotes the price accordingly. This price may be much above the cost of production. The high price is accompanied by heavy sales promotion practices. Gradually the firm brings down this price. The time and size of the price reduction has to be proper. As long as the product is able to maintain its distinctiveness the firm continues with the Skiming Price policy. This policy is successful because in the initial stages when the new product is introduced in the market the demand for it is relatively inelastic and therefore the firm resorts to Skiming Price.

ii) **Penetration Price**: Penetration Price policy implies that the objective of the firm is to get into the market as early as possible even when there are other substitutes and therefore considerately low price is charged. When the product is able to acquire greater demand and capture bigger markets then the prices will be gradually raised.

5. PRICING OF EXPORTS

Pricing of export-oriented product is perhaps more complicated than pricing of the product which remains in the domestic market. When it comes to export many more considerations are involved besides merely the cost of transporting of the product. The producer has to consider the following aspects:

i) The nature of demand for his product in the foreign market.

ii) The degree of competition depending on the quality of the product.

iii) The differences in the technology employed by producers in other countries thereby affecting costs.

iv) The availability of substitutes.

v) Governments' policy for promoting exports through providing subsidies, duties imposed by the foreign Government on inflow of our product, the commission by the middlemen and the brokers.

vi) The regularity or irregularity regarding the demand.

vii) The conditions for delivering of the goods in the foreign markets.

On the basis of these consideration, to following Export Pricing Strategies can be developed.

i) Penetration pricing to capture the foreign market.

ii) Skiming price for maximizing profit.

iii) Dumping i.e. the price charged in foreign market is lower than the price at which product is sold in domestic market.

iv) Competitive pricing.

v) Standard world wide price for all the buyers in all the markets based on average cost of production.

vi) Dual pricing based on cost plus or marginal cost method.

vii) Escalation pricing i.e. export price is higher than the domestic price.

viii) Follow the leader pricing i.e. the price fixed is the same as the price charged by the leading competitor in the foreign market.

ix) Probe pricing is a policy of trial and error, balancing losses and gains in fixing the price. Initially some price is charged and then on getting the feedback the price gets adjusted.

13.3 A VARIETY OF APPROACHES IN SETTING PRICES:

A variety of approaches are employed by businessmen in setting prices. These approaches are not mutually exclusive but sometimes they complement or supplement one another.

1. **Intuitive Pricing**: It is a psychological method of pricing in which prices are based on the 'feel of the market'. The system is more subjective rather than objective in nature. Initially the price is estimated on the basis of cost plus method with flexible mark-up pricing. This method is fairly common.

2. **Experimental Pricing**: It is a trial and error method of pricing. This method is widely used in pricing of new products especially at retail level.

3. **Initiative Pricing**: In this method a firm decides to follow a price fixing policy of a price leader.

4. **Backward Cost Pricing**: Certain industries target price as the starting point for strategic calculations. The selling price is determined first and by working backwards the firm arrives at a product design.

5. **Odd Number and Critical Number Pricing**: Many firms believe that consumers have strong price sensitivity at certain critical points. This is particularly noticeable in the retail trade. It is very commonly believed that odd numbers are more attractive to the buyers than the even numbers. The problem of the management is to determine that number which has the greatest appeal.

6. **Double Pricing**: Double pricing is a technique in which two prices are shown on the price tag or on the pack of the article. The original price is usually crossed out and substituted by a new price at a lower level.

7. **Prestige Pricing**: Buyers are often price-conscious. There is some sort of price illusion. The buyers often feel that higher the price, the more prestigious is the product and therefore greater the demand for it. Some type of social scaling exerts a powerful influence on the pricing behavior.

8. **Multiple Pricing/ Collective Pricing**: Retail prices are usually expressed in terms of one unit. Experience often reveals that sales can be increased if more units are offered for a price. This technique of pricing is known as Multiple Pricing. The Multiple Pricing must offer small saving to the consumer.

9. **Peak-Load Pricing**: Pricing done on the basis of the peak period demand and off peak period demand is called Peak-Load Pricing. Higher prices are charged in the peak period and lower prices are charged in the off-peak period.

From the above discussion we observe that various pricing methods and pricing approaches prevail in domestic and export market. The choice of pricing method eventually depends on the objectives of the firm.

13.4 ADMINISTERED PRICES AND PRICE CONTROL

The concept of Administered Price was first introduced by Keynes for the prices charged by a monopolist. A monopolist can be a price maker and he consciously administered the price of his product irrespective of the cost of production. Competitive prices are determined by the interplay of forces of demand and supply in the market whereas administered prices according to Keynes were associated with monopolists' decision regarding price fixation irrespective of the market forces of demand and supply.

However, in India the meaning of Administered Price has been quite different. **In India, Administered Prices refer to prices which are fixed and enforced by the Government**. They acquire a statutory nature. They are the outcome of the price policy of the Government. The Government interferes in the price mechanism and fixes minimum and maximum prices of various commodities in the agricultural and non- agricultural sectors.

Activity A

Out of several items/services you buy on day to basis, name five where you have to pay administered price.

_____

_____

_____

_____

_____

_____

Following are the **reasons for the Government interference in price regulation**:

1. **To prevent exploitation of consumers** by certain producers who charge high prices just to maximize their profits.

2. Administered prices aim at **providing stable and assured income to the farmers** especially under the unfavorable climatic conditions. Administered prices also aim at protecting the interest of weaker sections of society.

3. The Government resorts to administered pricing for **discouraging or encouraging the consumption of** certain commodities. By raising the prices of certain commodities the purpose of the Government may be to put a check on their consumption. Similarly to encourage consumption of certain commodities their prices may be lowered for certain section of the people.

4. Administered prices are introduced for **encountering inflationary pressures**. The administered prices ensure that the free play of market forces does not lead to malallocation of resources.

In fact, Administered Prices are the result of the policy of the Price Control resorted to by the Government for an efficient management of the economy. **Price control refers to a direct measure on the part of the Government in fixing the prices for achieving certain macro economic goals like**

social welfare, efficient resource allocation, prevention of exploitation of the consumers etc.

The Price Control may be informal or formal. In case of **informal price control** the producers voluntarily agree to regulate the prices which are within limits suggested by the Government whereas under **formal price control**, the prices are statutorily fixed by the Government and have to be accepted by the producers.

Price Control may be total or partial. In case of total price control the price of the entire stock of output is enforced and administered by the Government through a Public Distribution System. For example: In case of any particular drug produced by a private sector the price control is total. This is also referred to as **mono-pricing** of the commodity. In case of **partial price control**, the Government directly fixes the price of a part of the production of a commodity and arranges for its distribution may be through fair price shops or via the systems of rationing. The rest of the stock is allowed to be sold in open market at any price which is determined by the free play of market mechanism. Partial control therefore acquires the form of **dual pricing**.

The Government has from time to time introduced **price control for necessities** of various kinds. For example: edible oils, drugs, sugar, textiles and also for **certain intermediate inputs** such as cement, steel etc. In the case of agriculture the Government had appointed the **Agricultural Prices Commission** to enquire into prices of agricultural commodities and suggest suitable policy for prices of agricultural products. This commission recommended certain **minimum Procurement Prices** to safeguard the interest of the farmers assuring them of some minimum returns for their produce. Similarly **Issue prices** were also fixed to take care of the consumers of agricultural commodities. Later the **Agricultural Price Commission** was substituted by the **Commission for Agricultural Costs and Prices (CACP)**. Similarly **Price Stabilization Board, Price Intelligence Division, Cabinet Committee on Prices (CCP), The High Powered Price Monitoring Board (HPPMB)** have been set up. The **Tariff Commission of India and The Bureau of Industrial Costs and Prices** have been involved in determining fair prices of commodities.

SUGGESTED READINGS

1. Joel Dean: Managerial Economics

2. Pappas and Hirschey: Fundamentals of Managerial Economics

3. Peterson and Lewis: Managerial Economics

13.5 SUMMARY

Fixing appropriate price is a major decision-making function of any enterprise as it directly affects profits of the firm. Price decisions need to be reviewed time and again. Cost of production, demand for the product, competition and government policies are factors that influence price. Pricing is also governed by the objectives of the firm and structure of its markets.

Methods of pricing can be full cost or marginal cost pricing. Different criteria need to be used to determine prices of multi products, new products or products for exports.

Similarly a variety of approaches are there like intuitive, experimental, initiative, prestige, and peak load for setting prices.

Sometimes prices are fixed and enforced by the government to protect consumers or producers like farmers. Such prices are called administered prices.

13.6 SELF ASSESSMENT QUESTIONS

1. Outline the pricing practices under different market structures.

2. Explain the following pricing methods:
   i) Full Cost Pricing
   ii) Marginal Cost Pricing

3. What are the two types of pricing methods adopted in case of a new product ?

4. "Pricing of export-oriented product is perhaps more complicated than pricing of product which remains in domestic market." Explain.

5. What do you understand by the following:
   i) Intuitive Pricing
   ii) Backward Cost Pricing
   iii) Multiple Pricing
   iv) Peak-Load Pricing
   Give examples of each.

6. What do you understand by Administered Prices ? Why Administered Prices ? Give reasons with examples.

7. "Price-control may be informal or formal and total or partial." Explain with examples.

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Summary

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14

Profit its Nature, Significance, Management and Control

Objectives:

After completing this chapter, you will be able to understand:

• Different Perspectives of Profit.

• How Profits are Managed?

• Use of Profits.

Structure:

14.1 INTRODUCTION

Profit is the reward which goes to organization as a factor of production for its participation in the process of production.

Profits and other factor rewards

Profits differ from other factor rewards in the following ways:

1. Profit is a **residual income** left after the payment of contractual rewards to other factors of production. The entrepreneur while hiring other factors of production enters into contract with them. He pays wages to workers, rent for land and interest for borrowed capital and the residue or whatever is left is his profit. Thus profits become **non-contractual in character**.

2. The various factors of production are rewarded even before the sale of the product and irrespective of its sales whereas **profits accrue only after the product is sold**.

3. The rewards of other factors have been fixed. They do not fluctuate whereas **profits go on fluctuating** so much so that the entrepreneur bears the risk of even incurring losses which we call **negative profits**. Thus the nature of profits differs from the nature of rewards accruing through other factors of production.

14.2 DIFFERENT NOTIONS, SOURCES AND THEORIES OF PROFITS

1. Profits as an "Accounting Surplus"

In the sense of "Accounting Surplus", profit is the surplus of total revenue over total cost. However, costs have been classified into two categories, viz. Explicit Costs and Implicit Costs. Explicit costs are costs shown in the books of accounts as payments made in the form of rent, wages, interest and for the purchase of raw materials. The excess of Total Revenue over Total Explicit Costs gives us Gross Profits; and from these Gross profits if we deduct taxes and depreciation, then we get Net Profits in a purely accounting sense, i.e. in Accounting or Statistical sense:

Gross Profit = TR – Explicit Costs.

Whereas Net Profit = TR – (Explicit Costs +Depreciation +Tax) or Net Profit = Gross Profits – (Depreciation + Tax).

But, as Samuelson points out, "Such statistical profits are a hodgepodge of different elements. Obviously part at least of the reported profits is merely the return to the owners of the firm for the factors supplied by them. Thus, part may be the return to the personal work provided by the owners of the firm, part may be the rent return on self owned natural resources part may be the equivalent of interest on the owners' own capital." Thus, the entrepreneur may provide his own labour, land, and capital and has the right to enjoy some returns on them. But these returns which he should get for his own labour, land and capital are not shown in the books of accounts. These are the implicit costs.

In economics, Net Profit would be arrived at not by taking into consideration only the explicit costs but also the implicit costs. Thus, to quote Samuelson, "Much of what is ordinarily called profit is really nothing but interest, rent and wages under a different name. Implicit interest, implicit rent, and implicit wages are the names economists give to this part of profit, i.e. to theearnings of self-used factors."

2. Profits as a Cost

Profit does constitute an item of cost from the economist's point of view. It is a cost, because it is necessary to call forth a supply of enterprise, which is as necessary to the production of wealth as any other factor. An entrepreneur is induced to undertake production because of the profits that he expects to receive; in the ordinary course, an individual may rent out his labour to any other producer in return for wages or salaries; rent out his land to enjoy rent; and lend capital to enjoy interest – all this with the minimum element of risk, but when he employs his own labour, capital and land in the process of production, he expects a reward which must compensate at least the opportunities forgone. However, to simplify matters, that part of profit which the entrepreneur expects to receive if he has to be just induced to continue his implicit costs, and any profit above normal, is termed Supernatural Profit.

3. Profit as Rent of Ability

According to Walker, and American economist, "Profit is the rent of ability". Just as rent arises due to differences in fertility of land, profit accrues due to

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differences in ability of an entrepreneur. No doubt, the Rent Theory of Profits is subject to certain criticisms:

i) Rent can never be negative, profits can be negative.

ii) Profit is not always the reward for ability but it may arise on account of other factors, e.g. monopoly element or windfalls.

iii) There may prevail a no-rent land, according to Ricardo, but it is difficult to come across no-profit entrepreneur.

iv) This theory cannot explain why the shareholders enjoy dividends even without showing any ability.

Hence this theory fails to offer any comprehensive explanation of profit.

4. Profit as a Dynamic Surplus

According to J.B. Clark, profits arise due to dynamic changes in society. Profits cannot arise in a static economy. In a static society, the elements of time and expectations are non-existent. The economic activities of the past will be repeated in the present and in the future. There is no risk of any kind for an entrepreneur in a static society. The price of goods will be equal to the cost of production. The conditions of demand and supply are given under static economy, production is made to order and not in anticipation of demand. The entrepreneur will get not profits but only wages for his labour. It is only under a dynamic situation that profits are likely to arise. According to Clark, five main changes are constantly taking place in a dynamic society:

i) Changes in the size of population.

ii) Changes in the size of capital.

iii) Changes in the production techniques.

iv) Changes in the form of industrial organization.

v) Changes in human wants.

These changes take place almost with a kaleidoscopic rapidity, affecting the conditions of demand and supply and hence account for profits.

5. Profit as reward for Risk-bearing or Risk-avoiding?

According to Prof. **F.B.Hawley, profit is a reward for risk-bearing in the process of production**. If the returns were just to cover the cost, there would be no inducement for an entrepreneur to carry out production. All business enterprises are more or less speculative and hence involve risks. Unless and until an individual entrepreneur is prepared to take risks, he will not earn profits.

Two criticisms may be leveled against Hawley's theory of profits:

(i) Although profits do contain some remuneration for risk-taking, yet the high profits reaped by the entrepreneurs cannot in their entirety be attributed to the element of risk. Profits are not, at any rate, in proportion to the risk undertaken.

(ii) **Prof. Carver** points out that profits arise not because risks are taken but because the risks are avoided. Profit is a reward for risk-avoidance and not for riskbearing.

6. Profit as the reward for Uncertainty-bearing

According to Prof. Frank H. Knight, profit is not a reward for risk-bearing but for uncertainty-bearing. Risks are classified into two categories: (a) those risks that can be insured and (b) those risks which are non-insurable.

The insurable risks, e.g. risks of death, accident, fire etc. are statistically computable with probability theories and insurance companies are prepared to cover these risks in return for premiums. The payments of these premiums are included in the cost of production. The entrepreneur gets no profits because of these risks. Hence risk-bearing becomes the function not of the entrepreneurs but of the insurance-companies.

The non-insurable risks refer to the genuine risks of market-ability of the product due to shifts in conditions of demand and supply. These changes are unpredictable and indeterminable. Some non-insurable risks are as follows:

a) Competitive Risks: i.e. new firms may enter and the demand for their product may decline.

b) Technical Risks: i.e. new types of machinery may be introduced and this will influence the conditions of demand and supply.

c) Risk of Government Intervention: e.g. the Government may fix maximum prices or minimum wages.

d) Business Cycle Risks: e.g. the economy may experience periods of upswings and downswings. During the period of up-swings, super-normal profits will be enjoyed because the prices of the commodities go on rising. But during a depression, the producer may face a crisis, and suffer losses.

e) Risks of Natural Calamities: e.g. failure of monsoons leading to crop failures, floods etc., interruption and dislocation of economy due to the emergence of war etc. Since these risks cannot be measured with any degree of accuracy, no insurance has to shoulder these risks all by himself. For shouldering these risks, he enjoys a reward in the form of profits. Thus, profit becomes the reward for uncertainty-bearing.

However, it may be pointed out that uncertainty-bearing is not the only cause of profits. There are also other factors involved, e.g. the initiating and the coordination ability of the entrepreneur.

7. Profit as Reward for Innovation

According to Joseph Schumpeter, an Austrian born economist who taught at Harvard, **"the only source of profit is economic innovation."** An entrepreneur has been assigned an important role, that of an innovator. He is the man with vision, originality and daring. He need not be a scientist who invents new processes, but he is the one who successfully introduces them. **An innovation may consist of:**

a) the introduction of new product;.
b) the introduction of new method of production;
c) opening of new market;
d) development or acquisition of a new source of raw materials;
e) substantial change in business organization.

To quote Samuelson, "Usually these profits accruing from innovations are temporary and are finally competed out of existence by rivals and imitators. But as one source of innovational profits is disappearing, another is being born. So altogether, these innovational profits will continue to exist."

8. Profits as Monopoly Return

Under conditions of perfect competition, there are innumerable firms. As a result of competition, the price of the product will be pushed down to the minimum so as to just cover the cost of production. Only normal profits may be enjoyed. But competition is never "perfectly perfect" and we live in a world of little monopolies. Under imperfect competition, the monopolists may enjoy profits due to the following possibilities:

a) The monopolist may restrict output by resorting to the creation of artificial scarcity or as Samuelson calls it "contrived-scarcity", and thus, charge higher prices.

b) The monopolist may sell large quantities at a price slightly higher than the average cost and thus reap huge profits.

c) The monopolist may pay a price to the factors which are lower than their productivity and thus by exploiting them earn profits.

d) The monopolist may take advantage of government interference, e.g. when government restricts imports by imposing import duties to restrict foreign competition, the monopolist may raise the price of his product in the domestic market in the absence of foreign competitors and thus enjoy profits.

From the above analysis, we conclude that sources of profits are innumerable and all of them taken jointly account for the cause and the determination of profits. "Profits," according to Samuelson, "are the report card of the past, the incentive gold star for the future and also the grub stake for new ventures".

14.3 PROFIT MANAGEMENT AND CONTROL

Profit in its pure accounting sense is the surplus of revenue over the cost. Thus, = **TR – TC**

We have also studied that every business enterprise desires to maximise its profit. The condition for profit maximisation is the level of output where Marginal Revenue = Marginal Cost. We also differentiate between normal profit and super normal profit i.e. normal profit is included in average cost

whereas any profit above the average cost is super normal profit. We have also considered the concepts of gross profit and net profit besides profit in accounting sense, which considers only explicit cost whereas in economic sense to consider profit we take note of both explicit and implicit costs. The firm has also to reveal to its shareholders the profit before tax as well as profit after tax.

After all, 'Business of businessman is business' and therefore profit becomes the acid test of economic performance of any business enterprise. The aim is to maximize profit but if not maximum profit then atleast certain satisfactory level of profit. However, **following factors relegate profit maximization policy to the background**:

1. Government interference : This has two aspects a) There is always the threat of nationalization, b) The Government may appoint a Commission to scrutinize the affairs of the company.

2. Threat of entry of new firm i.e. if the firm maximizes profit it automatically attracts new producers to enter the same area of operation which adversely affect its profit.

3. Image building or tarnishing of the image of the firm i.e. the firm does not necessarily work for maximizing profits but works mainly to gain and retain the goodwill of the consumers or else it may be blamed for exploiting the consumers and therefore high profits may be looked upon with contempt as a means of consumer's exploitation and hence would become socially undesirable.

4. The firm would like to have a balance liquidity and profitability.

5. The firm will have to preserve good employer-employee relationship. High profit may lead to trade unions demanding higher wages.

6. The business enterprise has also to maintain proper Balance Sheet Ratios for the purpose of auditing as well as for upholding the interests of the shareholders.

Thus, the above mentioned considerations relegate the policy of profit maximization and hence the firm will have to be satisfied by earning maximum possible profits within the above mentioned constraints. Therefore, **maximum possible profit without in any way tarnishing the image of the**

enterprise so as to serve and satisfy more consumers should be the objective that should underly the management of profits.

14.4 ROLE OF PROFITS

Anticipation of higher profits leads to an **inducement to invest** as well as **to innovate**. As the entrepreneur begins to forecast more profits he undertakes more investment which in turn creates more employment. This will generate more incomes which in turn, will create more demand for a variety of goods in the market. The prices of these goods will rise at a rate which is related to supply. Higher prices may lead to more profits & greater inducement to invest. The **Keynesian Investment Multiplier** will begin to operate & the economy will march towards prosperity especially by creating bullishness in the stock markets.

Whereas **decline in profits signals the oncoming of depression** because as profit margins dwindle, investment will fall as there would be not much of incentive to invest more. As the investment declines the Investment Multiplier will begin to operate in reverse. Employment will fall, incomes will decline, demand for goods overall will fall, prices start falling & profits will fall further still. The economy begins to slide into depression. Therefore profits play a crucial role as a causative factor in different phases of trade cycle.

It is not necessary that profits of all the firms will be either rising or falling at the same rate & therefore the margin of profits will help in determining the direction in which the community's resources should be flowing.

The **institution of profit is often subject to criticism** & is looked upon with suspicion because the range of profits is responsible for widening the area of inequality. It leads to concentration of power & wealth. Often it is believed that profit is the result of **exploitation of labour as well as the class of consumers** i.e. the workers will be paid relatively lower wages to reduce costs; consumers may be charged higher prices to extract more return & thereby the entrepreneur will be enjoying more & more profits through exploitation of both labour & consumers. **However in the absence of profits there would be no other incentive which would provide inducement to undertake risky business ventures** & therefore fair amount of profits would be justified in the area of Managerial Economics.

Besides, **when we are analyzing the role of profits, weightage needs to be given not to the amount of profits but to the use to which the earned profits are employed**. If profits are used for promoting labour welfare or for development of research or for innovations or are even ploughed back for further production then profits should not be looked upon with contempt. But if profit is the outcome of exploitation then such amount of profits should be controlled. If the profits emerge out of restrictive trade practices then the Government has an important role to play in preventing such restrictive trade practices. It is for this reason that MRTP Act (Monopolies and Restrictive Trade Practices Act) was enacted to prevent such restrictive trade practices. Abuse of monopoly power as a result of emergence of profits is definitely considered to be an evil and needs to be controlled but if the profits are diverted for betterment of business research, innovation and development and for promoting labour welfare, after honouring the tax liabilities then profits need not necessarily be looked upon as an evil. In fact, the amount of profit and the use of it provide the Acid Test of the success or otherwise of the business enterprise.

SUGGESTED READINGS

1. Frank H Knight: Risks, Uncertainty and Profits

2. Stonier and Hague: A Text Book of Economic Theory

3. Paul Samuelson: Economics

14.5 SUMMARY

Profit is a residual income after payment of contractual rewards to all other factors of production. Profits accrue only after sale. Being non-contractual they fluctuate and are sometimes negative.

Profits are looked at as accounting surplus, as a cost when individual chooses not to rent his land/capital/labour but use them for business. It is also rent for ability or reward for risk bearing, innovation or monopoly return.

Profit management aims at maximizing them but at the same time attending to government regulations, image building, restricting entry of competitors, maintaining liquidity etc.

Profits are important as they induce investment. While analyzing the role of profits, weight age needs to be provided not to the amounts of profit, but to the use to which earned profits are employed. It is incorrect to view profits as result of exploitation of either labour or consumers. Profits are utilized for growth, labour welfare, research and many other productive purposes.

14.6 SELF ASSESSMENT QUESTIONS

1. Distinguish between

   a) Gross Profit and Net Profit

   b) Profit in Accounting sense and Economic sense

   c) Profits and other factor rewards

2. State and explain the various sources of profit.

3. Profit is the reward for risk-bearing. Do you agree? Give reasons for your answer.

4. What factors do you think relegate Profit Maximization policy to the background ?

5. How would you account for Monopoly Profits?

6. Outline the role of profits in influencing the level of business activity.

7. If you are a businessman, what would you care for- the amount of profit or the use of it? Elaborate your answer.

REFERENCE MATERIAL
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15

Capital Budgeting

Objectives:

After completing this chapter, you will be able to understand:

• What are Capital Budgets?

• Evaluation of Projects for Capital Budgeting.

• Audits of Capital Budgets.

Structure:

15.1 INTRODUCTION

Capital Budgeting is perhaps one of the most important branches of Managerial Economics. According to **Charles T Hormgrem "Capital Budgeting is a long term planning for making and financing proposed capital outlays." According to Eugene F Brigham "Capital Budgeting is in essence, an application of the classic proposition from the economic theory of the firm, namely, a firm should operate at a point where marginal revenue is just equal to its marginal cost. When this rule is applied to the capital budgeting decision marginal revenue is taken to be the percentage rate of return on investments and marginal cost is the firms' percentage cost of capital."**

Capital budgeting decisions are essentially **long-term investment decisions**. They have to be taken very carefully because once these decisions are taken and implemented they become very expensive if they are to be reversed. The time factor involved in financial planning is of fairly distant future and the capital expenditure can be recovered only over a fairly long period of time. Due to this time element, capital budgeting decisions are subject to greater degree of risks and uncertainty. The long term investment decisions therefore, must be based on sound budgeting procedures. The nature of budgeting problem revolves round three basic questions.

i) How much money will be needed for expenditure in the coming period?

ii) How much money will be available at what cost?

iii) How should the available money be distributed amongst various projects?

The first question deals with demand for capital. As the aim of capital expenditure is to make profits, this problem involves a survey of profitable opportunities of investments on the basis of their yields.

The second question concerns the supply of capital. The supply side has three aspects.

a) How much can we raise internally from depreciation and retained earnings?

b) How much can be procured from outside agencies?

c) What shall be the cost of capital?

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The third question relates to rationing of funds. How much should be spent in all and where?

These questions are analyzed by referring to the demand for capital, supply of capital and the cost of capital.

15.2 DEMAND FOR CAPITAL

The demand schedule for capital refers to the arrangement of the various proposed projects in a descending order according to their estimated rates of return together with required amounts of capital needed by the respective projects.

Before analyzing the investments, the management must understand the nature of opportunities. Some investments are complimentary i.e. making one investment implies that another investment will be necessary. Some investments are mutually exclusive i.e. acceptance of one, implies rejection of others and some investments are independent. It is therefore necessary to identify the various opportunities of investments. Alternative investments can be ranked according to their relative profitability. It is also important to distinguish between cost reducing investment and revenue increasing investment. **According to W.W. Haynes "any investment decision is profitable if it adds more to revenue than to cost or if it reduces cost more than the revenue."** An important element in the analysis of demand for capital is the productivity of proposed capital outlay. The yield must be calculated in terms of individual projects. It is the expected productivity of marginal unit of capital i.e. the key factor in the appraisal of allocating capital funds and not the profitability of the old and sunk investment based on the estimates of the historical costs. The past is useful only as a guide to the future i.e. the future profit which is more relevant and influences demand for capital; besides the capital yield should be calculated over the whole lifetime of the asset. Undoubtedly all the future ventures of capital investment involve risks.

INVESTMENT WORTH OR PROFITABILITY OF A PROJECT

One of the most significant aspects of capital budgeting is the measurement of investment worth.

For appraising the profitability of a project following criteria have been proposed:

A] The Payback Period Method

B] The Discounted Present Value Method

C] Internal Rate of Return Method

A] The Payback Period Method:

For example If initial investment outlay is Rs 1, 00, 000/- and cash inflow per year is Rs 25, 000/- then payback period is = 4 years

From among the several projects the one which has the shortest Payback Period may be selected.

Merits

1. Simple and easy to calculate.

2. It takes care of liquidity problem of the firm.

3. Favours less risky projects.

Demerits

1. It ignores profitability.

2. It ignores changes in cash flows over a long period.

3. It disregards time value of money i.e. simply adds up annuities without proper discounting.

4. It ignores cash inflow after the payback.

B] The Discounted Present Value Method (DPV)

$$DPV = \frac{R_1}{1+i} + \frac{R_2}{(1+i)^2} + \text{-------} \frac{R_n}{(1+i)^n}$$

i) Project cost is given.

ii) Market rate of interest is given.

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iii) R_1, R_2 are known.

Find the DPV.

Compare it with the cost.

Investment is worthwhile if DPV > Cost.

Illustration:

Assume that a machine has a life of 2 years, each year it yields Rs 1210. The present cost of the machine is Rs 2000 and the current rate of interest is 10%. Is the investment worthwhile?

Applying the formula

$$DPV = \frac{R_1}{1+i} + \frac{R_2}{(1+i)^2} + \text{--------} \frac{R_n}{(1+i)^n}$$

$$DVP = \frac{R_1}{1+i} + \frac{R_2}{(1+i)^2}$$

$$= \frac{1210}{1+.1} + \frac{1210}{(1+.1)^2}$$

$$= \frac{1210}{1.1} + \frac{1210}{(1.1)^2}$$

$$= \frac{1210}{11/10} + \frac{1210}{121/100}$$

$$= \frac{1210 \times 10}{11} + \frac{1210 \times 100}{121}$$

$$= 1100 \times 1000$$

$$DPV = 2100$$

The Discounted Present Value (DPV) of the machine is expected to be Rs. 2100. Considering the current rate of interest and also assuming that R_1, R_2

remain the same; whereas the actual cost of the machine is Rs.2000. Therefore DPV>C and hence the investment in the machine is worthwhile.

C] Internal Rate of Return Method

$$C = \frac{R_1}{1 + e} + \frac{R_2}{(1 + e)^2} + \text{------} \frac{R_n}{(1 + e)^n}$$

C: Cost is given.

R_1 ,R_2 is the expected return each year.

e is the marginal efficiency of capital. To be obtained i.e. e = ?

Compare e with I (market rate of interest) where value of i is given.

As long as e > i, investment is worthwhile.

A well managed firm is always very careful with its capital budgeting.

15.3 SUPPLY OF CAPITAL AND COST OF CAPITAL

So far we have considered various concepts and principles underlying demand for capital funds. We now turn to supply of capital. There are fundamentally two sources of supply of capital:

i) Internal
ii) External

The internal sources of supply of capital are a) depreciation charges, and b) retained earnings. The capital expenditure of many firms is confined purely to the amount that can be secured internally. Therefore amount that can be expected from accumulated depreciation and from retained earnings comprises the most significant part of capital budgeting. The retained earnings as a source of supply of capital makes the plough back policy an integral part of capital budgeting.

The external sources of capital are issue of shares and debentures and inter- firm borrowings. The external sources which depend on issue of shares, debentures and inter firm borrowings are very volatile and depend upon the overall atmosphere in the capital market, the company's reputation,

its financial backing and the integrity of its management. Whenever the firm decides to acquire external source of finance its project, it has to think many a times about the cost of capital. **The cost of capital is the rate which must be paid to obtain funds for operating the enterprise**. As the supply of capital comes from several sources, each source has to be analyzed carefully because every source has a different cost component.

There are innumerable difficulties that arise while measuring the cost of capital and hence the determination of company's cost of capital is subject to various margins of error. The computed values can be at the most regarded as fair approximations of the cost. The cost approximation includes the computation of the cost of debt capital, as well as cost of preference share capital, the cost of equity capital, the cost of retained earnings, the cost of depreciation funds etc. The capital costs are determined by a number of forces that exert their influence on capital markets. The Government itself is the single most important determinant of the interest rate structure through resorting to various policy measures by exercising control over reserve requirements, rediscounting facilities selective controls and open market operations. The Government influences the cost of capital. Similarly the investor's psychology, their confidence and business outlook also affect the yields on security issues. Estimating the cost of capital requires the knowledge of market value of securities and cost of floatation.

To conclude, the cost of capital is a complex subject although determining the firm's cost of capital is an essential part of capital budgeting process. Firms raise funds in many forms including long-term and short-terms debts, stock, retained earnings and lease financing. Each source of funds has a cost and these costs are the basic inputs in the cost of capital determination.

15.4 POST AUDIT

Post Audit is necessary in any treatment of capital budgeting. The Post Audit involves:

i) A comparison of actual results to those predicted in the investment proposal.

ii) An explanation of observed differences.

The Post Audit serves many purposes such as improving of the forecasts as well as improving of the operations.

The Post Audit is a complex process. We must recognize that every element of cash flow forecast is subject to uncertainty. Secondly, projects sometimes fail to meet expectations for reasons beyond control of operating executives. It is also difficult to separate the operating results of one investment from those of a larger system. Because of these difficulties some firms do not give adequate importance to Post Audit. However, experience shows that the best run and most successful organizations are those that put greatest stress on the Post Audit's and therefore Post Audit is one of the most important elements in a good system of capital budgeting.

15.5 PROJECT PLANNING

Capital budgeting presupposes Project Planning. In fact, project planning is the most practical branch of Managerial Economics. A project refers to a scheme of investing resources; **project planning is essentially a long term planning of proposed capital outlays**. It relates to long term investment decisions.

Features of Project Planning

1. Determining the financial outlays.
2. It has time, technical and financial dimensions.
3. It is a long term phenomenon
4. It is non-repetitive & non-routine exercise.
5. It envisages a flow of yield in future.

In fact, Project Planning is also very often referred to as Capital Budgeting.

Stages of Project Planning

i) Identification of investment opportunities through a search for new investment proposals.

ii) Assembling of resources.

iii) Optimizing the use of resources.

iv) Estimating the yield.

v) Selection of the project on the basis of investment worth and economic feasibility.

vi) Decision taking.

vii) Implementation.

viii) Mid-term appraisal.

ix) Performance reviews.

x) Further areas:

    a) Expansion of existing product.
    b) Expansion of existing markets.
    c) Innovation.
    d) Environmental investments.
    e) Replacement for maintenance.
    f) Replacement for cost reduction.

These matters which underly project planning will have to be taken into consideration in capital budgeting for further developments in distant future.

SUGGESTED READINGS

1. Joel Dean: Managerial Economics

2. Pappas and Hirschey: Fundamentals of Managerial Economics

3. Peterson and Lewis: Managerial Economics

4. Haynes, Mote and Paul: Managerial Economics

15.6 SUMMARY

Capital Budgeting is a long term planning for making and financing proposed capital outlays. Capital Budgeting involves long term investment decisions.

It addresses three questions. How much capital is required for future investments? How will it be available and at what cost? And how should the available capital be distributed amongst different projects?

Demand for capital is determined by arranging proposed projects in descending order according to their estimated rates of return together with required amounts of capital needed by the respective projects.

Profitability of different projects is determined by using tools like Payback Period, Discounted Present Value or Internal Rate of Return.

Capital supply is through internal accruals or through outside sources like equity, debentures, bank loans and other forms of debt.

Capital Budgets or Projects need to be audited during and after completion to compare actual results with those estimated in the budget. Differences are explained for corrective action.

15.7 SELF ASSESSMENT QUESTIONS

1. What do you understand by Capital Budgeting?

2. "Capital Budgeting decisions are subject to risks and uncertainty." Why?

3. "It is necessary to identify the various opportunities of investments." Explain.

4. "One of the most significant aspects of Capital Budgeting is the measurement of investment worth." What methods are normally used in deciding the profitability of a project?

5. Explain briefly the following:
   i) The Payback Period Method
   ii) The Discounted Present Value Method
   iii) Internal Rate of Return Method

6. Explain the Internal and External sources of Supply of Capital.

7. "Each source of Supply of Capital has different cost component." Explain the cost component of the various sources of Supply of Capital.

8. 'Post Audit is necessary in any treatment of Capital Budgeting.' Do you agree? Why?

9. 'Capital Budgeting presupposes Project Planning.' Outline the features and stages of Project Planning.

10. Visit a few firms to study their methods of Capital Budgeting. Do they all have similar Capital Budgeting structures? Do you notice any differences? If so, why?

REFERENCE MATERIAL
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Summary

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16

Glimpses Of Macro-economic Environment And Input Output Analysis

Objectives:

After completing this chapter, you will be able to understand:

• Characteristics of Trade Cycle.

• Fiscal and Monetary Policies.

• Indicators of Business Activity.

Structure:

16.1 Introduction

16.2 Business Cycle : Its Meaning

16.3 The Phases of a Trade Cycle

16.4 Characteristic Features of Each Phase of Trade Cycle

16.5 Business Policies

16.6 Indicators of Business Activity

16.7 Summary

16.8 Self Assessment Questions

16.1 INTRODUCTION

Although Managerial Economics is Micro-Economics-oriented yet the knowledge and awareness of Macro-economics is essential for the successful and profitable working of any business unit. No single firm works in isolation. It has got to consider so many other aspects while taking decisions for itself; such as the economic environment, the political jig-saws, the sociological, psychological, legal and philosophical considerations. Changes in the Macroeconomic variables such as National Income, National Output, National level of employment; changes in the Government policy at National level, such as Fiscal and Monetary Policies, the policy of Privatization, Disinvestment, Liberalization as well as the International policy of Globalization or at times Protection will all have to be well understood by the managerial unit at the firm's lebvel. Neglect of these changes may lead the producer in taking wrong decisions which may have disastrous effects.

In this chapter, therefore, we propose to highlight the phases of Business Cycle, elaborating the characteristic features of each phase. We shall also highlight some aspects of the Business Policy along with the Basic Indicators of economic activity. In conclusion we will throw light on the Fundamentals of Leontiff's Input-output analysis.

16.2 BUSINESS CYCLE: ITS MEANING

Business Cycles are also often described as Trade Cycles. These refer to a wave-like movement in the level of Business activities. Trade cycles are characterized by alternations and oscillations of economic variables between the periods of depression and prosperity. **The 'upswings' and 'downswings', in the levels of business activity mark the different phases of the Trade Cycle.**

Paul Samuelson remarks: "Business conditions rarely stand still. Prosperity may be followed by a panic or a crash. National Income, employment and production fall. Prices and profits decline, men are thrown out of work. Eventually the bottom is reached; and revival begins. The recovery may be slow or fast. It may be incomplete, or it may be so strong as to lead to a new boom. The new prosperity may represent a long sustained plateau of brisk demand, plentiful jobs, rising prices and increased living standards. Or it may

represent a quick inflationary flaring up of prices and speculation to be followed by another disastrous slump."

According to Keynes; "A Trade Cycle is composed of periods of good trade characterized by rising prices and low unemployment, altering with periods of bad trade characterized by falling prices and high unemployment".

According to Hawtrey; the peculiarity of Trade Cycle is such that "an excess movement in one direction tends to bring into operation not only its own remedy but a stimulus to an excess movement in the other direction".

According to Haberler; "The business Cycle may be defined as an alternation of periods of prosperity and depression of good and bad trade".

According to R. A. Gorden; "Business Cycle consists of recurring alternation of expansion and contraction in aggregate economic activity, the alternating movements in each direction being self-reinforcing and pervading virtually all parts of the economy".

GENERAL CHARACTERISTICS OF TRADE CYCLE

1. **A business cycle is a wave-like movement**. It is characterized by alternation of expansion (or prosperity) and contraction (or depression) in economic activities.

2. **According to Haberler; "The basic feature of the Business Cycle is its pervasiveness**. It affects almost all phases of economic life and is clearly reflected by all the broad measures of economic activity e.g. G.N.P.; Index of industrial production; non-agricultural employment and unemployment. A very significant fact is that the wholesale price level almost always rises during the upswings and falls during the downswing of a cycle, and the money values, payrolls, profits etc., always go with the cycle".

3. Another common feature of all Business Cycles is the **cumulative process of expansion and contraction**. Each upswing or downswing of a cycle is **self-reinforcing. It feeds on itself** and creates further movement in the same direction. Once started it gathers momentum and persist in a given direction, till forces accumulate to reverse the direction.

4. Both the depression and boom **contain the seeds of their own destruction.**

5. Under '**open economy**' booms and depression in one country are **transmitted** to other countries.

6. According to Keynes, a Trade Cycle is characterized by the presence of a crisis; the peak and the trough are not symmetrical. **The change from upward to downward tendency is more sudden and violent than the change from the downward to the upward direction.**

7. **Harberler** points out that the **MV grows during the period of prosperity and shrinks during depression.**

8. The cyclical fluctuations are **more marked in capital goods industry than consumer goods industry**.

9. Although business cycles are recurrent, no **two business cycles are the same. Haberler** remarks "Each cycle, each period of prosperity and depression, has its special features which are not present in any, or not in many others. In a sense **each cycle is a historical individual**, each is embedded in a socio-economic structure of its own. It is not surprising to find great variation between cycles in different countries and different periods. Not only do the business cycles vary in periodicity but they also vary in amplitude. Some business cycles have resulted in steeper fluctuations in output, employment and prices and for a longer period than others. **Samuelson confirms; "No two business cycles are quite the same. Yet they have much in common; though not identical twins they are recognizable as belonging to the same family"**.

16.3 THE PHASES OF A TRADE CYCLE

To quote **Paul Samuelson** "The business cycle, like the year, has its seasons. The cycle is broken up by many economists into Four Phases; the two important ones being called the period of '**expansion**' and '**contraction or recession**'. The expansion phase comes to an end and goes into the recession phase at the Upper swing point or so called **Peak**. Similarly the Recession phase gives way to that of expansion at the lower turning point or so-called **Trough**. Thus the four phases are supposed to keep repeating themselves". Samuelson repeatedly notes that "the emphasis is not so much on high or low business activity as on the dynamic aspects of rising or falling business activity". Each phase of the cycle passes into the next; each phase

is characterized by different economic conditions, e.g. during expansion we find that employment, production, prices, money, wages, interests and profits are usually rising with the reverse as true in recession."

According to **Arthur Burns and Wesley Mitchell**, "the cycle is characterized by the critical mark-off points of '**peak**' and '**trough**' : the expansion phase extends from trough to peak and the contraction phase extends from peak to trough". **Burns and Mitchell** have, then, divided the complete cycle from trough to trough into **nine stages**.
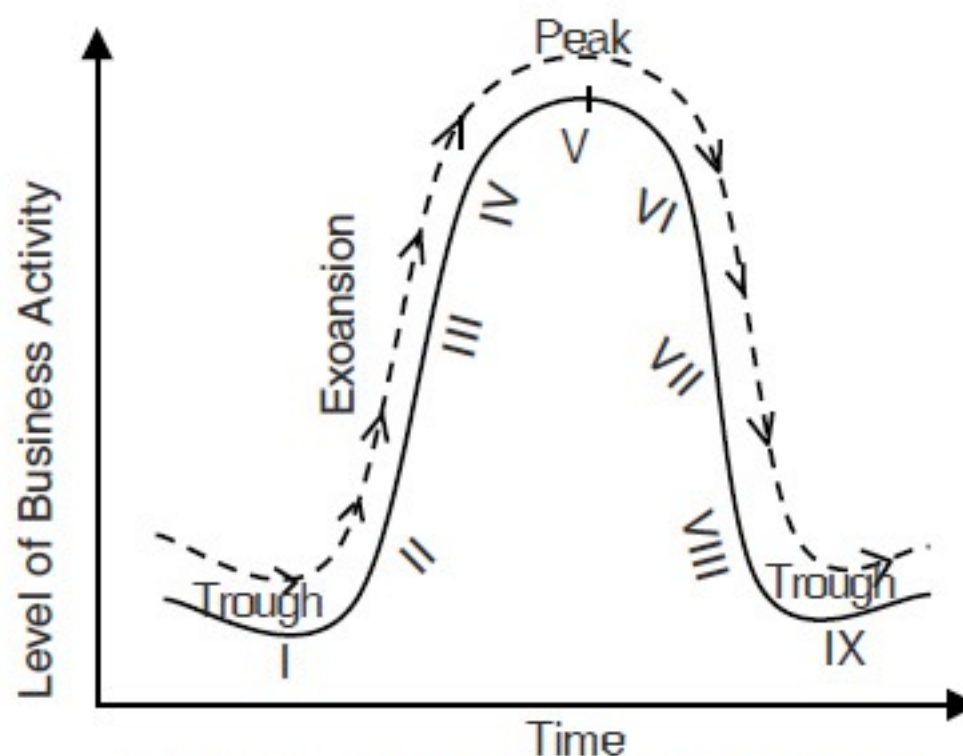
Fig 16.1 A Typical Trace Cycle (The Burns & Mitchell Type)

The **starting trough** is designated **I**.

The **expansion phase** by **II, III** and **IV**.

The **peak** is designated **V**.

The **contraction phase** by **VI, VII** and **VIII**.

The **end-trough** is designated **IX**.

The above diagram cannot distinguish where the phase of recovery ends and that of prosperity begins in the process of expansion. Nor does it demarcate where recession ends and depression begins during the downturn phase of contraction.

Let us consider the **four-phase trade cycle model of Schumpeter.** According to Schumpeter trade cycle should be marked from Equilibrium to Equilibrium.

Fig 16.2 Schumpeter's 4-phase Trade Cycle Model
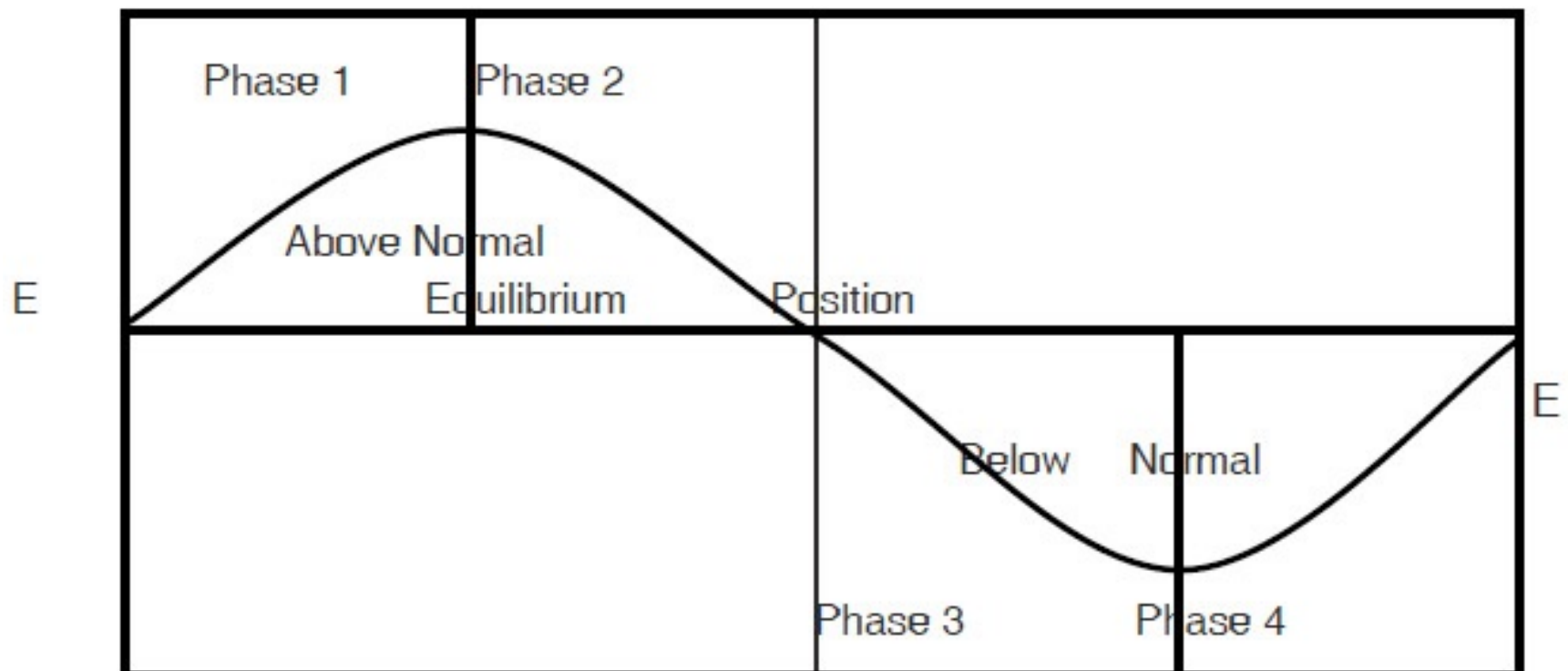
Let EE represents the line of Equilibrium situation for the economy as a whole. Portion above equilibrium is **above-normal** and the portion below equilibrium is **below-normal**. Phase 1 of above-normal is the phase of prosperity in which employment is being generated rapidly. Once the peak is reached we have a down-turn symbolizing the phase of recession in which employment level starts declining. It must be noted that an upswing takes a longer time. It is a slow process whereas downswing is sudden and quick. In case of below-normal situation we have the phase of depression which results in trough and a gradual upward tend signaling the phase of recovery. A typical trade cycle, according to Schumpeter comprises of four phases : viz. Prosperity, Recession, Depression and Recovery. Since it is a cycle one may start from any phase only to return to the same phase. It could be Depression, Recovery, Prosperity and Recession to be again followed by Depression. The cycle is complete and history repeats itself.

16.4 CHARACTERISTIC FEATURES OF EACH PHASE OF TRADE CYCLE

Depression: According to Haberler "Depression means a state of affairs in which real consumption or volume of consumption per head, real production or volume of production per head and of employment are falling or are subnormal. The level of economic activity is extremely low."

1. The volume of production and trade shrinks.

2. Unemployment increases.

3. Incomes decline.

4. Prices decline.

5. Profits dwindle

6. Aggregate expansion and effective demand falls.

7. Overall pessimism pervades.

8. There is general contraction of credit. Banks accumulate excess reserves with little opportunity to invest funds.

9. Stock markets collapse. Prices of stocks and shares crash.

10. There is a strong inclination to maintain liquidity.

11. No entrepreneur even dreams of undertaking a risky venture.

12. The structure of Interest Rates decline.

13. Practically all construction activity, whether in machinery or building construction comes to a standstill.

However, Depression will not be a permanent feature of a dynamic economy. In fact the very forces which intensified Depression are themselves self-defeating. During depression as businessmen are postponing replacement of their plant and machinery and consumers are postponing the purchase of durable goods, the need for replacements and purchase of durable gods gradually accumulates. The pent up demand bursts open. After a period of time there will be moderate increase in the purchases of durable goods on the consumers' part and replacement of plant and machinery by producers.

This will call for increase in production, in turn leading to an increase in employment, income and effective demand. Banks will expand credit. The era of pessimism gradually vanishes and sparks of optimism develops. The economic activity gathers momentum and the stage for recovery is set.

Recovery: Recovery phase marks a turning point from depression to prosperity. During the phase of revival

(1) levels of employment, income and output gradually begin to rise

(2) Stock Markets become more sensitive. A rise in stock prices favour expansion

(3) The expectations of the entrepreneurs improve

(4) An atmosphere of Optimism sets in

(5) Investment activity is stimulated

(6) Banks expand credit

(7) The wave of recovery once initiated begins to feed upon itself

(8) When investment begins to rise the multiplier begins to operate. Incomes rise by multiple amount; generate effective demand and the economy marches towards prosperity.

Prosperity: Harberler defines prosperity as "a state of affairs in which the real income consumed, real income produced and level of employment is high or rising, and there are no idle resources or unemployed workers or very few of either". The phase of prosperity is characterized by :

(1) large volume of production and trade

(2) A high level of employment

(3) Higher incomes

(4) Overall rising prices

(5) Swelling profits

(6) Greater inducement to invest

(7) Rise in interest rates

(8) Expansion in bank credit

(9) A high level of real investment

(10) Operation of the economy at full capacity and

(11) An era of optimism.

Through the leverage effect of multiplier-accelerator interaction, the economy attains the pinnacle of prosperity.

But the seeds of recession are sown during the period of prosperity.

Why should the Boom break?

a) The period of over-optimism and over-investment signals the oncoming of depression. In view of higher profits and business optimism, entrepreneurs invest and expand more. But scarcity of resources, particularly shortages of skilled labour and raw materials cause bottlenecks and business calculations go wrong.

b) Moreover as income increases, the marginal propensity to consume falls. Not only do people spend a smaller proportion of their income as income increases but it is likely that the more of the income is going to profit recipients who are likely to spend a much smaller proportion of it than wage-earners. Thus effective demand shrinks.

c) In addition, with progressive taxation, the marginal profit is reduced. Added to this as Employment rises the government spending on unemployment payments falls. The result is that, unless increased investment or other government spending is sufficientto match saving and taxation and smaller unemployment payments, the expansion in income will come to an end.

d) Moreover, rising costs as output expands exert pressure on profit margins

(i) As higher levels of employment are reached, less and less efficient resources will be employed. The labour cost will tend to rise as the cycle proceeds.

(ii) Bottlenecks will tend to develop.

(iii) As prices rise wage rates will also have to be raised to compensate for the rising cost of living.

(iv) As expansion proceeds, funds for investment will become harder to obtain; interests will tend to rise and banks will begin to be more selective in granting credit. Any pressure on profit margins will cause firms to revise their current output plans for future expansion.

e) All types of investment may fall sharply, entrepreneurs become less optimistic. As costs begin to rise and profit expectations dwindle entrepreneurs will begin to be more pessimistic. Capital may prove to be less profitable because in relation to total demand there is over-investment.

Thus boom contains the seeds of its own destruction.

Recession & the Downswing

Recession is that phase in which the forces that make for contraction finally win over the forces of expansion. Following characteristics mark the phase of Recession:

1. The utter optimism of the boom gives way to skepticism; characterized by the feeling of hesitation, doubt and fear.

2. The recovery dreams of entrepreneurs disappear. Not only are the fresh enterprises postponed for some future date but even those in hand are abandoned.

3. Credit is suddenly curtailed sharply as the banks are afraid of failure.

4. Business expansion slumps, orders are cancelled.

5. Workers are laid off. Liquidity preference rises and people prefer to hoard rather than invest.

6. Building activity slows down and unemployment appears in construction industry.

7. Unemployment spreads to all the sectors. The multiplier begins to operate in reverse.

8. Unemployment leads to fall and expenditure, demand, prices, profits by industrial and commercial activities.

9. Panic prevails in the stock market and the prices of shares decline. There is a sudden and complete collapse of the share market.

The downswing gathers momentum and the economy sinks into Depression. Eventually the bottom is reached, and the cycle starts all over again. The history repeats itself. No doubt the cycle varies both in periodicity and in its severity.

	Characteristic Features of each phase of Trade Cycle				
	Item	**Depression**	**Recovery**	**Prosperity**	**Recession**
1	Employment	Lowest	Slow rise	High	Declines
2	Output	Lowest	Slow increase	High level	Falling
3	Prices	Lowest	Recovery	Very high	Fall
4	Wage Rate	Lowest	Begin to rise	High	Falls
5	Profits	Lowest	Start rising	High	Dwindle
6	Bank Credit	Lowest	Expands	High	Sharp decline
7	Bank Reserves	High	Slow fall	Low	Start rising
8	Business failures	Plenty	Few	Not many	Suddenly many
9	Construction activity	Almost Nil	Slow rise	Very high	Sudden decline
10	Investment	No inducement	Slow rise	High	Starts falling
11	Share Market	Crash	Hopes	Bullish	Bearish
12	Feeling	Hopelessness (Pessimism)	Hopeful	Optimism	Hesitation,fear, doubt, skepticism

16.5 BUSINESS POLICIES

Business fluctuations will influence managerial decisions regarding investments in undertaking production. During the period of inflation the prices rise and the value of money falls. This may dampen the consumer's demand for goods. Although, with rising prices the profit margins may swell. The firm will have to estimate the cost for further production and the revenue from it over a period of time. Besides, the anticipated returns the firm will also have to take into consideration a rise in the rate of corporate taxes. Replacement of capital equipments may also become costly and yet higher dividends will have to be paid. So also the problems will arise when prices start falling. The firm may have to implement cost saving-devices. Falling prices may lead to lower profits and thereby will discourage any further investment. The Government will have to undertake measures to control such business fluctuations and ensure business stability. The two major tools of Macro Economic Policy are the Fiscal Policy and the Monetary Policy. Keynes was of the opinion that Monetary Policy is rather ineffective to pull out the economy from depression. He thus emphasized the role of Fiscal Policy as an effective tool of stabilizing the economy.

Fiscal Policy

Fiscal Policy refers to the Government's spending, taxing, borrowing and debt management. According to **Arthur Smithis "Fiscal Policy is the policy under which the Government uses its expenditure and revenue programmes to produce desirable effects and avoid undesirable effects on the National Income, production and employment."** In brief, Fiscal Policy refers to a process of shaping public taxation and public expenditure so as to help to control the swings of business cycle and to contribute towards the maintenance of progressive high employment economy free from excessive inflation or deflation.

The three constituents of Fiscal Policy are a) Taxation, b) Public expenditure and c) Public debt. The objectives of Fiscal Policy differ from country to country according to the level of Economic Development.

The main objectives of Fiscal Policy in a developing economy are:

1. Resource mobilization.

2. Acceleration of Economic growth thereby stimulating business activity.

3. To reduce inequalities.

4. To increase employment opportunities through public spending. The Government may also resort to the policy of Pump Priming and Compensatory expenditure to raise the level of employment.

5. Price stability: The Fiscal Policy should aim at curbing inflationary pressures inherent in a developing economy. Fiscal Policy as a corrective measure during recession should resort to increase in Government expenditure and reduction in taxes; whereas Fiscal Policy as a corrective measure for inflation should reduce Government expenditure and increase taxes.

   While Fiscal Policy acts as an important and potent instrument of economic growth in developed countries, it suffers from several limitations in developing countries.

   A sizeable portion of developing countries is non-monetized, there is a lack of adequate, reliable data pertaining to income, expenditure, saving, investment etc. Large portion of the population is illiterate and do not understand the implications of Fiscal Policy. Fiscal administration is weak and there is large scale tax evasion. There is political instability and the policy measures keep changing periodically.

Monetary Policy

Monetary Policy refers to those decisions and measures of the monetary authority which alter the supply of money in order to vary the rate of interest so as to achieve some predetermined objectives. **Monetary Policy would therefore refer to management of expansion or contraction of money and credit supply in the economy by either changing the cost of credit or the availability of credit with a view to achieving certain Macro Economic objectives of full employment, price stability, economic growth and exchange rate stability.**

In case of Monetary Policy there is a problem of conflicting objectives. **A.W. Philips**, a British economist indicated that there is a basic conflict between objectives of full employment and price stability. With the help of **Philips Curve** he showed that if we want to reduce the rate of unemployment we will

have to tolerate high rate of inflation and if we want to reduce the rate of inflation we will have to accept high rate of unemployment.

Although Monetary Policy has certain limitations, it has certain definite advantages over Fiscal Policy. For example : It requires minimum interference of the Government. It is free from political pressures. It is more objective in nature. It is impersonal and non-discriminatory. It is also time-saving in nature because the implementation lag is brief in case of Monetary Policy.

Although, Monetary Policy is useful tool in the hands of the Government to achieve certain Macro Economic goals, yet Monetary Policy alone is not enough. The Fiscal Policy should supplement the Monetary Policy. Besides Fiscal and Monetary Policies the Government also resorts to certain Physical Controls. All these, taken collectively form the triple pillars of the Government action-oriented program to regulate business activities.

16.6 INDICATORS OF BUSINESS ACTIVITY

The Economic Indicators of business activity can be broadly classified into two categories:

1. Internal Economic Indicators

2. External Economic Indicators

Some of the major **Internal Economic Indicators** are:

i) National Income and National Output

ii) Gross Domestic Product

iii) Net Domestic Product

iv) Level of employment

v) Index of agricultural production

vi) Index of industrial output

vii) Wholesale Price Index, Cost Of Living Index.

viii)Supply of money

ix)Banking development

x)Rate of saving, rate of investments, rate of economic growth.

xi)Changes in the value of money resulting from inflation or deflation.

xii)Infrastructure such as electricity, power supply, roadways, railways, waterways, airways, lines of communication.

xiii)Computerization and technology.

xiv)Innovations, Research and Development

xv)Modernization

xvi)Disinvestment and Privatization

xvii)Nationalization

xviii)Liberalization

xix)Population pressures

xx)Internal migration

Besides these the indicators of economic development such as Per Capita Income, standard of living, availability of food, clothing, shelter, health, education, sanitation, availability of pure drinking water, environmental improvements are all very important Internal Indicators promoting growth, development and in turn the levels of business activity.

The External Economic Indicators will include:

i) Exports and Export promotion

ii)Imports and Import substitution

iii)Terms of Trade

iv)Balance of payments

v)Capital Accounts- Capital inflows and outflows, loans, repayments, SDRs.

vi)Current Account

vii)Emigration and Immigration of population

viii)Globalization

ix)Foreign Exchange Reserves

x)Rate of exchange, depreciation, appreciation, devaluation.

All these are the indicators of the levels of business activities and the nature and rate of country's economic growth and development.

16.7 INPUT-OUTPUT ANALYSIS

The Input-Output Analysis is used to study the supply and demand inter-relationships that exist between the various sectors of an economy during some period of time. The Input- Output Analysis was developed by **Prof. Wassily Leontif** for which he was awarded Nobel Prize in Economics in 1973.

The phrase **Input-Output** is used because the matrices show how much each sector buys from other sectors and how much it sells to them as well as how much of its output does it use as its own input.

Let us consider an over-simplified hypothetical example of two industry economy model; namely, industry A and industry B.

Consumers (input)				
	Industry A	**Industry B**	**Final demand C**	**Total D**
Producers (output)				
Industry A	120	250	230	600
Industry B	180	100	470	750
Labour	300	400	700	1400
Total	600	750	1400	2750

Each row shows how the output of each sector is consumed by the three sectors. E.g, of the total output of industry A, 120 went to industry A itself (for internal consumption), 250 to industry B, 230 to consumers for the final use (hence the term "final demand "). The total output of industry A is the sum of industrial and final demands (viz, 120+250+230 = 600).

Each column gives the value of what each sector consumes from the other sectors. E.g., in producing 600 units, industry A consumes 120 units of output from itself, 180 units of B's output and 300 units of Labour's output.

"Note that the sum of entries in each row is equal to the sum of the entries in the corresponding column" i.e. for instance, industry A consumed from all sectors the same amount as it produced for them.

Input-Output Analysis enables us to estimate the total production of each **"industrial"** sector if there is a change in final demand, **"so long as the basic structure of the economy is static."** This important assumption means, in effect, that, for each industry, the amount spent on each input for each rupee's worth of output must remain unchanged.

E.g., in producing 600 units, industry A uses 120 units from itself, 180 units from B, and 300 units of labour. Thus, for each rupee's worth of output, industry, A spends 120/600 =1/5 (=20 paise) on itself, 180/600 = 3/10 (=30 paise) on Buyer, and 300/600 = 1/2 (=50 paise) on labour.

Thus, we get the matrix

$$
\begin{array}{c}
A \\
B \\
\text{Labour}
\end{array}
\left[
\begin{array}{cc}
\dfrac{1}{5} & \dfrac{1}{3} \\[2mm]
\dfrac{3}{10} & \dfrac{2}{15} \\[2mm]
\hline
\dfrac{1}{2} & \dfrac{8}{15}
\end{array}
\right]
$$

These entries in matrix are called **"input-output coefficients"**. The sum of each column is **1.**

Now suppose final demand changes from 230 to 250 for industry A and from 470 to 600 for industry B. what total output must A and B produce for both, industry and final demand to meet new requirement, assuming, of course,

that the structure in the preceding matrix is unchanged? Using 'Leontiff's Matrix Method' we should be able to derive the answer.

Assumptions of Input-Output Analysis:

1. The Input-Output Analysis assumes that no two products are produced jointly i.e. each industry produces one homogenous product.

2. Factor prices and commodity prices are assumed to be given.

3. All inputs are assumed to be employed strictly in fixed proportion and the use of these inputs expand in proportion with the level of output.

4. The nature and extent of consumer demand is given.

5. There is no scope for external economies or diseconomies.

Uses and Limitations of Input-Output Analysis:

The construction of Input-Output model is very expensive and time consuming. It is certainly difficult for a firm to develop its own tables. However, several large models have been developed by various Governmental agencies. Perhaps the most intricating one is 460 sector model of the U.S. economy maintained by Department of Labour. In addition, there have been State and Regional Input-Output models that can be used for forecasting on a more localized basis. The most important advantage of Input-Output Analysis is that it takes into account interrelationship between sectors.

However the Input-Output Analysis has certain limitations. In addition, to its high cost and laborious task, it rules out technical progress and technological changes. The element of dynamism gets diluted. It also makes us believe that the firms experience Constant Returns to Scale.

Despite, these limitations the Input-Output Analysis is very much useful because it takes into consideration the inter-relationships among various industries and sectors of the economy in an internally consistent manner. It provides an important mathematical tool for analyzing inter-industry- inter-sectoral Input-Output relations.

SUGGESTED READINGS

Estey: Trade Cycles

Mitchell W. C.: Business Cycle, The Problem and its setting

Dr Batra Ravi: The Great Depression of 1990

Haberler: Prosperity and Depression

Schumpeter J. A.: Business Cycles

Paul Samuelson: Economics

16.7 SUMMARY

Managerial Economics is essentially Micro Economics, still knowledge of Macro Economics is essential for working of business unit.

The alternate upswings and downswings in the levels of business activity mark the different phases of the trade cycle. Business cycles affect all phases of economic activity and are, therefore, pervasive. Each cycle of boom and recession is self-reinforcing until forces gather to reverse the trend. In open economy, effects of trade cycle are transferred from one country to other.

The phase of expansion continues till it reaches a Peak from where it goes into recession. Similarly recession gives way to expansion at the lowest point called Trough.

In recession cycle, volumes of production and incomes shrink, unemployment increases, both prices and profits decline, stock markets collapse and there is sentiment of pessimism everywhere.

In boom or expansion cycle production and incomes rise, levels of employment rise, Banks expand credit, stock markets are more sensitive and atmosphere of optimism sets in.

Both the cycles have seeds of destruction within themselves and when these gather momentum reversal takes place.

Two major tools of Macro Economic Policy are Fiscal and Monetary policies. Under Fiscal policy the Government uses its expenditure and revenue programmes to produce desirable effects and avoid undesirable effects on the national income, production and employment. Under Monetary policy, money and credit supply in the economy is managed by either changing the cost of credit or the availability of credit with a view to achieving objectives of full employment, price stability, economic growth and exchange rate stability.

At the end of the chapter a list of business activity indicators, both internal and external, is provided.

16.8 SELF ASSESSMENT QUESTIONS

1. What do you understand by 'Trade Cycle'?

2. 'Business conditions rarely stand still'. Explain.

3. Outline the general characteristics of Trade Cycles.

4. 'Each cycle is a historical individual'. Discuss.

5. 'Trade cycles, though not identical twins, they belong to the same family'. Discuss.

6. Describe a typical trade cycle.

7. 'Trade Cycle is a wave-like movement'. Explain.

8. What are the different phases of a Trade cycle?

9. Outline the characteristic features of each phase of the trade cycle.

10. Describe Schumpeter's four-phase model of Trade Cycle.

11. 'The seeds of recession are sown during the phase of prosperity'. Explain.

12. What do you understand by Fiscal Policy? Bring out the objectives of Fiscal Policy in a developing economy?

13. In what way Fiscal Policy could be used to bring about price stability?

14. What are the limitations of Fiscal Policy?

15. Explain the concept of Monetary Policy. What are its main objectives?

16. 'Although Monetary Policy has certain limitations, it has certain definite advantages over Fiscal Policy.' Discuss.

17. Enumerate the Internal and External Economic Indicators of business activity.

18. Briefly explain the Input-Output analytical model.

19. What are the assumptions, uses and limitations of Input-Output Analysis?

20. "Although Managerial Economics is Micro-economics oriented yet the knowledge and awareness of Macro-economics is essential." Discuss.

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PPT

MCQ

Video1

Video2

we school