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MASTER OF BUSINESS ADMINISTRATION / MASTER OF COMMERCE

MANAGERIAL ECONOMICS

MBA601/MCM601

Self Learning Material

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D. M. Mithani

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Managerial Economics

Course Code: MBA601/ MCM601 **Credits: 3**

Course Objectives:

- To make the students understand how prices get determined in markets, how market participants benefit in the form of consumer surplus and producer surplus, and what are the consequences of government intervention.
- To measure the responsiveness of consumers' demand to changes in the price of a good or service, the price of other goods and services, and income.
- To make the students understand the different costs of production and how they affect short and long run decisions.

Syllabus

Unit 1 - **Managerial Economics:** Concepts based on scarcity and optimization. Fundamentals of Demand: Demand Function, Law of Demand and its Exceptions, Change in Demand, Kinds of Demand.

Unit 2 - **Elasticity of Demand:** Elasticity of Demand: Price Elasticity of Demand, Degrees, Determinants, Measures, Income Elasticity of Demand, and Cross Elasticity of Demand.

Unit 3 - **Consumer Behavior Part-1:** Theory of Utility, Concept of Marginal Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility.

Unit 4 - **Consumer Behavior Part-2:** Indifference Curve Analysis: Properties, Budget Line, Determination of Consumer's Equilibrium, Explanation and Measurement of Price Effect, Income Effect and Substitution Effect.

Unit 5 - **Production Analysis:** Production Frontier, Short run and Long run Production Function, Iso-quant Curves, Producer's Equilibrium, Optimal Combination of Inputs and Economies of Scale.

***Unit 6* - Theory of Cost and Revenue Analysis:** Cost and Revenue Concepts: Long Run and Short Run Cost Curves, Traditional and Modern Theory of Cost: Relationship between Total Revenue, Average Revenue, Marginal Revenue and elasticity of demand.

***Unit 7* - Market Structure:** Perfect Competition, Monopoly, Monopolistic Competition. Alternative Firm Goals: profit maximization, sales maximization, business expansion and goodwill promotion.

***Unit 8* - Macro Economics:** Concept of National Income, its Methods of Measurement, and Circular Flow of Income.

***Unit 9* - Classical Theory and Keynesian Theory of Employment:** A comparative analysis of Classical and Keynesian Theory of Employment.

***Unit 10* - Keynesian Tools:** Effective demand; Consumption Function; Investment Function and Multiplier.

***Unit 11* - Inflation:** Concept, Causes and Theories of Inflation.

Text Books:

1. Salvatore,D.(2012). *Managerial Economics: Principles and Worldwide Applications*. Oxford: Oxford Press.
2. Ahuja, H. L.(2017). *Managerial Economics*, New Delhi: S. Chand.
3. Dwivedi, D.N.(2018). *Managerial Economics*, New Delhi: Vikas Publications.

Reference Books:

1. Peterson, L., Jain.(2005). *Managerial Economic*. New Delhi: Prentice Hall of India.
2. Mote, V.L., Gupta G..S.(2017). *Managerial Economics*. New Delhi: McGraw Hill Education.

CONTENTS

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UNIT 1 MANAGERIAL ECONOMICS

Structure:

1.0 Learning Objectives

After studying this unit, you will be able to:

- Describe the basic concepts of managerial economics.
- Explain the concepts based on scarcity and optimisation
- Discuss the meaning of demand and trace its determinants.
- State the demand functions.
- Grasp the law of demand.
- Know the phenomenon of upward sloping demand curve.
- Expose the meaning of change in demand.
- Enlist the kinds of demand.

1.1 Introduction

Economics

Economics is a social science of management of limited resources with unlimited wants of human beings. The development and happiness of human beings depend upon the production, distribution and consumption of various goods and services. Man wants food, shelter and clothing primarily. These are for his existence. He needs more in order to make his life comfortable and joyful. These lead to exploration of various resources and materials and technique of production, movement and consumption of various types of goods. Man is confronted with various problems like what to produce, how to produce, for whom to produce, are the resources economically used, the products so produced are within the reach of men, etc. Knowledge of economics helps to solve all these problems. Here lies the importance of business economics.

Business Economics

As population and per capita income go on increasing, the demand for goods and services also increases. These development in human civilization inspires the leaders in production, trade and commerce to take up new economic activities (With the expansion and diversification of human wants, various economic activities will result in). Here comes the significance of business economics in exposing the utilization of natural and man-made resources in a desired manner for the production of various goods and services. Managerial economics as such is derived as a body of organised and systematized knowledge comprising of theories. Managerial economics is often defined as the science of management of economic institutions which engage in the conversion and transformation of raw-resources into consumable products. The modern society with its complex character, exercises tremendous influence through tastes and attitudes on the production and marketing of innumerable types of goods and services. Ever increasing and changing of human wants and the existence of limited volume of resources give rise to many problems such as what to produce, how to produce and how much to produce and where to produce. In this game, business people play the central role. The men behind in organizing production and marketing of the products are called the business people or business executives. The business executives usually turn to economics to get knowledge which would help in formulating business policies. Thus a new branch of economics called Business Economics emerged in fifties of twentieth century. Managerial Economics is thus a ready made tool for the business people in shaping their business decisions. Managerial Economics or Business Economics has become an indispensable tool for the business people to make proper decisions.

Decision Making

Modern business organisation are very much concerned with decision making and forward planning. Decision making means the process of selecting the suitable action from among several alternative courses of action. The modern business is confronted with various intricate problems such as – what goods to be produced. Here the problem is selecting from among various models. Secondly, there is again another problem regarding the quality of the products to be produced. Then again, selecting the proper technology of production, such as labour saving technology or labour using technology, which energy resource is to be used – gas, diesel or coal-based or electricity, etc. Then comes another problem – how to obtain resources or what alternative resources are there for these resources and the cost aspects. Finally the determination of prices which would give the business people a reasonable amount of profit. Thus, understanding of decision making is the central objective of business economics.

Forward Planning

Forward planning means preparing the perspective plan of development of the organisation. This involves capital budgeting, obtaining land for future expansion, the availability of technology, cost reduction programmes, etc. As the production of the quantity of the output increases, the unit cost is required to fall gradually. Future expansion will have to be done from the surplus derived from annual profit. Forward planning also involves plan for mobilizing raw-materials, labour, pricing, etc. Thus, forward planning and decision making go hand in hand.

Present day business functions are with the cloud of uncertainty. This makes decision making and forward planning difficult and complicated. If the knowledge of the future is certain, then the formulation of business plans is not difficult. But today, since the business functions are with too much of uncertainty, the knowledge of business economics helps the manager to incorporate suitable changes whenever necessary.

1.2 Methods of Managerial Economics

Since Economics is recognized as a science, it follows certain methodologies. A systematic way of approach to any problem is called methodology. In fact, method means the mode of rule of accomplishing an end. It is a procedure of examining any economic problem. Some tools are employed to arrive at a solution. These tools are used in a systematic way in business economics. A business manager is confronted with many problems. In order to solve these problems, he is required to use some tools of investigation. In other words, he uses certain methods which would help him to collect data to understand the problems. These methods are data-oriented: (1) Internal data, (2) The data given by associations, (3) Published data, (4) Field investigations and assistance of specialized agencies.

Internal Data: Internal data refers to facts and figures available with the company or business organisation. When a manager wants to solve the problem, he should have complete knowledge of things going on in his company. He gets the latest figures and facts regarding production, inventory, sales, etc. In a modern business organisation, all major departments are expected to maintain complete records. Nowadays they are all computerized. He can get any information within minutes. Let us now see how he can use these figures in order to take a decision. Supposing the sales of a company producing soaps fell down in the previous month. In order to find out the reason and to arrive at a solution, he takes the data of several months of the year. The data from three departments such as production, inventory and sales is as follows.

Table 1.1: Illustrative Data on Production, Inventory and Sales (Year 2018)

Month	Production	Inventory	Sales (in tonnes)
January	3000	2000	4000
February	3100	1000	3100
March	2900	1000	3000
April	2800	900	3000
May	3200	700	3000
June	3000	900	3000
July	3000	900	3000
August	2000	900	2800
September	2000	100	2100
October	2000	Nil	2000
November	2100	100	3000
December	3000	200	2900

With this data, the manager is required to analyse the cause for downward trend in sales, particularly during September and October. From the table, it can be seen that sales actually fell down during August September and October. Rest of the months, the sales were normal except in January. A look at the production level will reveal that in months of August, September and October production was only 2000 tonnes. The question is that why the stocks could not be met from the inventory. A look at the inventory position also reveals that the stocks of finished goods fell down from 2000 tonnes in January to Nil in October. This means that the inventory department met the demand of sales department to the maximum extent. In the month of September, the stock fell down to 100 tonnes and in October to Nil and hence could not meet the requirement of sales department. Therefore, the problem is with the production department. The solution lies in tackling the causes for decreased production. The manager now takes up measures of increasing production. Thus internal data is of great help in solving business problems. He will now closely follow the trend in production and inventory management. Huge stocks of inventory means blocking of working capital. A meagre stock or huge stock of finished goods would have a adverse effect on sales.

Associations: Manufacturers form association in order to promote their interests, Association will help the producers in obtaining information on sources of raw materials, marketing movement of finished goods, etc. The members of the association are required to furnish various data, which will compile it and publish in their annual reports. Members of the association can study these figures supplied by the association. This reveals whether a company is selling more or less. The data is useful in working where the company stands in the market. He can now take up suitable measures in improving the sales of this product.

Published Data: The data furnished by the Associations does not give a correct picture of the industry as a whole and it is only partial. In order to get the information at the national level, he has to depend upon the published data brought out either by the government or by research bodies. Data published by Planning Commission, Centre for Monitoring Indian Economy (CMIE), National Council of Applied Economic Research. The Directorate General of Technical Development (D.G.T.D.) publishes two books, one Annual Report and the Hand Book of Statistics. Annual Report contains the data of production of both agricultural and industrial products. The Hand Book of Statistics furnishes advance information. From these documents, the business managers can know as to how many units are manufacturing various industrial products, their installed capacity and percentage of utilization, etc. The Centre of Monitoring Indian Economy brings several publications periodically. These publications will help in arriving at two important points namely the production trend over the years and percentage of capacity utilization. From this, present supply of products can be estimated. On the demand side, the journals like Fortnightly Journal of Indian Economy publishes current as well as future demand. From this, the Managers can draw the production schedule of their products.

Besides this, factors like seasonal, economic, climatic etc. are also to be known. The Association of Indian Engineering Industry publishes bulletins to reveal the demand and supply pattern of Engineering goods. A business economist can arrive at an agreeable conclusion as regards production, inventory and sales.

Field investigation: In addition to the above mentioned methods, it is necessary to undertake field investigation. The Company can take up this work itself by sending sales executives or personnel to the respective areas. Supposing the sales of the product of particular company in a particular area is sluggish, then the company may take up special investigation. This enquiry may be conducted to find out the various facts, such as number of rival products sold in the region, their prices, their demand, the nature of sales campaign by the rivals etc. To get answers to these questions, one has to go to the specific area for detailed investigation. The company takes up market survey by itself. On the basis of the survey report, the company can take suitable measures to face the competition.

Specialised Agencies: If the Company finds that its officers are not equipped to undertake this type of enquiry, it can entrust this work to specialized consultancies. Market Survey is a technical job, only experts can do it efficiently. The Consultants may also furnish many related matters such as potential buyers, their income and their consumption pattern, etc. It is also better to entrust such specially technical enquiries to those agencies.

1.3 Economic Principles Applicable to Business Analysis

Several concepts and tools are used in economic theory to analyse various problems concerned with production and consumption. These concepts and tools are very much used in Managerial Economics too. In fact, economics does not provide ready made answers to all problems but it offers variety of broad principles which can be applied with modifications wherever necessary to solve economic problems. In applying economic principles for solving various business problems, the managerial economist has to use additional skills and tools to bridge the gap between economic theory and business practices. It is because, that in actual practice there exists great disparity between economic principles and actually observed practices in business. The basic principle tools which are used in managerial economics are as follows:

(a) The Opportunity Cost Principle

(b) The Incremental Principle

(c) The Principle of Time Perspective

(d) The Discounting Principle

(e) The Equimarginal Principle

(a) The Opportunity Cost Principle: By the opportunity cost, we mean the cost involved in any decision that consists of sacrifices of alternatives required by that decision. If there are no sacrifices there are no costs. The opportunity costs are measured by sacrifices made in the decision. This can be very well understood by the following examples. The opportunity costs of funds employed in one's own business is the interest that could be earned on those funds had they been employed in other ventures.

The opportunity cost of using a machine to produce one product is the income foregone which would have been possible from other products. If the machine has only one use, it has no opportunity cost. If the machine has a number of uses, opportunity cost of a product is measured in terms of cost of producing an alternative product. Similarly, the opportunity cost of time an entrepreneur devotes to his own business is the salary that he could earn if he would take up a job with some one else. For decision making, application of opportunity cost principle is very much useful and it is the only relevant cost.

(b) The Incremental Principle: Economists use the incremental principle in the theories of consumption, production, pricing and distribution. Incremental concept is closely related to marginal cost and marginal revenue in the theory of pricing. Incremental cost involves estimating the impact of decision alternatives on cost and revenue, emphasising the changes in the total cost and total revenue resulting from changes in prices, products, procedures, investments, etc. The two basic components of incremental principle are incremental cost and incremental revenue. Incremental cost is the change in the total cost as a result of new decision. The incremental principle is useful when the firm wants to expand the production of a commodity. If the incremental revenue is higher than incremental cost, then it is profitable for the manager to expand the business. The moment the incremental revenue is equal to incremental cost, the manager is required to stop further expansion. Incremental principle is very much used in decision taking.

(c) The Principle of Time Perspective: The time perspective such as short run and long run or market period, short period, long period and secular period is useful in determining prices of products. Economists have established through analysis, short term costs and price are higher than long run prices and costs. In this connection, they have maintained an argument that in the short term average prices may not cover average costs, but in the long run, they must be equal. The most important aspect in decision taking is that the firm must maintain right balances between short term and long term considerations. Modern economists have introduced a new time perspective called 'Intermediate run' between short term and long term in order to explain price and output behaviour of the firm under oligopoly. The principle of time preference can be stated as 'A decision should take into account both the short run and the long run effects on revenues and costs and maintain a right balance between short run and long run perspectives'.

This principle can be explained with the following illustration. If a company has idle capacity, to make use of this idle capacity, it may offer the product at a price lower than the cost. This may be alright in the short period. Supposing the demand for the product rises, then the firm comes into the problem of building sufficient capacity to increase production. This will result in increased incremental cost. In the long run the prices will have to be equal to cost. It is therefore necessary to give due consideration to the time perspective. Haynes, Mote and Paul mentioned an example of a company which followed the stable price policy, even though there was idle capacity. The reason was that the management realised that long run repercussions of pricing below the full cost would be more than offset any short term gain.

(d) Discounting Principle: Discounting principle occupies a very important place in managerial economics. It is because the future is uncertain. The costs and revenues may change in future. Whenever the present value of a business is to be known, the future values will have to be discounted. For example, suppose a person is offered to make a choice to make an investment on shares of a company, he will prefer the present value more than the future value. It is because of the uncertainty of the future. If the share is worth ₹ 100, he will prefer ₹ 100 today to ₹ 100 next year. Even if he is sure to receive ₹ 100 next year, one would do well to receive ₹ 100 now and invest it for one year and earn a rate of interest on ₹ 100 for one year. To find out its present worth, we have to find out what rate of interest he is going to earn in one year. Suppose the rate of interest is 8 per cent. Then we have to discount ₹ 100 at 8 per cent in order to find out its present value. The relevant formula for finding this out is:

$$PW = \frac{₹100}{1+i}$$ where 'i' is the rate of interest.

Present worth of ₹ 100 is 100 ÷ 1 + 8% = 100 ÷ 1.08 = 92.59

The same logic applies to longer periods. A sum of ₹ 100 after two years will have a present worth:

$$\frac{₹100}{(1+i)^2} = \frac{₹100}{(1.08)^2} = \frac{₹100}{1.1664} = ₹85.73$$

The discounting principle is thus stated as follows:

If a decision affect costs and revenues of future dates, it is necessary to discount those costs and revenues to obtain the present values of both before a value comparison of alternatives can be made.

(e) The Equimarginal Principle: The Equimarginal Principle is one of the widely used concepts in economics. The law of equimarginal principle states that an input should be allocated in such a way that the value added by last unit of the input is the same in all its uses. This law can be explained with the following illustration.

Suppose a firm has to employ 50 workers in three departments such as spinning, weaving and printing. The firm has to allocate the workers in such a way that the marginal productivity of the last worker employed is the same. Supposing the marginal productivity of a labour in spinning is ₹ 20 and in weaving ₹ 30, it is profitable to shift labour from spinning to weaving, thereby there is expansion in B and reduction in A. The optimum is reached when the value of marginal product is equal in all the twin activities. The formula is as follows:

$$VMP_A = VMP_B = VMP_C \text{ etc.}$$

In applying the equimarginal principle or make it more practicable, certain aspects will have to be looked into. Firstly, we have to find out the net value of the marginal products before resorting to comparison. It is because, when a worker is to be added to an activity, it necessitates adding other inputs like machinery. And to find out the net marginal value of the workers, we must deduct from his VMP the value of additional materials used in the process of production. Supposing the value of the additional material used is ₹ 10, then the VMP of the worker is 30 – 10 = 20.

Secondly, the future prices of the products produced by additional labour input is also to be considered. If, as a result of increased production, the price falls, the additional revenue earned by the firm will be less. Then we have to subtract the reduction in revenue from the VMP of the worker in order to get net marginal revenue product of the labour.

Thirdly, it is necessary to discount the revenues made available to the firm from the sale of additional production in the future. Labour is to be paid today, while the output will be sold in future. If a year is required to sell the output, we have to discount the net product for one year.

It should be noted that equimarginal principle works only under ideal conditions. For example, due to non-economic pulls and pressures, an economic activity will have to be carried on, even though additional revenue is negative. This happens especially when the government wants to keep up employment generation programme. There is also certain instances where a firm wants to expand, managers may resort to spending more than necessary. Managements may not agree to retrench workers even after the introduction of automation, simply because of maintaining good labour relations. In such cases, the equimanagerial principle has to be rendered unworkable.

Summing up, it can be stated that principles and theories of economics are of considerable interest to modern business. Economic theories as such cannot be directly applied to draw conclusions. Economic theory is meant for generalised study and application to practical situations, some modifications have to be made. There is a great need for modification of the assumptions in managerial economics. For example, there is an assumption in the theory of firm where the entrepreneur strives to maximise his profit. But in actual practice, the businessmen strive to attain a level of profit holding a certain share of the market for his product. Prof. Baumol is of the opinion that firms do not devote all their energies to maximising profit but they seek to maximise the sales revenue. Thus, suitable modifications have to be made to assumptions of pure economic theory.

1.4 Basic Concepts in Managerial Economics

1. Scarcity: Scarcity is one of the important concepts of economics relevant to management. The reason for any economic problem, micro or macro, is the scarcity of resources. The managers who decide on behalf of the firm always face the economic problem and scarcity of one kind or the other. A few examples to illustrate this – A production manager may be facing scarcity of good quality of materials or skilled technicians. A marketing manager may be encountering shortage of sales force at his command. A finance manager may be facing the scarcity of funds necessary for his programme. Thus, scarcity is a universal problem.

The term scarcity in terms of economics may be defined as 'excess demand'. At any time, for any thing if demand (requirement) exceeds supply (availability) that thing or good is said to be scarce, *i.e.,* the demand in relation to supply determines the elements of scarcity. So scarcity is a relative concept. For example, unemployment is due to scarcity of jobs. Inflation is due to scarcity of goods. Unsold stock of inventory is due to shortage of consumers etc.

2. Marginalism: When the resources are scarce managers have to be careful about the utilisation of every additional resources. A decision about additional investment has to be taken in the light of the additional return from that investment. In economics the term "marginal" is used for all such additional magnitudes of out put or return. For example, the terms like marginal output of labour, marginal output of machines marginal return on investment, marginal costs of production etc are used in economics.

The term 'marginalism' is not similar to the concept of average. For example average product of labour is the ratio of total product to total labour whereas marginal product of labour is the ratio of change in product to one unit change in labour.

The following table will illustrate the relationship between average and marginal concepts Δ is a symbol which denotes change.

When the average output decreases, the marginal output decreases steeper than the average output such that marginal is lower than the average. When the average output remains constant, the marginal output is equal to average output. When the average output increases the marginal output increases steeper than the average output such that the marginal exceeds the average.

Table 1.2

No. of Labourers	Total Output	Average Output	Marginal Output
L	(Q)	(Q/L)	ΔQ/ΔL
1	100	100	–
2	180	90	80
3	240	80	60
4	320	80	80
5	450	90	130
6	600	100	150

The marginal principles of economists are:

1. Each factor (labour) will be paid wages (W) according to its marginal product (MP).

$\Rightarrow W_L = MP$

2. Each commodity(x) will be priced (P) according to its marginal utility (MU).

$\Rightarrow P_x = MU_X$

The basic idea is that satisfaction should balance sacrifice.

In the real business situation, it is difficult to apply the concept of marginalism. The problem is of the margin. Variable may be supplied to many (group) changes 'rather than' unit changes.

In such cases the concept of 'marginalism' may be replaced by the concept of 'incrementalism'. For example the additional cost of installing computer facilities may be called as 'incremental costs'. Incrementalism is more wide whereas marginalism is more specific. All marginal concepts are incremental concepts but all incremental concepts need not be confined to marginal concepts alone.

3. Risk and Uncertainty: Many of the business decisions involve future revenues and costs. But it is not possible to predict future with great accuracy. Future involves changes and there is no guarantee that the present will be repeated in future. The business environment changes in course of time.

All changes are not the same. The changes may be known or unknown. The result of known changes may be either definite or indefinite. The definite result or outcome related with known changes is known as “certainity”. The indefinite nature of outcome or result related with known charges involves ‘risk’. Such risks can be estimated and can be insured. On the other hand, if changes are unknown, their outcome is indefinite the risk element is incalculable and immeasurable. This is called as ‘Uncertainty’ and cannot be insured. This is the difference between ‘risk’ and ‘uncertainty’, though these two terms are used as synonyms in common parlance. (eg) The interest rate is a risk premium where as profit is a reward for uncertainty.

With the help of statistical concept of probability, the concept of risk and uncertainty is introduced in the analysis of business decision making.

4. Profits: Profits means revenue minus costs, Revenue (TR) depends on total quantity of sales (Q) and the price at which the output is sold (P). The total cost (TC) depends on the number of factors employed (F) and the average factor price (c).

Thus profits (π) can be stated as $\pi = TR - TC$

$$P.Q - C.F.$$

Since profit is a controversial subject, a distinction is made between business (accounting) profit and economic profit.

The businessman calculates his return on investment (ROI) by calculating profit as a percentage on investment. The various profit concepts such as gross profit, net profit, profit after tax etc., are used depending on accounting convention and accounting convenience.

The concept of accounting profit is wider than that economic profit, because the opportunity costs have to be deducted from accounting profit to get economic profit. Opportunity cost refers to the costs of employing self owned factors in the business. For example, suppose a businessman uses his own capital, building, labour in his business. If he rents out the same to some body's business he would have earned interests, rents and wages have to be regarded as opportunity costs.

Since it is very difficult to measure opportunity cost, most of the economists assume zero opportunity costs so that accounting profits and economic profits do not differ.

There are some more pure micro-economic concepts of profits.

Super normal profit (TR > TC)

Normal profit (TR = TC) and

Subnormal profit (TR < TC)

Normal profit refers to no profit - no loss situation where as subnormal profit refers to loss.

5. Industry: Group of firms which produces similar commodity is called an industry. The concept of an industry has been developed to include firms, which are in some form of close relationship with one another. These firms belonging to a group are behaviourly interdependent.

The concept of industry serves a lot of purposes. It helps us to group the firms, makes it possible to predict the behaviour of firms in the group that constitute industry, it provides the framework for equilibrium price and output, helps the businessmen in designing the tactics in view of the industry and the government policy is designed with reference to industry; most policies are industry-specific.

There are two criteria of industry classification:

(i) Product criterion: The firms are grouped in an industry if their products are close substitutes.

(ii) Process Criterion: The firms are grouped in an industry on the basis of similarity of processes – technology, use of raw materials, methods of production, channels of distribution etc.

6. Firm: A firm is defined as an organisation carrying on economic activities like production, distribution and marketing of goods and services with a view to earn profit. In traditional economic theory, a firm is defined as an organisation of an individual or a group of individuals formed to achieve economic objectives. A firm in modern period is defined as a joint stock company in which decisions are taken by the shareholders and they are executed by the Company Officers.

Whether the firm is owned by an individual or by group of persons, the goal is to make profit. Once this goal is ensured, the next goal, namely, expansion of the firm comes into existence. The traditional economists keeping profit maximization as the goal of the firm, formulated a theory which is called equilibrium of a firm. They said, that a firm is in equilibrium position when it is earning maximum profits.

As regards the objectives of a firm, Prof.Galbraith in his book "The Goals of Industrial System" says, 'Any organisation, as for any organism, the goal has a natural assumption of pre-eminence is the survival of the organisation'. Survival here refers to obtain normal earnings. Once a firm accomplishes this objective, it plans to expand the activities of the firm, which means assuming more responsibilities in the organisation. The goal of expansion is followed by growth and then by technological development. This means taking up of innovation. In course of time, a business firm with a simple objective grows to a global institution with multiple objectives.

7. The Market: Market in economics means, meeting place of buyers and sellers directly or indirectly. Cournot, a French Economist defines market as "Economists understand by the term market not any particular market place in which things are bought and sold, but the whole of any region in which buyers and sellers are in such a free intercourse with each other that the prices of the same goods tend to equality easily and quickly."

In the words of Jevons, "The word market has been generalised so as to mean any body of persons who are in intimate business relations and carry on extensive transactions in any commodity."

Stonier and Hague explain the term market as, "any organisation whereby buyers and sellers of a good are kept in close watch with each other..... There is no need for a market to be in a single building....... The only essential for a market is that all buyers and sellers should be in constant touch with each other either because they are in the same building or because they are able to talk to each other by telephone at a moment's notice."

Benham explains the term market as “and area which buyers and sellers of a commodity are in close touch with each other either directly or indirectly that the price obtainable in one part of the market affects the prices paid in other part.” Ely observes, “market means the general field within which the forces determining the price of particular product operate.”

If we study the above definitions, we find that a market comprises of the following components:

(a) Consumers: The buyers of the product are called consumers. The buyers of a product are identified by means of income, need, etc. If there are high income groups and they are concerned with trade and commerce or higher government administration, they need luxuries like motor cars, VCRs etc.

(b) Sellers: There should be manufacturers of a product in the market. There must be industries manufacturing motor cars in a country. They form sellers in the market.

(c) Commodity: A market means the buying and selling of a commodity. If there is no commodity, the market will not exist. Each commodity has a separate market, in the sense that every commodity has a separate set of buyers and sellers.

(d) Price: If the commodity is to be bought and sold, there must be a price for the product. The exchange of the product between buyers and sellers take place at a place.

Thus all the four components form a market.

1.5 Determinant of Demand

Demand for a commodity depends on a number of factors.

Factors Influencing Individual Demand

An individual’s demand for a commodity is generally determined by such factor as:

(a) Price of the Product: Price is always a basic consideration in determining the demand for a commodity. Normally, a larger quantity is demanded at a low price than at a higher price.

(b) Income: Income is an equally important determinant of demand. Obviously, with the increase in income one can buy more goods. Thus, a rich consumer usually demands more and more goods than a poor consumer.

(c) Tastes and Habits: Demand for many goods depends on the person's tastes, habits and preferences. Demand for several products like ice-cream, chocolates, bhel-puri, etc., depends on an individual's tastes. Demand for tea, betel, tobacco, etc., is a matter of habit.

(d) Relative Prices of Other Goods – Substitutes and Complementary Products: How much the consumer would like to buy of a given commodity, however, also depends on the relative prices of other related goods such as substitutes or complementary goods to a commodity.

When a requirement can be satisfied by alternative similar goods, they are called substitutes. For example, peas and beans, groundnut and til oil, tea and coffee, jowar and bajra, etc., are substitutes of each other.

(e) Consumer's Expectations: A consumer's expectations about the future changes in the price of a given commodity also may affect its demand. When he expects its prices to fall in future, he will tend to buy less at the present prevailing price. Similarly, if he expects its price to rise in future, he will tend to buy more at present.

(f) Advertisement Effect: In modern times, the preferences of a consumer can be altered by advertisement and sales propaganda, albeit to a certain extent only. Thus, demand for many products like tooth paste, toilet soap, washing powder, processed foods, etc., is partially caused by the advertisement effect in a modern man's life.

Factors Influencing Market Demand

The market demand for a commodity originates and is affected by the form and change in the general demand pattern of the commodity at large. The following factors affect the common demand pattern for a commodity in the market:

(a) Price of Product: At a low market price, market demand for the product tends to be high and *vice-versa.*

(b) **Distribution of Income and Wealth in the Community:** If there is equal distribution of income and wealth, the market demand for many products of common consumption tends to be greater than in the case of unequal distribution.

(c) **Common Habits and Scale of Preferences:** The market demand for a product is greatly affected by the scale of preferences by the buyers in general. For example, when a large section of population shifts its preference from vegetarian food to non-vegetarian foods, the demand for the former will tend to decrease and that for the latter will increase.

(d) **General Standards of Living and Spending Habits of the People:** When people in general adopt a high standard of living and are ready to spend more, demand for many comforts and luxury items will tend to be higher than otherwise.

(e) **Number of Buyers in the Market and the Growth of Population:** The size of market demand for a product obviously depends on the number of buyers in the market. A large number of buyers will constitute a large demand and *vice versa.*

Thus, growth of population is an important factor. A high growth of population over a period of time tends to imply a rising demand for essential goods and services in general.

(f) **Age Structure and Sex Ratio of the Population:** Age structure of population determines market demand for many products in a relative sense. If the population pyramid of a country is broad based with a larger proportion of juvenile population, then the market demand for toys, schools etc. – goods and services required by children – will be much higher than the market demand for goods needed by the elderly people. Similarly, sex-ratio has its impact on demand for many goods. A disproportionate sex ratio, *i.e.,* females exceeding males, in number (or males exceeding females as in Mumbai) would mean a greater demand for goods required by the female population than by the male population (or the reverse).

(g) **Future Expectations:** If buyers in general expect that prices of a commodity will rise in future, etc., the present market demand would be more as most of them would like to hoard the commodity. The reverse happens if a fall in the future prices is expected.

(h) **Level of Taxation and Tax Structure:** A progressively high tax rate would generally mean a low demand for goods in general and *vice versa.* But, a highly taxed commodity will have a relatively lower demand than an untaxed commodity if that happens to be a remote substitute.

(i) **Inventions and Innovations:** Introduction of new goods or substitutes as a result of inventions and innovations in a dynamic modern economy tends to adversely affect the demand for the existing products, which as a result of innovations, definitely become obsolete. For example, the advent of electronic calculators has made adding machines obsolete.

(j) **Fashions:** Market demand for many products is affected by changing fashions. For example, demand for commodities like jeans, salwar-kameej, etc., is based on current fashions.

(k) **Climatic or Weather Conditions:** Demand for certain products is determined by climatic or weather conditions. For example, in summer, there is a greater demand for cold drinks, fans, coolers, etc., Similarly, demand for umbrellas and rain coats is seasonal.

(l) **Customs:** Demand for certain goods is determined by social customs, festivals, etc. For example, during the Diwali festival, there is a greater demand for sweets and crackers, and during Christmas, cakes are more in demand.

(m) **Advertisement and Sales Propaganda:** Market demand for many products in the present day is influenced by the seller's efforts through advertisements and sales propaganda. Demand is manipulated through selling efforts. Of course, there is always a limit.

When these factors change, the general demand pattern will be affected, causing a change in the market demand as a whole.

1.6 Demand Functions and Demand Schedule

(A) Demand Function: The functional relationship between the demand for a commodity and its various determinants may be expressed mathematically in terms of a demand function, thus:

$$Dx = f\,(Px, Py, M, T, A, U)$$

where,

Dx = Quantity demanded for commodity X.

f = Functional relation.

Px = The price of commodity X.

Py = The price of substitutes and complementary goods.

M = The money income of the consumer.

T = The taste of the consumer.

A = The advertisement effects.

U = Unknown variables or influences.

The above-stated demand function is a complicated one. Again, factors like tastes and unknown influences are not quantifiable. Economists, therefore, adopt a very simple statement of demand function, assuming all other variables, except price to be constant. Thus, an over-simplified and the most commonly stated demand function is: $Dx = f(Px)$, which connotes that the demand for commodity X is the function of its price. The traditional demand theory deals with this demand function specifically.

It must be noted that by demand function, economists mean the entire functional relationship: *i.e.,* the whole range of price-quantity relationship, and not just the quantity demanded at a given price per unit of time. In other words, the statement, "the quantity demanded is a function of price" implies that for every price there is a corresponding quantity demanded.

To put it differently, demand for a commodity means the entire demand schedule, which shows the varying amounts of goods purchased at alternative prices at a given time.

(B) Demand Schedule: A tabular statement of price-quantity relationship is known as the demand schedule. It narrates how much amount of a commodity is demanded by an individual or a group of individuals in the market at alternative prices per unit of time. There are, thus, two types of demand schedule: (i) individual demand schedule, and (ii) the market demand schedule.

(C) Individual Demand Schedule: A tabular list showing the quantities of a commodity that will be purchased by an individual at various prices in a given period of time (say per day, per week, per month or per annum) is referred to as an individual demand schedule.

Table 1.4 illustrates a hypothetical demand schedule of an individual consumer Mr. X for mangoes.

Table 1.4: Individual Demand Schedule

Price of Mangoes (₹ per kg.)	Amount Demanded per Week (Quantities in kg.)
30	2
25	4
20	6
15	10
10	16

(D) Characteristics of Demand Schedule:

(i) The demand schedule does not indicate any change in demand by the individual concerned, but merely expresses his present behaviour in purchasing the commodity at alternative prices.

(ii) It shows only the variation in demand at varying prices.

(iii) It seeks to illustrate the principle that more of a commodity is demanded at a lower price than at a higher one. In fact, most of the demand schedules show an inverse relationship between price and quantity demanded.

(E) Market Demand Schedule: It is a tabular statement narrating the quantities of a commodity demanded in aggregate by all the buyers in the market at different prices in a given period of time. A market demand schedule, thus, represents the total market demand at various prices.

Theoretically, the demand schedules of all individual consumers of a commodity can be compiled and combined to form a composite demand schedule, representing the total demand for the commodity at various alternative prices. The derivation of market demand from individual demand schedule is illustrated in Table 1.5. Here it is assumed that the market is composed only of three buyers, A, B, and C.

Table 1.5: A Market Demand Schedule

Hypothetical Data

Price (in ₹)	**Units of Commodity X Demanded per Day by Individuals**					**Total or Market Demand**
	A	+	B	+	C	=
4	1		1		3	5
3	2		3		5	10
2	3		5		7	15
1	5		9		10	24

Apparently, the market demand schedule is constructed by the horizontal additions of quantities at various prices shown by the individual demand schedules. It follows that like individual demand schedule, the market demand schedule also depicts an inverse relationship between price and quantity demanded.

(F) Demand Equation and Demand Schedule: A linear demand function may be stated as follows:

$$D = a - bP$$

where, D stands for the quantity demanded, a is constant parameter signifying initial demand irrespective of the price. Similarly, b is a constant parameter which represents a functional relationship between price (P) and demand (D), b having a minus sign denotes a negative function. It thus implies that the demand for a commodity is a decreasing function of its price b. In fact it measures the slope of the demand curve, b suggests that the demand curve is downward sloping.

We may now, illustrate a demand equation and the computation of demand schedule as: $D = 20 - 2P$.

Suppose, the given price per unit of the commodity are:

₹ 1, 2, 3, 4 and 5 alternatively. In relation to these prices, a demand schedule may be constructed as in Table 1.6.

Table 1.6: Demand Schedule

Price per Unit (P) (₹)	Units Demanded (D)
1	18
2	16
3	14
4	12
5	10

When this schedule of Table 1.6 is represented graphically, a linear (straight line) demand curve is drawn, as in Fig. 1.1.

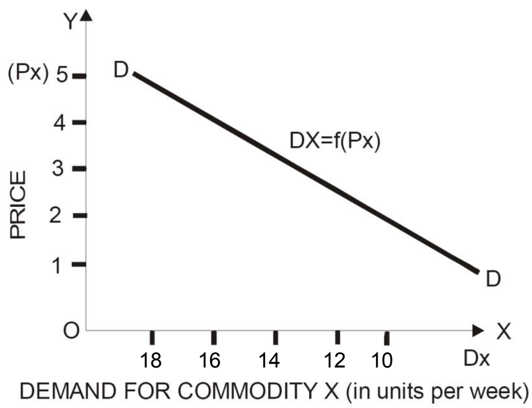

Fig. 1.1: Demand Curve

1.7 The Law of Demand

The general tendency of consumers' behaviour in demanding a commodity in relation to the changes in its price is described by the law of demand. The law of demand expresses the nature of functional relationship between two variables of the demand relation, *viz.,* the price and the quantity demanded. It simply states that demand varies inversely to changes in price. The nature of this inverse relationship stressed by the law of demand forms one of the best known and most significant laws in economics.

Statement of the Law

The law may be stated thus. "Other things being equal, the higher the price of a commodity, the smaller is the quantity demanded and lower the price, larger the quantity demanded." In other words, the demand for a commodity extends (*i.e.,* the demand rises) as the price falls and contracts (*i.e.,* the demand falls) as the price rises. Briefly it can be stated, law of demand stresses that, other things remaining unchanged, demand varies inversely with price.

The conventional law of demand however, relates to the much simplified demand function: $D = f(P)$ where, D represents demand, P the price, and f connotes a functional relationship. It however, assumes that other determinants of demand are constant, and only price is the variable and influencing factor. The relation between price and quantity of demand is usually an *inverse* or *negative* relation, indicating a *larger* quantity demanded at a *lower* price and a *smaller* quantity demanded at a *higher* price.

Explanation of the Law Demand

The law of demand is usually referred to the market demand. The law of demand can be illustrated with the help of a market demand schedule, i.e., as the price of a commodity decreases, the corresponding quantity demanded for that commodity increases and *vice versa.*

Table 1.7: A Market Demand Schedule (Imaginary Data)

Price for Commodity X (in ₹)	Quantity Demanded (Units per Week)
1	500
2	400
3	300
4	200
5	100

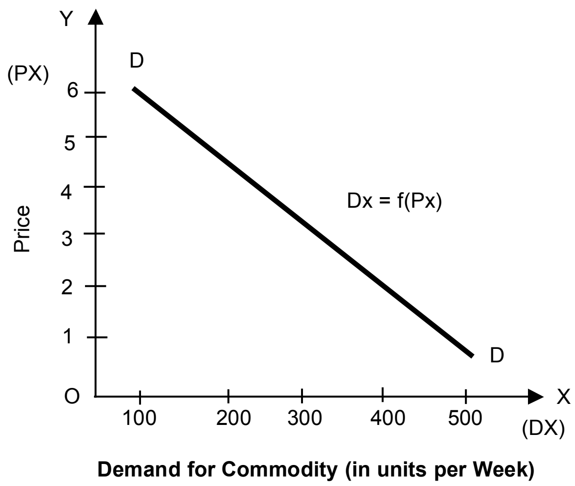

Fig. 1.2: Demand Curve

Table 1.7 represents hypothetical demanded schedule for commodity X. We can from this ascertain that with a fall in price at each state demand tends to rise. There is an inverse relationship between price and quantity demanded. Usually, economists draw a demand curve to give a pictorial presentation of the law of demand. When the data of Table 1.7 are plotted graphically, the demand curve will be as shown in Fig. 1.2.

In Fig. 1.2, DD is a downward slopping demand curve indicating an inverse relationship between price and demand, Demand curve is a very convenient means of further economic analysis. From the given market demand curve, one can easily locate the market demand for a product at a given price. Further, the demand curve geometrically represents the mathematical demand function: Dx = F(px).

Assumptions Underlying the Law of Demand

The above-stated law of demand is conditional. It is based on certain conditions as given.

Thus, it is always stated with "other things being equal." It relates to the change in price variable only, assuming other determinants of demand to be constant. The law of demand is, thus, based on the following *ceteris paribus* assumptions:

(a) No change in consumer's income: Throughout the operation of the law, the consumer's income should remain the same. If the level of a buyer's income increases, he may buy more even at a higher price, invalidating the law of demand.

(b) No change in consumer's preferences: The consumer's tastes, habits and preferences should remain constant.

(c) No change in fashion: If the commodity concerned goes out of fashion, a buyer may not buy more of it even at a substantial price reduction.

(d) No change in the prices of related goods: Prices of other goods like substitutes and complementaries remain unchanged. If the prices of other related goods change, the consumer's preferences would change which may invalidate the law of demand.

(e) No expectations of future price changes or shortages: The law requires that the given price change for the commodity is a normal one and has no speculative consideration. That is to say, the buyers do not expect any shortages in the supply of the commodity in the market and consequent future change in the prices. The given price change is assumed to be final at a time.

(f) No change in size, age-composition and sex-ratio of the population: For the operation of the law in respect of total market demand, it is essential, that the number of buyers and their preferences should remain constant. This necessitates that the size of population as well as the age-structure and sex-ratio of the population should remain the same throughout the operation of the law. Otherwise, if population changes, there will be additional buyers in the market, so the total market demand may not contract with a rise in price.

(g) **No change in the range of goods available to consumers:** This implies that there is no innovation or arrival of new varieties of products in the market which may distort consumer's preferences.

(h) **No change in the distribution of income and wealth of the community:** There is no redistribution of incomes either, so that the levels of income of the consumers remain the same.

(i) **No change in government policy:** The level of taxation and fiscal policy of the government remains the same throughout the operation of the law. Otherwise, changes in income-tax, for instance, may cause changes in consumer's income or commodity taxes (sales tax or excise duties) and may lead to distortion in consumer's preferences.

(j) **No change in weather conditions:** It is assumed that the climatic and weather conditions are unchanged in affecting the demand for certain goods like woollen clothes, umbrella, etc.

1.8 Exceptional Demand Curve

It is almost a universal phenomenon of the law of demand that when the price falls, the demand extends and it contracts when the price rises. But sometimes, it may be observed, though, of course, very rarely, that with a fall in price, demand also falls and with a rise a price, demand also rises. This is a paradoxical situation or a situation which apparently is contrary to the law of demand. Cases in which this tendency is observed are referred to as exceptions to the general law of demand. The demand curve for such cases will be typically unusual. It will be upward sloping demand curve as shown in Fig. 1.3. It is described as an exceptional demand curve.

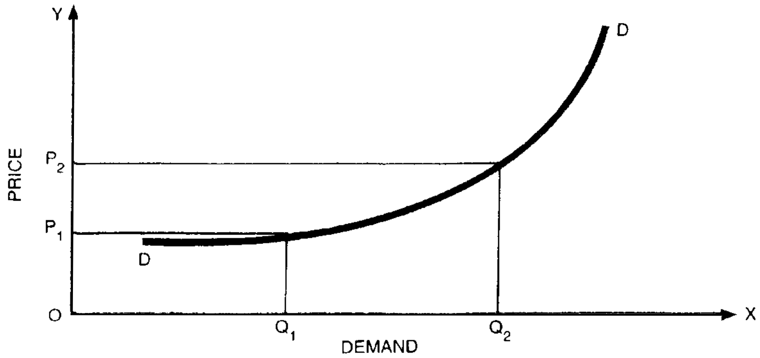

Fig. 1.3: Exceptions Demand Curve: Upward-sloping Demand Curve

In Fig. 1.3, *DD* is the demand curve which slopes upward from left to right. It appears that when OP_1, is the price, OQ_1 is the demand and when the price rises to OP_2, demand also extends to OQ_2. It represents a direct functional relationship between price and demand.

Such upward sloping demand curves are unusual and quite contradictory to the law of demand as they represent the phenomenon that 'more will be demanded at a higher price and *vice versa.*' The upward sloping demand curve thus, refers to the exceptions to the law of demand. There are a few such exceptional cases, which may be categorised as follows:

- **Giffen goods:** In the case of certain inferior goods called Giffen goods (named after Sir Robert Giffen), when the price falls, quite often less quantity will be purchased than before because of the negative income effect and people's increasing preference for a superior commodity with the rise in their real income. Probably, a few appropriate examples of inferior goods may be listed, such as staple foodstuffs like cheap potatoes, cheap bread, *pucca* rice, vegetable ghee, etc., as against superior commodities like good potatoes, cake, *basmati* rice and pure *ghee*.
- **Articles of snob appeal:** Sometimes, certain commodities are demanded just because they happen to be expensive or prestige goods, and have a 'snob appeal.' They satisfy the aristocratic desire to preserve exclusiveness for unique goods. These are generally ostentatious articles, and purchased by the fewer rich people or using them as 'status

symbol.' It is observed that, when prices of such articles like, say diamonds, rise their demand also rises. Similarly, Rolls-Royce cars are another outstanding illustration.

- **Speculation:** When people speculate about changes in the price of a commodity in the future, they may not act according to the law of demand at the present price say, when people are convinced that the price of a particular commodity will rise still further, they will not contract their demand with the given price rise: on the contrary, they may purchase more for the purpose of hoarding. In the stock exchange market, some people tend to buy more shares when their prices are rising, in the hope that the rising trend would continue, so they can make a good fortune in future.
- **Consumer's psychological bias or Iillusion:** When the consumer is wrongly biased against the quality of a commodity with the price change, he may contract this demand with a fall in price. Some sophisticated consumers do not buy when there is stock clearance sale at reduced prices, thinking that the goods may be of bad quality.

1.9 Change in Demand

In economic analysis, the technical jargon 'changes in quantity demanded' and 'changes in demand' altogether have different meanings.

The phrase 'changes in quantity demanded' relates to the law of demand. It refers to the changes in the quantities purchased by the consumer on account of the changes in price. We, may say that the quantity demanded of a commodity increases when its price increases. But, it is incorrect to say that demand decreases when price increases or demand increases when price decreases. For 'increase and decrease' in demand, refers to changes in demand caused by the changes in various other determinants of demand, price remaining unchanged.

The movement along the demand curve measures changes in quantity demanded in relation to changes in price, while changes in demand are reflected through shifts in demand curve. The phrase 'changes in quantity demanded' essentially implies variation in demand referring to 'extension' or 'contraction' of demand which are quite distinct from the term 'increase' or 'decrease' in demand.

Extension and Contraction of Demand

A variation in demand implies 'extension' or 'contraction' of demand. When with a fall in price more of a commodity is bought, there is an extension of demand. Similarly, when a lesser quantity is demanded with a rise in price, there is a contraction of demand. In short, demand extends when the price falls and it contracts when the price rises. The terms 'extension' and 'contraction' are technically used in stating the law of demand.

The terms 'extension' and 'contraction' of demand should, however, be distinguished from 'increase' or 'decrease' in demand. The former is used for indicating variation in demand, while the latter for denoting changes in demand. Variation in demand is the connotation of the law of demand. It expresses a functional relationship between demand and price. A change in demand due to a change in price is called extension or contraction. Extension and contraction, relates to the same demand curve. A change in demand due to causes other than price is called increase and decrease in demand.

In graphical exposition, 'extension' or ' contraction' of demand is shown by the movement along the demand curve. A downward movement from one point to another on the same demand curve implies extension of demand, for instance, movement from *a* to *b* in Fig. 1.4. It suggests that when the price reduces from OP to OP_1, demand extends from OQ to OQ_1, while an upward movement from one point to another on the same demand curve implies contraction of demand, *e.g.,* movement from *a* to *c* in the figure. It suggests that when price rises from OP to OP_2, demand contracts from OQ to OQ_2

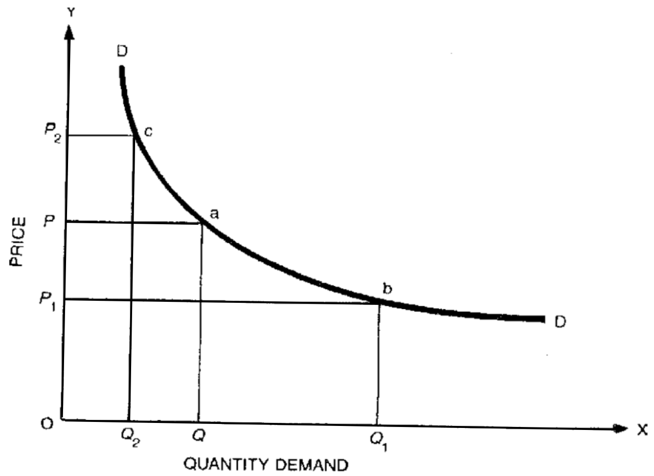

Fig. 1.4: Quantity Demanded

In short, a change in the quantity demanded in response to a change in price is explained by the term 'extension' or 'contraction' of demand. Further, extension or contraction implies a movement on the same demand curve. It, thus, signifies that the demand schedule remains the same.

Increase and Decrease in Demand

These two terms are used to express changes in demand. Changes in demand are a result of the change in the conditions or factors determining demand, other than the price. A change in demand, thus, implies an increase or decrease in demand. When more of a commodity is bought than before at any given price, there is an increase in demand. For example, suppose a consumer purchased yesterday 2 kg. of apples at a price of ₹ 50 per kg. If today at the same price of ₹ 50 per kg, he buys 3 kg. of apples, then it means there is an increase (by 1 kg.) in his demand for apples. Similarly, with price remaining unchanged less of a commodity is bought than before, there is a decrease in demand. In our previous examples, if the consumer now buys only 1 kg, at the same price of ₹ 50 per kg., it means decrease (by 1 kg.) in his demand.

An 'increase' in demand signifies either that more will be demanded at a given price or same will be demanded at a higher price. An increase in demand really means that more is now demanded than before at each and every price. Likewise, a 'decrease' in demand signifies either that less will be demanded at a given price or the same quantity will be demanded at the lower price. Decrease in demand really means that less is now demanded than before at each and every rise in price. Shifting the demand curves shows the increase and decrease in demand.

The terms 'increase' and 'decrease' in demand are graphically expressed by the movement from one demand curve to another. In other words, the change in demand is denoted by the shifting of the demand curve. In the case of an increase in demand, the demand curve is shifted to the right. In Fig. 1.5(A), thus, the shift of demand curve from *DD* to D_1D_1 shows an increase in demand. In this case, the movement from point *a* to *b* indicates that the price remains the same at *OP*, but more quantity (OQ_1) is now demanded, instead of *OQ*. Here, increase in demand is QQ_1. Similarly, as in Fig. 1.5(B) a decrease in demand is depicted by the shifting of the demand curve towards its left. In the figure, thus, the shift of demand curve from *DD* to D_2D_2 shows a decrease in demand. In this case, the movement from point *a* to *c* indicates that the price remains the same at *OP*, but less quantity QQ_2 is now demanded than before. Here decrease in demand is QQ_2.

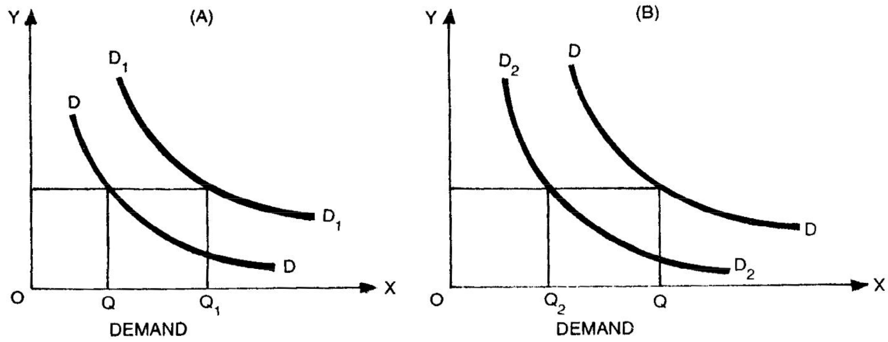

Fig. 1.5: Increase in Demand (A) and Decrease in Demand (B)

In short, a change in the quantity demanded due to change in the overall pattern of demand results in an increase or decrease in demand. For a change in demand, the change in factors other than price is responsible.

Reasons for Change (Increase or Decrease) in Demand

A change in demand occurs when the basic conditions of demand change. Some of the important influences are:

1. **Changes in income:** A change in the income of the consumer significantly influences his demand for most commodities. The demand for superior commodities in general and for

comforts and luxury articles increases with a rise in the consumer's income. Similarly, overall demand generally decreases with a fall in income.

2. **Changes in taste, habit and preference:** When there is a change in taste, habit or preference of the consumer, his demand will change. For instance, when a person reduces his smoking habit, his demand for cigarettes decreases.

3. **Change in fashions and customs:** Many of our demands are determined by fashions and customs in our society. When these change, demand also changes.

4. **Change in substitutes:** Changes in the supply of substitutes, change in their prices, the development of new and better quality substitutes certainly affect the demand pattern of the commodity in question. For instance, introduction of ball-point pens has caused a fall in the demand for fountain pens.

5. **Change in complementary goods:** When there is a change in the supply or demand conditions of a complementary good (which is jointly demanded), there will be side-effects on the demand for the commodity in question. For instance, a change in the demand for shoes will automatically bring about a similar change in the demand for shoe-laces.

6. **Change in population:** The market demand for a commodity substantially changes when there is a change in the total population or change in its age or sex composition. For instance, if the birth rate is high in a country, more toys and chocolates will be demanded. But when the birth rate is substantially reduced through overall family planning efforts, their demand will decrease. Similarly, if the sex ratio of the country changes and if females outnumber males, demand for skirts will increase and that for shirts will decrease.

7. **Change in the level of taxation:** When the government changes its tax structure, especially that of direct taxes, the disposable income of the people changes, which causes changes in the overall demand. Therefore, high tariff duties are imposed by the government on imports to decrease the demand for foreign goods.

8. **Expectation of future changes in prices:** When the consumer expects that there will be a rise in prices in future, he may buy more at the present price and so his demand increases. In the reverse case, his demand decreases.

1.10 Kinds of Demand

The demand behaviour of the buyer or consumer differs with different types of demand. From managerial business economics point of view, thus, we may distinguish the following important types of demand:

1. Demand for Consumer's Goods and Producer's Goods;
2. Demand for Perishable Goods and Durable Goods;
3. Autonomous Demand and Company Demand;
4. Industry Demand and Long-Run Demand;
5. Short Run Demand and Company Demand;
6. Joint Demand and Composite Demand; and
7. Price Demand, Income Demand, and Cross Demand.

Demand for Consumers' Goods and Producers' Goods

Commodities may be divided into two subgroups: (i) consumer goods, and (ii) producer goods:

- Goods and services demanded by consumers for the direct satisfaction of their wants, i.e., consumption purpose are referred to as consumer goods, e.g., food, clothes, house, services of a lawyer, doctor, teacher, cobbler, house-maid, etc. Goods which are demanded by producers in the process of production are referred to as producer goods or capital goods, e.g., tools and equipments, machinery, raw materials, factory buildings, offices, etc.
- Demand for consumer goods is direct or autonomous. Demand for producer goods is derived. It is based on the demand for the output.

- Demand for customer goods depend on its marginal utility. Demand for producer goods depends on its marginal productivity or the marginal revenue products.
- Since marginal utility curves are usually negatively sloping, the demand curves for consumer goods are negatively sloping.

Similarly, the producer goods too have negatively sloping demand curves because the marginal productivity or marginal revenue product curves are also negatively sloping.

Dean (1976), assigned the following reasons for explaining the distinctive demand behaviour for producer goods in the economy:

- The buyers of producer goods are professionals. They are usually experts. They are less likely to be influenced by sales promotion activities.
- The producers buyers are more sensitive to factor price differences and substitutes. Thus, the demand for capital labour and other products tends to be elastic.
- The motives of the producers buyers are purely economic. They buy capital goods on account of profit prospects.
- Their demand being derived from consumption demand, there are frequent and violent fluctuations in it.

The distinction between some capital goods and consumption goods is, however, arbitrary.

It is based on who buys the goods and why. For example, a refrigerator purchased by the households is regarded as the consumer goods, while if it is purchased by a hotel it is considered to be the producer goods. Further, economic motive alone is not always kept in mind by the producers buyers. For instance, while buying the office furniture quite often costly items are ordered to maintain prestige rather than to see the economy of purchases. As Joel Dean (1976 p. 148) mentions, 'There are thousands of incidental needs on any business that are simply not worth the cost of scientific purchase planning.'

Demand for Perishable Goods and Durable Goods

From durability point of view, goods in general may be subdivided into: (i) perishable goods, and (ii) durable goods:

- Perishable goods have no durability. That is, they cannot be stored for a long time., e.g., milk, eggs, fish, vegetables, etc. Durable goods last long, whereas perishable goods perish soon. Durable goods are storable for a long period, e.g., house furniture, car, clothes, etc.
- Use of non-durable goods or perishable goods gives one short service. Durable goods, on the other hand, can be used for several years.
- There are durable and perishable consumption goods, e.g., vegetables, fish, etc., are perishable consumption goods, while TV set, car, etc., are durable consumption goods. Similarly, there are durable and non-durable capital goods, e.g., factory-plant, machinery, etc., are durable capital goods, while raw material, power, etc., are non-durable capital goods. Durable physical capital assets are referred to as fixed capital. Non-durable capital, which has one-time use only in the process of production, is called working or circulating capital. Fixed capital remains a fixed input component in the short period, while working capital is a variable capital input all the time.

  Capital assets are referred to as fixed capital. Non-durable capital, which has one-time use only in the process of production, is called working or circulating capital. Fixed capital remains a fixed input component in the short period, while working capital is a variable capital input all the time.
- Perishable goods have more elastic demand. Durable goods have less elastic demand in the short run and their demand tends to be more elastic in the long run.
- The demand for perishable goods is always immediate. Demand for durable goods is postponable.
- The existing conditions of style, convenience and the income of the buyers usually govern the demand for non-durable goods.

Demand for durable goods depends on current trends, the state of optimism, the rate of obsolescence, lifetime of the product, improvement in product design, apart from prices and incomes and such other considerations.

Demand for durable goods is more volatile in relation to business condition. Hence, demand analysis of durable goods is a complex phenomenon. Storability, postponability, replacement and expansion are the interrelated problems involved in determining the demand for durable goods. (See Dean: 1976, p. 148).

Total demand for durable goods is composed of new demand as well as replacement requirement. Thus: $D = Dn + Dr,$

Where, D = total demand for durable goods, Dn = new demand, and Dr = replacement demand. Dn and Dr are influenced by different factors.

The new demand or expansion demand (Dn) for durable goods is determined by a number of factors such as:

- Prices
- Buyers' incomes
- Cost of maintenance
- Operating costs
- Resale value in future
- Price changes
- Product improvement
- Price concessions on outdated models
- Obsolescence rate, etc.

All these need to be included in the demand functions for the durable goods.

The replacement demand (Dr) for durable goods depends on:

- The degree of postponability
- Expected shortages
- Rate of obsolescence caused by technological advancement and innovations
- Physical determination

- Financial exigencies
- Urge for renovation
- Cultural lags
- Rivalry of alternative investment
- Competition in the market, etc.

Autonomous Demand and Derived Demand

Spontaneous demand for goods, which is based on an urge to satisfy some wants directly is called autonomous demand. Demand for consumer goods is autonomous. It is a final demand and is a direct demand.

When the demand for a product depends on the demand for some other commodities it is called derived demand. 'When demand for a product is tied to the purchase of some parent product, its demand is called derived.'(Dean: 1976, p. 150)

In many cases derived demand of the dependent product is owing to its being a component part of the main product, e.g., demand for doors derived from demand for houses, or demand for bulbs derived from demand for lamps. Similarly, demand for antennas is derived from the demand for TV sets.

In many cases, demand for dependent product is caused by complementary consumption, e.g., demand for sugar emerges from the demand for tea. Demand for all capital goods is derived on account of necessities of production.

In modern days, however, it is rare to see demand for goods to be wholly-independent of all others. In fact, mostly demands are derived demand, e.g., even so-called autonomous demand for a car by a household is derived from the demand for transport service. There is a thin line of demarcation between autonomous demand and derived demand. The distinction between the two types of demand is rather arbitrary and a matter of degree.

Generally, derived demand is less price elastic than autonomous demand, e.g., the demand for paints for automobiles is much inelastic as even a large percentage change in the price of paints carries insignificant impact on the total cost of producing automobiles.

The concept of derived demand facilitates demand forecasting very easy, especially in those cases where dependent and parent products are used in fixed proportions and there is a definite time lead in the parent product's demand.

Industry Demand and Firm or Company Demand

A firm is a business unit. Industry is the group of closely competitive firms. Industry demand refers to the total demand for the commodity produced by a particular industry, e.g., total demand for cars in India is the demand for automobile industry's output in aggregate and essentially represents the market demand. Firm or company demands relate to the market demand for the firm's output.

In demand analysis, thus, it should be noted that within the industry, the products of one company or firm can be substituted for another owing to their similarities. Company or firm's demand, therefore, is fairly elastic. A basic relationship of a firm's demand and industry or market demand is established by the market structure whether perfect competition, monopoly, or monopolistic competition. In a perfectly competitive market, the degree of substitutability being perfect owing to homogeneity of goods of the different firms, the firms or company demand for the product tends to be perfectly elastic. So, the demand curve becomes horizontal straight-line.

If there is product differentiation and monopolistic competition among the firms, then the demand curve for the individual firm will be downward sloping. Industry's demand curve as a whole is downward sloping indicating inverse price quantity relationship. In case of monopoly, the firm itself is industry, so its demand is identical with the industry demand.

Fig. 1.6 illustrates demand conditions of industry and company.

Further industry demand may be classified customer groupwise, e.g., cement demanded by the builders, individual households, housing boards and government departments.

A business economist or the business manager has to see the share of company demand in the industry demand. For undertaking sales forecasting, therefore, it is essential to project industry demand first and then given projection for the growth of company's demand in relation to the company's share in total demand and the possible growth of the rivals in the business.

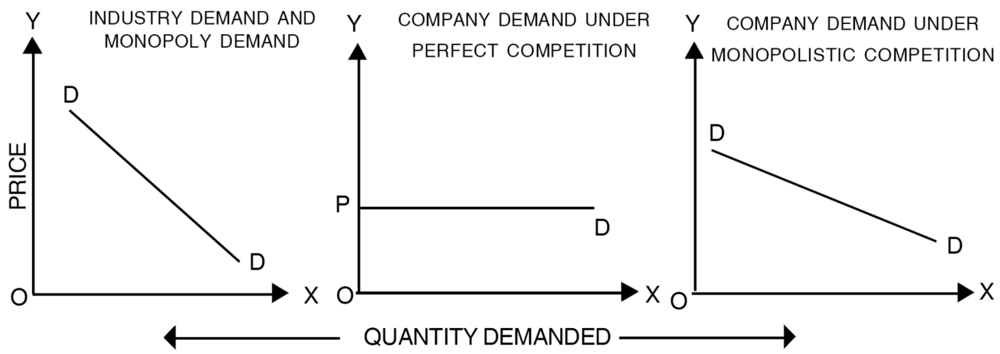

Fig. 1.6: Industry and Company Demand

Short Run Demand and Long Run Demand

Though there is no clear demarcation between the short run and long run demand, the distinction is useful for solving many decision-making problems. Especially, demand elasticity differs with time. In specific terms:

'Short-run demand refers to existing demand with its immediate reaction to price changes, income fluctuation, etc., whereas long run demand is that which will ultimately exist as a result of the changes in pricing, promotion, or product improvement, after enough time is allowed to let the market adjust itself to the new situation.' (Dean: 1976, p. 150)

The short run elasticity of industry demand is usually less than the long run elasticity owing to many reasons, such as:

- Cultural lags in information and experience;
- Capital investment required of buyers to shift consumption patterns;
- Time adjustment involved, e.g., it takes time to change consumption habits, time needed to arrange for the finance, etc.

Fig. 1.7 illustrates the long run and short run demand curves for an industry.

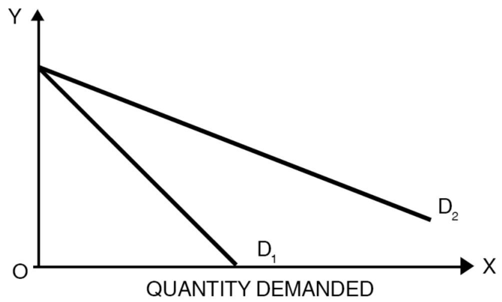

Fig. 1.7: Short-run and Long-run Demand

Joint Demand and Composite Demand

Demands for most of the commodities in real life are independent of each other. But there are several commodities the demands for which are interrelated. Interrelation in demand makes markets for physically different goods interlinked and interdependent. Broadly, two types of inter relationships exist in demand for such commodities.

Joint or complementary demand: When two goods are demanded in conjunction with one another at the same time to satisfy a single want, they are said to be joint or complementary demand. Examples are pens and ink, cars and petrol, bread and butter, coffee, sugar and milk, pipes and pipe tobacco and so on. In such cases, a change in demand for one commodity leads to a change in demand for the other in the same direction and often in the same proportion. Commodities so related are termed as complementary goods.

Composite demand: A commodity is said to be in composite demand when it is wanted for several different uses. Steel is needed for manufacturing cars, building, construction of railways, etc. Households, factories, railways, chemical industries, etc., demand coal. Wool is required in clothing, carpet manufacturing and in several other industries. Similarly, electricity also has a composite demand as it is used for lighting, cooking, TV, radio and many other electrical appliances by a household. Likewise, sugar is another illustration of composite demand. Sugar is needed for a variety of purposes ranging from the manufacture of sweets, toffees to preservatives, etc. A change in demand for the commodity by one user will affect its supplies to others and will bring about a change in its price and hence alter its demand pattern.

Price Demand, Income Demand and Cross Demand

Price demand: Refers to the various quantities of a product purchased by the consumer at alternative prices. In price demand, the demand function is based on the single price. Thus:

$D = f(p)$

Where, D refers to demand, f shows functional relationship and p denotes price of the product.

Usually, price demand function has inverse functional relationship between the price and the demand. The law of demand pertains to the customer behaviour regarding price demand.

Income demand: Refers to the various quantities of a commodity demanded by the consumer at alternative levels of his changing money income. In income demand, the demand function is based on the income variable: (M). Thus:

$D = f(M)$

The income demand function is usually a direct function. It indicates that demand extends with the rise in income and *vice versa.*

Cross demand refers to the various quantities of a commodity (say, X) purchased by the consumer in relation to changes in the price of a related commodity (say, Y – which may be either a substitute or a complementary product).

Cross demand function may be stated as follows:

$Dx = f(Py)$

Where, Dx = the demand for commodity X and Py = the price of commodity Y.

1.11 Summary

Economics is a science of management of scarce resources ordained towards the satisfaction of chosen wants on priorities determined form the unlimited nature of human wants.

Managerial Economics is essentially a ready-made tool for helping the business community in undertaking their business decisions in the high-order. Business information in practice are incorporated in terms of Business Data relating to trends of production, inventory and sales volume.

Business Association such as chambers of commerce or specialised agencies like the centre of Monetaring Indian Economics, etc. furnish valuable on business data of their members.

Field investigation are constructed under the market survey to gather the information about consumer behaviour and rival's business approaches.

The opportunity costs are measured by sacrifices made in the business decisions.

Scarcity of supply is realised under the conditions of excess demand for the resources. Marginalism is the central concept used in economic decision-making.

Profit is the businessman's reward for risk-taking of uncertainity.

An industry comprises the firms producing identical products.

Market is an economic arrangement operating towards buying and selling behaviour of the consumer and producers.

Perfect connection is an ideal model conceived in economic analysis.

In reality these tends to the imperfect competition.

Monopoly, Duopoly, Oligopoly and monopolic competition are the variants of imperfect competition:

- **Monopoly:** Single seller,
- **Duopoly:** Two seller,
- **Oligopoly:** A few seller
- **Monopolistic connection:** Many sellers connecting on the basis of price and products.

Demand implies effective desire. Demand for a product in the market implies the quantity of the product purchased at a given price per unit of time. Market demand is the aggregation of individual demand. Demand is the function of price. Demand for a product varies in opposite direction to changes in its price. Demand varies inversely to price change. Law of demand: Other things being equal, when price rises, demand contracts. When price falls, demand rises.

Demand curve normally slopes downward. Giffen Paradox: Demand varies directly to the direction of price change. When price falls, demand also falls. Demand curve has an upward slope.

Increase in demand suggested by an upward shift in the demand curve. It means more quantity is demanded as the same price or same quantity at higher price. Decrease in demand: Price remaining the same, less is purchased than before. When income of the consumer increase till demand for certain products of comforts/luxuries may tend to increase.

1.12 Key Words/Abbreviations

- **CMIE:** Centre for Monitoring Indian Economy
- **DGTD:** Directorate General of Technical Development
- **TR:** Total Revenue
- **TC:** Total Cost
- **Demand function:** D = f(P)
- **Demand variation:** Extension/Contraction
- **Demand change:** Increase/Decrease
- **Demand Schedule:** Tabulated data of price-demand relations.
- **Perishable goods:** No durability cannot be preserved over a large-line producers'
- **Period demand:** Offshoot-n-demand for capital goods owing to demand for consumer goods
- **Joint demand:** Two or more goods demanded together to satisfy the same unit. Pen and Ink.

1.13 Learning Activity

1. Students prepare a report on concept of managerial economics.

   ----

2. Analyse the managerial principles.

   ----

3. Prepare a report on demand function.

   ----

4. Students write a note on kinds of demand.

1.14 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. Describe the characteristics of Economics.
2. Explain briefly the phenomenon of decision-making in business.
3. What is meant by opportunity cost principle?
4. Expose the concept of scarcity.
5. Explain the meaning of profit.
6. Define industry.
7. Define firm.
8. What are the components of a market?
9. How do you see perfect competition in the market?

10. Trace the phenomenon of imperfect competition.
11. Define demand.
12. What is demand function?
13. State the law of demand.
14. What are the exceptions to the law of demand?
15. Explain increase and decrease in demand.
16. Illustrate the nature and distinct features of managerial economics.
17. Illustrate the term managerial economics and the various areas where it can be applied.
18. Explain the fundamental concepts and basic tools of managerial economics.

B. Multiple Choice/Objective Type Questions

1. Economics is a ____________.

   (a) social science (b) natural science

   (c) human science (d) global science

2. The men behind organising production and marketing are ____________.

   (a) government (b) business executive

   (c) marketiers (d) functionalist

3. The central objective of business economics is ____________.

   (a) business intricacies (b) market-laws

   (c) government regulation (d) undertaking of division making

4. To a modern manager the knowledge of business economics is ____________.

   (a) indispensable (b) beneficial

   (c) internal market (d) none of the above

5. Market service is a ____________.

   (a) group-job (b) manager's duty

   (c) technical job (d) businessman's paradise

6. Demand means effective____________.

   (a) desire (b) wish

   (c) purchase (d) buying

7. Demand function may be stated as ____________.

   (a) $Dx = f(Px)$ (b) $D = P$

   (c) $\Delta D = \Delta P$ (d) $Df = fP$

8. Law of demand implies that the relationship between price and demand tend to be ____________.

   (a) direct (b) inverse

   (c) upward (d) downward

9. The law of demand is based on ____________.

   (a) strict assumption (b) notions

   (c) ceteris paribus assumption (d) all of the above

10. Demand curve slopes ____________.

    (a) upward (b) backward

    (c) downward (d) forward

Answers

1. (a), 2. (b), 3. (d), 4. (a), 5. (c), 6. (a), 7. (a), 8. (b), 9. (c), 10. (c).

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UNIT 2 ELASTICITY OF DEMAND

Structure:

2.0 Learning Objectives

After studying this unit, you will be able to:

- Discuss meaning and definitions of elasticity of demand
- Explain the determinants of elasticity of demand
- Explain the concepts and measurements of price, income, cross-price and advertising elasticity of demand and their applications in practice

2.1 The Concept of Elasticity of Demand

Demand usually varies with price. But the extent of variation is not uniform in all cases. In some cases, the variation is extremely wide; in some others, it may just be nominal. That means sometimes demand is greatly responsive to changes in price; at other times, it may not be so responsive. The economists, to measure this responsiveness or the extent of variation, use the term "elasticity." In measuring the elasticity of demand, two variables are considered: (i) demand, and (ii) the determinant of demand. For measuring the elasticity coefficient, thus, a ratio is made of the two variables.

$$\text{Elasticity of Demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in determinant of demand}}$$

The term 'elasticity of demand', when used without qualifications, is commonly referred to as price elasticity of demand. This is a loose interpretation of the term. In a strict logical sense, however, the concept of elasticity of demand should measure the responsiveness of demand for a commodity to changes in the variables confined to its demand function. There are, thus, as many kinds of elasticity of demand as its determinants. In view of its major determinants, however, economists usually consider three important kinds of elasticities of demand:

- Price elasticity of demand
- Income elasticity of demand
- Cross price elasticity of demand or just cross elasticity.

2.2 Price Elasticity of Demand

The extent of response of demand for a commodity to a given change in price, other demand determinants remaining constant, is termed as the price elasticity of demand. The price elasticity of demand may, thus, be defined as the ratio of the relative change in demand and price variables.

The coefficient of price elasticity (e) *i*s measured as:

$$e = \frac{\text{The percentage change in quantity demanded}}{\text{The percentage change in price}}$$

Since the relative change of variables can be measured either in terms of percentage change or proportional change, the price elasticity coefficient can be measured alternatively as:

$$e = \frac{\text{The proportional change in quantity demanded}}{\text{The proportional change in price}}$$

Representing it in symbols, the price elasticity formula can be stated as:

$$e = \frac{\Delta Q/Q}{\Delta P/P}\text{, Alternatively } e = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

Or, by rearranging: $e = \dfrac{\Delta Q}{\Delta P} \times \dfrac{P}{Q}$

where,

Q = The original demand (say Q_1)

P = The original price (say P_1)

ΔQ = The change in demand. It is measured as the difference between the new demand (say Q_2) and the old demand (Q_1). Thus, $\Delta Q = Q_2 - Q_1$.

ΔP = The change in price. It is measured as the difference between the new price P_2 and the old price (say P_1). Thus, $\Delta P = P_2 - P_1$.

The above formula, in fact, relates to point price elasticity of demand, that is, the coefficient signifies very small or marginal changes only. To illustrate the use of the formula, suppose the following information is available from a demand schedule:

Price of Apples	*Quantity Demanded*
(₹)	(Kgs.)
20 (P_1)	100 (Q_1)
21 (P_2)	96 (Q_2)

Thus,

$\Delta P = P_2 - P_1 = 21 - 20 = 1$, and $P = P_1 = 20$

$\Delta Q = Q_2 - Q_1 = 96 - 100 = -4$, and $Q = Q_1 = 100$

(Here, minus signs are ignored).

Elasticity of demand

$$e = \frac{Q}{Q} \times \frac{P}{P} = \frac{-4}{100} \times \frac{20}{1} = \frac{4}{5} = -0.8$$

Owing to inverse price-demand relationship, the coefficient of price elasticity of demand is, usually, negative. Customarily, however, economists report it as a positive number, referring to its absolute value for the sake of convenient comparison and analysis. Hence, its signs are ignored. This means, in above illustration, the elasticity of demand is less than one.

Using the above formula, the numerical coefficient of price elasticity can be measured from any such given data. Apparently, depending upon the magnitudes and proportional changes involved in data on demand and prices, one may obtain various numerical values of coefficient of price elasticity, ranging from zero to infinity.

When price elasticity coefficient is greater than unity ($e > 1$), the commodity is said to be price elastic. If it is less than unity ($e < 1$), the product is considered to be price inelastic. This knowledge is very useful in determining pricing policy and other business decisions.

2.3 Types of Price Elasticity

Marshall has suggested a three fold classification of types of price elasticity of demand, viewing the numerical coefficient of price elasticity in terms of unity or 1. Since the numerical coefficient (e) values range between zero and infinity, in terms of unity we may say either e is equal to, greater than or less than 1. Marshall's classification is as follows:

- Unit elasticity of demand ($e = 1$)
- Elastic demand ($e > 1$), i.e., elasticity is greater than unity.
- Inelastic demand ($e < 1$), i.e., elasticity is less than unity.

Marshall treats unit elasticity as normal or standard elasticity and all economists commonly hold the same notion. By elastic demand, we mean that demands respond greatly or relatively more to a price change. It, however, does not imply that the consumers are fully responsive to a price change. What it means simply is this that a relatively large change in demand is caused by a smaller changes in price. Similarly, inelastic demand does not mean that demand is totally insensitive. It only means that the relative change in demand is less than that of price. It means demand responds to a lesser extent only. Modern economists have elaborated the Marshallian classification further and stated five kinds of price elasticity as under:

- Perfectly elastic demand;
- Perfectly inelastic demand;
- Relatively elastic demand;
- Unitary inelastic demand; and
- Relatively inelastic demand.

Perfectly Elastic Demand

An endless demand at the given price is the case of perfectly elastic demand. When demand is perfectly elastic, with a slight or infinitely small rise in the price of a commodity, the consumer stops buying it. The numerical coefficient or perfectly elastic demand is infinity ($e = \infty$).

In a broad sense, the shape of demand curve is significant in ascertaining the elasticity of demand. In the case of perfectly elastic demand, the demand curve will be a horizontal straight line. Thus, the demand curve in Fig. 2.1(A) implies that at the ruling price of OP, the demand is infinite, while a slight rise in price would mean zero demand.

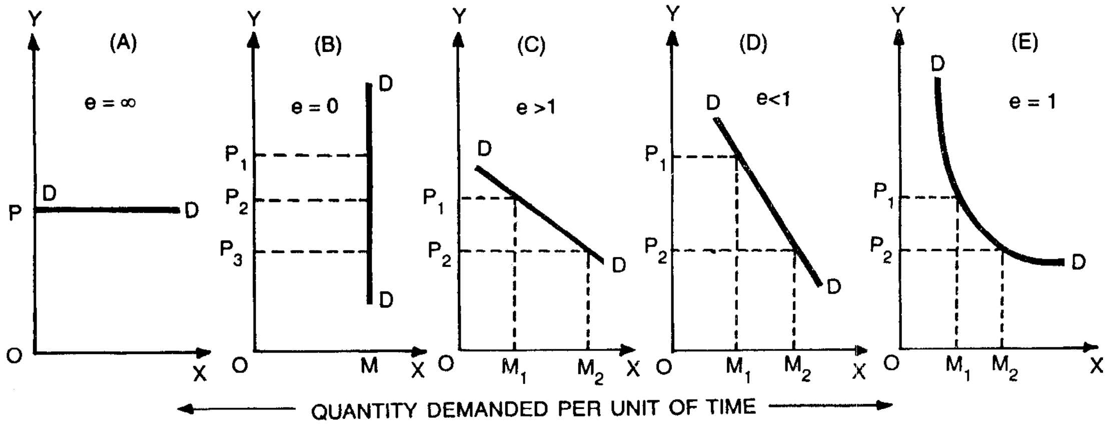

Fig. 2.1:Types of Price Elasticity of Demand

Fig. 2.1(A) indicates that at price OP a person would buy as much of the given commodity as can be obtained, i.e., an infinite quantity, and that even at a slightly raised price he would buy nothing. While, it is assumed that when price is lowered, the demand curve shifts down at this price — the demand curve remaining horizontal. Perfectly elastic demand is a case of theoretical extremity. It is hardly encountered in practice.

Perfectly Inelastic Demand

When the demand for a commodity shows no response at all to a change in price, that is to say, whatever change in price, the demand remains the same, it is called a perfectly inelastic demand. Perfectly inelastic demand has, thus, zero elasticity (e = 0). In this case, the demand curve would be a straight vertical line as in Fig. 2.1(B). Fig. 2.1(B) indicates that whether the price moves from OP_2 to OP_1 or OP_3, the quantity demanded remains the same, OM only. Perfect inelasticity is again a theoretical consideration rather than a very practical phenomenon. However, a commodity of absolute necessity like salt seems to have perfectly inelastic demand for most consumers.

Relatively Elastic Demand

When the proportion of change in the quantity demanded is greater than that of price, the demand is said to be relatively elastic. The numerical value of relatively elastic demand lies between one and infinity. Thus, what Marshall called elasticity greater than unity of demand is again referred to as "relatively elastic" demand or "more elastic" demand. A relatively elastic demand will be represented by a gradually sloping, i.e., rather a flatter demand curve as shown in Fig. 2.1(C). In Fig. 2.1(C) when the price falls from OP_1 to OP_2 the demand rises to OM_2 which is relatively large in proportion to the change in price $\frac{\Delta O}{Q} > \frac{\Delta P}{P}$; hence elasticity is greater than one. It is a more realistic concept as many commodities have such higher elastic demand.

Relatively Inelastic Demand

When the proportion of change in the quantity demanded is less than that of price, the demand is considered to be relatively inelastic. The numerical value of relatively inelastic demand lies between zero and one. Hence, the concept "relatively inelastic" or "less elastic" demand is the same as what Marshall presented by a rapidly sloping, i.e., rather a steeper demand curve as shown in Fig. 2.1(D). In Fig. 2.1(D) when the price falls by P_1P_2, the demand is extended just by M_1M_2 which is relatively very less in proportion to the change in price $\frac{\Delta O}{Q} > \frac{\Delta P}{P}$; hence elasticity is less than one. This is also a very realistic concept.

Unitary Elastic Demand

When the proportion of change in demand is exactly the same as the change in price, the demand is said to be unitary elastic. The numerical value of unitary elastic demand is exactly 1. It is just the same as that of elastic demand, the demand curve would be a rectangular hyperbolar curve, as shown in Fig. 2.1(E). In Fig. 2.1(E) when the price falls by P_1P_2, the demand is extended by M_1M_2 which is in the same proportion to change in price $\frac{\Delta O}{Q} > \frac{\Delta P}{P}$ hence elasticity is equal to unity. This is a theoretical norm, which helps to distinguish between elastic and inelastic demand in general.

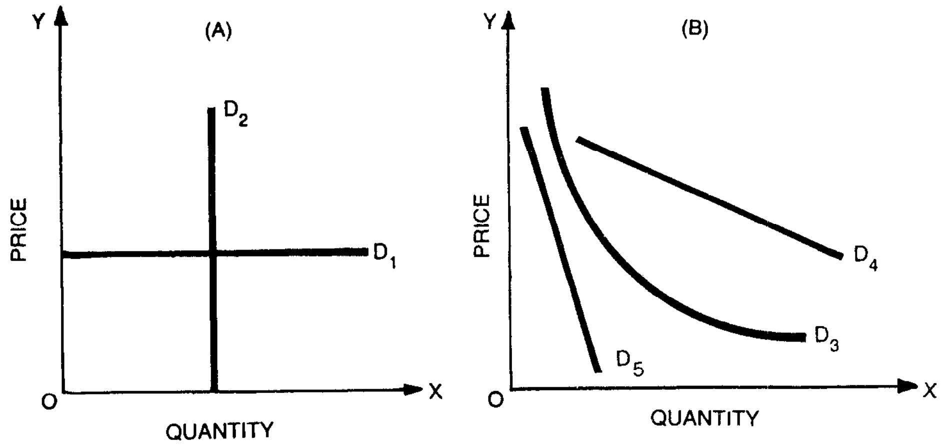

Fig. 2.2: Slopes of Demand Curve

The different kinds of price elasticity of demand discussed above can be summarised as in the following table:

Table 2.1: Price Elasticity of Demand

Numerical Value	*Terminology*	*Description*
$e = \infty$	Perfectly (or infinitely) elastic at particular price.	Consumers have infinite demand at a even slightly higher than this given price.
$e = 0$	Perfectly (or completely) inelastic.	Demand remains unchanged, whatever be the change in price.
$e > 1$	Relatively elastic percentage than does price.	Quantity demanded changes by a larger.
$e < 1$	Relatively inelastic percentage than does price.	Quantity demanded changes by a smaller change in price
$e = 1$	Unitary elastic	Quantity demanded changes by exactly the same percentage as does price.

It should be noted that various demand curves drawn in Fig. 2.1 are based on the same scale. If these are not drawn on the same scale, it will be erroneous to make assertions about their relative elasticities. Because, it is quite likely that the same demand schedules may have curves with different slopes when the scales along the X-axis are different. It is only when scales are the same, will the two demand curves have different slopes representing different demand schedules. Even then, just by looking at the demand curves, we cannot infer precisely anything about elasticities over different price ranges on each curve without some calculations. If two demand curves are drawn on the same scale and we consider the same price range in each case, in which case we can assert that a flatter demand curve represents a greater elasticity of demand than a steeper demand curve.

Indeed, in a broad sense, the elasticity of demand for a commodity depends on the demand schedule or demand function and hence on the shape of the demand curve for that commodity. To recapitulate again, on a given scale, the different slopes of demand curve relating to price elasticity can be compared as in Fig. 2.2.

In Fig. 2.2(A), the demand curve D_1 represents perfectly elastic demand. D_2 represents perfectly inelastic demand. Similarly, in Fig. 2.2(B), unitary elastic demand is represented by the curves D_4 and D_5 respectively.

2.4 Measurement of Price Elasticity

There are three different methods of measuring price elasticity of demand:

- Ratio method to measure coefficient of price elasticity;
- Total revenue method; and
- Point method.

The Ratio Method

Of these, the calculation of coefficient of price elasticity by ratio method has been already discussed in the previous section using the formula:

$$e = \frac{\Delta Q}{Q} > \frac{P}{\Delta P}$$

It is also known as percentage method, when we measure the ratio as:

$$e = \frac{\%\Delta Q}{\%\Delta P}$$

where, $\%\Delta Q$ = Percentage change in demand.

$\%\Delta P$ = Percentage change in price.

Total Revenue (or Total Outlay) Method

Marshall suggested that the easiest way of ascertaining whether or not demand is elastic is to examine the change in total outlay of the consumer or total revenue of the seller corresponding to change in price of the product.

Total Revenue (or Total Outlay) = Price × (Quantity Purchased or Sold)

According to this method:

- When with a change in price, the Total Revenue (TR) remains unchanged, demand is unit elastic (e = 1). The total remains constant in the case of unit elastic demand, because the demand changes in the same proportion as the price. This has been illustrated in Table 2.2.
- When with a rise in price, the total revenue falls or with a fall in price, the total revenue rises, elasticity of demand is greater than unity. This happens because the proportion of change in demand is relatively greater than that of price. In short, when the price and total outlay move in opposite directions, demand is relatively elastic (se2.Table 3.2).

Table 2.2: Total Outlay Method

	Price	*Quantity (Units)*	*Total Revenue (TR)*	*Elasticity of Demand (e)*
Original	2	10	20	—
1. Change	4	5	20	e = 1
	1	20	20	(unit)
2. Change	4	4	16	e > 1
	1	24	24	(elastic)
3. Change	4	6	24	e < 1
	1	16	16	(inelastic)

- When with a rise in price, the total revenue also rises and with a fall in price, the total revenue falls, elasticity of demand is less than unity. This happens because the proportion of change in demand is relatively less than the proportion of change in price. Briefly, thus, when the price and total outlay move in the same direction, demand is relatively inelastic (Table 2.2).

We may now summarise the total outlay method as follows:

Fig. 2.3 represents the relationship between total outlay (or total revenue) and the price elasticity of demand. In Fig. 2.3 Panel (A) represents an upward sloping total revenue curve (T_1R) indicating that when price rises from P_1 to P_2, total outlay (or total revenue) rises from R_1 to R_2. It shows how the demand is relatively inelastic ($e < 1$).

Panel (B) represents a vertical straight line total revenue curve (T_2R). Here, total revenue remains unchanged (OR), whether price changes from P_1 to P_2 or *vice versa.* It means that the demand is unitary elastic ($e = 1$).

Panel (C) represents a downward sloping total revenue curve (T_3R). So, with the rise in price from P_1 to P_2, total revenue decreases from R_1 to R_2. It means that the demand is relatively elastic ($e > 1$).

Thus, from the behaviour of total outlay or total revenue, we can infer the kind of price elasticity of demand. Likewise, from a given price elasticity, we can conclude about the nature of change in the consumer's total outlay or seller's total revenue. In the case of unitary elastic demand, with any change in price, total revenue remains unaltered. But when there is elastic demand, the total revenue is expected to move in the opposite direction of the change in price, while in the case of inelastic demand, the total revenue would change in the same direction as of the price change.

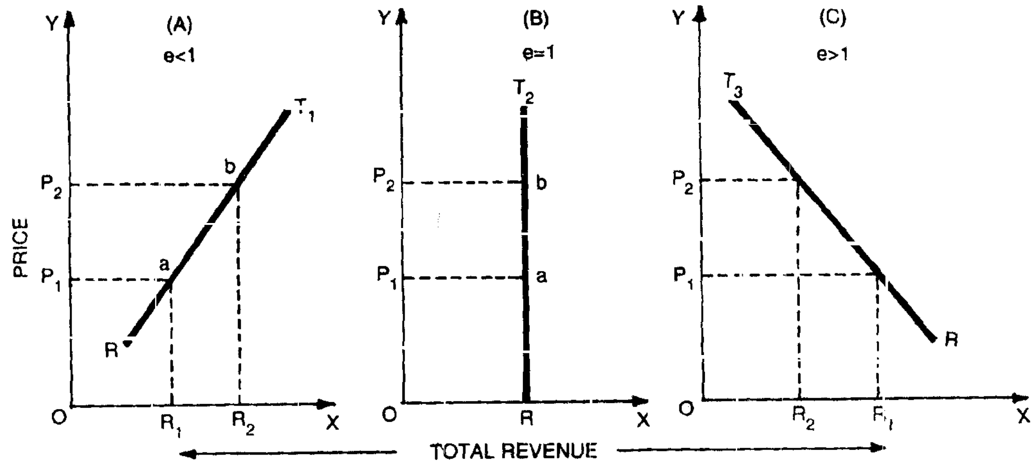

Fig. 2.3: Total Outlay (Revenue) and Elasticity of Demand

Behavioural relationships between price changes, elasticity, and total revenue may be summarised as under:

The total revenue method of measuring elasticity is however, less exact. It can indicate only the class of elasticity, but not its exact numerical value, we have to resort to the formula method or the point method. However, the economic significance of total outlay or total revenue method is that it shows directly what happens to the total outlay or revenue as a practical guide for determining a price policy and its effect on demand and revenue.

Table 2.3: Total Revenue Method

Price	*Total Revenue (TR)*	*Type of Elasticity (e)*
1. Increases Decreases	Constant Constant	e = 1 (Unitary)
2. Increases Decreases	Decreases Increases	e > 1 (Relatively elastic)
3. Increases Decreases	Increases Decreases	e < 1 (Relatively inelastic)

However, the total revenue method gives the value of elasticity as equal to one, greater than one and less than one. It does not give correctly the numerical value of elasticity and therefore, the second method, i.e., formula method is used.

Table 2.4: Price Changes Elasticity and Total Revenue

Change in Price	*Change in Total Revenue When:*		
	$e < 1$	$e > 1$	$e = 1$
Rise	Rise	Fall	No Change
Fall	Fall	Rise	No Change

Point Elasticity Method or the Geometric Method

Marshall also suggested another method called the point elasticity method or geometrical method for measuring price elasticity at a point on the demand curve.

The simplest way of explaining the point method is to consider a linear (straight line) demand curve. Let the straight line demand curve be extended to meet the two axes, as in Fig. 2.4. When a point is plotted on the demand curve like point P in Fig. 2.4, it divides the curve into two segments. The point elasticity is, thus, measured by the ratio of the lower segment of the curve below the given point to the upper segment of the curve above the point.

For brevity, we may again put that:

$$\text{Point Elasticity} = \frac{\text{Lower segment of the demand curve below the given point}}{\text{Upper segment of the demand curve above the point}}$$

or, to remember through symbols, we may put as:

$$e = \frac{L}{U}$$

where, e stands for point elasticity, L stands for lower segment, and U for the upper segment.

In Fig. 2.4, AB is the straight line demand curve and P is a given point. Thus, PB is the lower segment and PA the upper segment.

$$\therefore\ e = \frac{L}{U} = \frac{PB}{PA}$$

If after the actual measurement of the two parts of the demand curve, we find that PB = 3 cms and PA = 2 cms, then elasticity at point P is $^3/_2 = 1.5$.

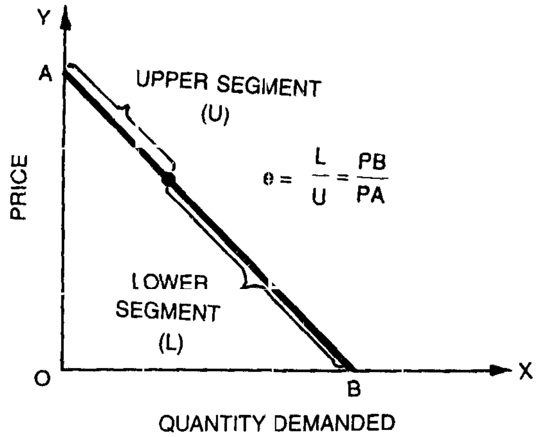

Fig. 2.4: Quantity Demanded

This measure is called a 'point' elasticity measurement because it effectively measures elasticity at a point on the demand curve assuming infinitely small changes in price and quantity variables.

2.5 Income Elasticity of Demand

Income is a major determinant of demand for a number of goods. We may have an income demand function thus:

$D = f(M)$

where, M refers to the money income of the buyer.

It suggests that the demand may change due to a change in the consumer's income, other factors remaining constant. The concept of income elasticity is, thus, introduced to ascertain the extent of such change. The income elasticity of demand measures the degree of responsiveness of demand for goods to changes in the consumer's income.

Definition: The income elasticity is defined as a ratio of percentage or proportional change in the quantity demanded to the percentage or proportional change in income.

Income elasticity coefficient is, thus, measured by the following formula:

$$\text{Income elasticity} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

Symbolically,

$$e_m = \frac{\%\Delta Q}{\%\Delta M}$$

where, %ΔQ signifies the percentage change in demand, and %ΔM the percentage change in income.

$$e_m = \frac{\Delta Q}{Q} \times \frac{M}{\Delta M} \text{ or } \frac{\Delta Q}{\Delta M} \times \frac{M}{Q}$$

where,

ΔQ = Change in demand

Q = Initial demand

M = Initial income

ΔM = Change in income

2.6 Types of Income Elasticity

Income elasticity on the basis of its coefficient (e_m), may thus be classified as under:

- Unitary income elasticity of demand ($e_m = 1$);
- Income elasticity of demand greater than unity ($e_m > 1$);
- Income elasticity of demand less than unity ($e_m < 1$);
- Zero income elasticity of demand ($e_m = 0$); and
- Negative income elasticity of demand. ($e_m < 0$)

Unitary Income Elasticity

When the percentage change in demand is equal to the percentage change in income, the demand is unitary income elastic. Thus, $e_m = 1$.

The demand curve representing income demand function D = f (M) will have an upward slope, and will be at 45° angle, as shown in Fig. 2.5 curve D_1.

Income Elasticity Greater than Unity

When the percentage change in quantity demanded is greater than the percentage change in income, the income elasticity of demand is greater than unity. Thus, $e_m > 1$. The demand curve will be flatter as D_2 in this case.

Income Elasticity Less than Unity

When the percentage change in demand is less than the percentage change in price, the income elasticity of demand is less than unity. Thus, $e_m < 1$. The demand curve in this case will be steeper like D_3 in Fig. 2.5.

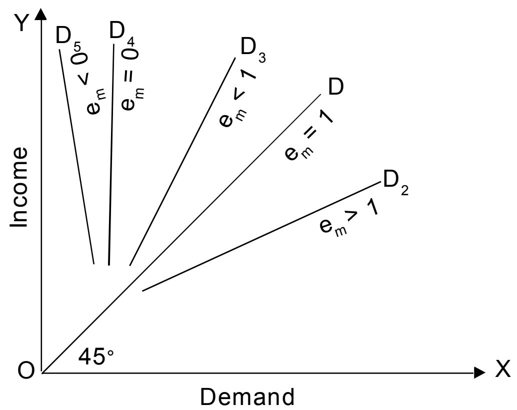

Fig. 2.5: Income Elasticity of Demand

Zero Income Elasticity

When the income change in any direction or in any proportion but carries no effect on demand, so that the quantity demanded remains unchanged, it is referred to as zero income-elasticity of demand. Thus, $e_m = 0$. The demand curve in this case is a vertical line like D_4 in Fig. 2.5.

Negative Income Elasticity

When an increase in income causes a decrease in the demand for a commodity, the demand is said to be negative income elastic. The income elasticity coefficient, $e_m < 0$. The demand curve in this case will be downward sloping like D_5 in Fig. 2.5. Only in the case of a few exceptional inferior goods like jowar and bajra in India and margarine in the USA, we find income elasticity.

Income elasticity is generally positive, as there is a positive correlation between income and demand. Other things remaining the same, with an increase in income, there will be an increase in demand and vice versa. Sometimes, however, negative income elasticity is also observed. Especially, in the case of Giffen goods and certain kinds of inferior goods, income elasticity is negative. That is to say, when with a rise in income the consumer buys less of a commodity, then there is negative income effect. But in most cases, the amount demanded increases with a rise in the consumer's income and decreases with a fall in income. Thus, income elasticity, which is a numerical expression of income effect on demand, is found to be positive in the case of most commodities.

Income elasticity of demand depends upon per capita income and the prevailing standard of living of a community. In industrially advanced countries of the West, with high living standards, the elasticity of demand for home appliances and gadgets, cars, new house, etc., is usually very high. Comparatively, for necessaries such as potatoes, salt, bread, income elasticity of demand is quite low.

A high positive income elasticity of demand may be found in many food items in India, because people here are already living on a subsistence level and they are underfed. So, with a rise in income, they would buy, first, more of food products on account of their high marginal propensity to consume. Even ordinary comfort goods will also have a high positive income elasticity of demand in India, as our standard of living is very low.

The income elasticity helps us in classifying the commodities. The following points may be stated in this regard:

- When income elasticity (e_m) is positive, the commodity is of a normal type.
- When income elasticity (e_m) is negative, the commodity is inferior. For instance, cereals like jowar, bajra, etc. are inferior goods, so their income elasticity is negative.
- If income elasticity coefficient is positive and greater than one ($e_m > 1$), the commodity is a luxury. For example, the demand for TV sets, cars, etc., is highly income elastic.

- If income elasticity coefficient is positive but less than unity ($e_m < 1$), the commodity is an essential one, e.g., the demand for foodgrains is income elastic.
- If income elasticity coefficient is zero ($e_m = 0$), the commodity is neutral. For instance, consumption of commodities like salt, match-box, etc., has zero income elasticity.

A case study on measuring elasticity of demand is summarily reported in Table 2.5.

Table 2.5: Elasticity of Demand: Some Case Study Results

Sl. No.	*Product*	*Degree of Elasticity*		*Classification*	
		(PE)	*(IE)*	*(PE)*	*(IE)*
1.	Cigarettes	–0.3	+0.5	Inelastic	Inelastic
2.	Coffee	–0.15	+0.29	Inelastic	Inelastic
3.	Kitchen Appliances	–0.6	—	Inelastic	
4.	Tires: short-run	–0.6	—	Inelastic	—
5.	Tires: Long-run	+0.04	—	Inelastic	—
6.	Automobiles (Long-run)	+0.02	—	Inelastic	
7.	Housing	–0.04	—	Inelastic	—
8.	Soyabean meal	–1.65	—	Elastic	—
9.	Telephone — Business use	+0.08	+0.10	Inelastic	Inelastic
10.	Elasticity (1 year)	–0.06	+0.06	Inelastic	Inelastic

Source: Thompson Jr. and Formby (1993), Table 2.5.

Comments

Data in Table 2.5 above implies that barring the exact value of elasticity coefficients, except Soyabeen meal, all other selected items, such as, cigarettes, coffee, kitchen appliances, tires, automobiles, housing, telephone and electricity have highly price-inelastic as well as income-inelastic demand. Though these measures of studies pertain mostly to the United States economy, the general nature of the category of inelasticity of these goods have universal tendency of demand behaviour.

K.K. Sen points out that income elasticity of demand is applicable to many planning and strategy problems, such as:

- **Long-term business planning:** In the long run, demand for comforts and luxury goods may tend to be highly income elastic. Hence, prospects for long-run growth in sales for these goods are very bright. The firm can plan out its business accordingly.
- **Market strategy:** Income elasticity of demand is helpful in developing market strategies.
- **Housing development strategies:** On the basis of income elasticity, housing development requirement can be predicted and construction work can be effectively launched upon.

2.7 Cross Elasticity of Demand

In arriving at the price elasticity of demand, one takes into account the change in demand due to a change in the price of the same commodity. In cross elasticity of demand, we take into account the change in the price of commodity Y and its effects on the demand for commodity X. The concept of cross elasticity is important in the case of commodities which are substitutes and complementary. Tea and coffee are substitutes for each other, pen and ink, car and petrol are complementary goods.

Definition: The cross elasticity demand refers to the degree of responsiveness of demand for a commodity to a given change in the price of some related commodity.

The cross elasticity of demand between any two goods X and Y is measured by dividing the proportionate change in the quantity demanded of X by the proportionate change in the price of Y. Thus:

$$\text{Cross Elasticity of Demand} = \frac{\text{Proportionate or percentage change in Demand for X}}{\text{Proportionate or percentage change in Price of Y}}$$

Symbolically,

$$e_c \text{ or } e_{xy} = \frac{\Delta Q_x}{Q_x} \div \frac{\Delta P_y}{Py} \text{ or } e_{xy} = \frac{\Delta Qx}{\Delta Py} \div \frac{Px}{Qx}$$

e_c or e_{xy} = Cross elasticity of demand (demand for X in relation to the price of Y)

ΔQx = Change in quantity demanded for commodity X

Qx = Initial demand for X

Py = Initial price of commodity Y

ΔPy = Change in the price of commodity Y (Preferably d instead of Δ is used to represent a point change.)

2.8 Summary

- **Price elasticity of demand:** The ratio of the relative change in demand to the given price change.
- **Unitary Elastic Demand:** e = 1
- **Elastic Demand:** e > 1
- **Inelastic Demand:** e < 1
- **Ratio method:** Percentage change in demand/percentage change in price
- **Unitary Elastic Demand:** Total Revenue remaining unchanged against the price change.
- **Relatively Elastic Demand:** Total Revenue moves in opposite direction to the direction of the price change.
- **Relatively Inelastic Demand:** Total Revenue move in the same direction of the price change.
- **Income Elasticity of Demand:** Percentage change in demand/percentage change in income.
- **Zero income elasticity of demand:** Salt. Match-box.
- **Substitutes:** Positive cross elasticity of products demand.
- **Complementary Goods:** Negative cross elasticity of demand.

2.9 Key Words/Abbreviations

- E = Elasticity of demand
- Q = Quantitiy demanded
- P = Price
- Δ = Change
- M = Initial income

2.10 Learning Activity

1. Review the phone call charges – Rate structure of ides and Jio.

   ----

2. Review the airfare seasonwise of Air India, Indian airways.

2.11 Unit End Questions (MCQ and Descriptive)

A. Descriptive Type: Short Answer Type Questions

1. What is meant by the elasticity of demand? Define price elasticity.
2. What are the type of price elasticity of demand?
3. Explain the point of elasticity method.
4. Define income elasticity of demand and indicate their types.
5. (a) Define cross elasticity of demand.

   (b) How would you determine whether the given goods are substitute or complementary?

6. Describe in detail the various methods of measuring elasticity of demand.
7. Summarize notes on:
   (a) Demand determinants
   (b) Income elasticity of demand
   (c) Cross elasticity of demand
8. Explain the difference between increase in demand and extension of demand and decrease in demand and contraction of demand. Discuss the conditions under which increase in price leads to increase in demand.

B. Multiple Choice/Objective Type Questions

1. The responsiveness of demand to change in price is termed as
   (a) Variation (b) Elasticity
   (c) Price elasticity (d) Degree
2. When price elasticity coefficient is greater than unity, the product is considered to be
   (a) Inelastic (b) Elastic
   (c) High responsive (d) Business-oriented

3 Perfect elastic demand is a case of
   (a) Practical consideration (b) Theoretical extremity
   (c) _____ motivation (d) Prosperity

4. Total revenue method of identifying price elasticity of demand was suggested by
   (a) Pigon (b) Retention
   (c) Marshall (d) Friedman

5. Income elasticity may be negative in the case of

    (a) Superior goods   (b) Cereal like Bajra

    (c) Wheat   (d) Sweet

Answers

1. (c), 2. (b), 3. (b), 4. (c), 5. (b).

2.12 References

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UNIT 3 CONSUMER BEHAVIOR PART-1

Structure:

3.0 Learning Objectives

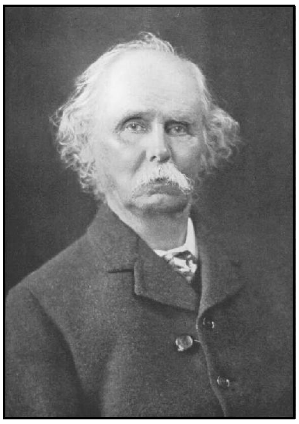
After studying this unit, you will be able to:

- Explain the law of diminishing marginal utility
- Describe the concept of utility and its theoritical significance in economic analysis of demand.

3.1 Introduction

Consumers generally purchase goods and services so long as they yield some satisfaction to them. The term 'utility' refers to the capacity of a commodity to satisfy a human want. One man may go to see a movie while another may purchase a piece of cloth. Each derives pleasure or satisfaction in a particular way and behaves in the market accordingly. There is no reason or season excepting the utility that he derives from the consumption of various goods and services. His actions in the market are only a manifestation of his utility or disutility of different goods in the market.

Economists have offered their theories of consumer behaviour on the basis of the measurement of utility. There are two major approaches regarding the measurement of utility, *viz.,* cardinal measurement and ordinal measurement of utility. Accordingly, we have: (*i*) cardinal utility theory of consumer behaviour, and (*ii*) ordinal utility theory of consumer behaviour, popularly known as the indifference curve analysis.



ALFRED MARSHALL

The utility analysis of demand behaviour was evolved in the early 1870s by three contemporary economists, Jevons, Menger and Walras. It, however, attained perfection and systematic presentation at the hands of Alfred Marshall when his celebrated book, Principles of Economics, appeared in 1890.

The Marshallian approach in the theory of demand is based on the following postulates.

1. Concept of utility and its cardinal, *i.e.,* numerical, measurements;
2. The law of diminishing marginal utility; and
3. The law of equi-marginal utility.

Hence, Marshall's theory of demand is commonly described as the 'Marginal Utility Approach'.

3.2 Basic Concepts and Postulates of the Marshallian Cardinal Utility Approach

1. The Concept of Utility

When the consumer consumes or buys a commodity, he derives some benefit in the form of satisfaction of a certain want. This benefit or satisfaction experienced by the consumer is referred to by economists as 'utility'. The concept of utility was originated by Stanley Javons, a noted classical economist.

Definition: Utility is something experienced by the consumer about the given commodity's significance relating to its want-satisfying power.

Utility is, thus, an introspective or a subjective term. It relates to the consumer's mental attitude and experience regarding a given commodity or a service.

2. Cardinal Measurement of Utility

Marshall assumes cardinal measurement of utility. Cardinal measurement is a numerical expression. Marshall believed that utility could be measured in numerical terms in its own units called 'utils'. To him, utility of commodity is quantifiable, hence measurable numerically. He assumes that, for instance, to a consumer an apple may yield 16 utils of satisfaction, while a mango may yield 30 utils of satisfaction. Thus, utility of a mango is proportionately two times the utility of an apple. Such a numerical measurement is imaginary. When a utility statement is tabulated as a schedule of utility, it is referred to as the cardinal measurement of utility.

3. Total Utility and Marginal Utility

The concept of total utility and marginal utility are the basic concepts in the cardinal measurement of utility.

Definition: Total utility means total satisfaction experienced or attained by the consumer regarding all the units of a commodity taken together in consumption or acquired at a time.

Apparently, total utility tends to be more with a larger stock and less with a smaller stock. In mathematical terms, thus, total utility is a direct function of the number of units of a commodity in consideration. To put it symbolically, $TUx = F(Qx)$,

where $\frac{TUx}{Qx} > 0$

(*Read:* Total utility of X is the increasing function of its quantity) where TUx = total utility of a commodity X, F = functional relation, Qx = quantity of X. Δ refers to a small change.

Definition: Marginal utility is the extra utility obtained from an extra unit of any commodity consumed or acquired.

In other words, marginal utility refers to the successive increment in total utility made by taking separately each unit of the commodity in a successive manner as an addition to its total stock. Thus, utility of the first unit is measured as the marginal utility at the beginning. Then, the utility of the second unit of X is measured as the marginal utility of two units in the given stock. Similarly, the utility derived from the third unit would be the marginal utility of the stock with 3 units, and so on.

Thus, marginal utility may be measured as the difference between the utility of the total units of stock of consumption of a given commodity minus that of consuming one unit less in the stock considered. In symbolic terms, thus: $MUn = TUn - TUn - 1$ where, MUn stands for the marginal utility relating to n units of stock of a commodity. TUn = Total utility of n units taken together, $TUn - 1$ = total utility of n–1 units taken together. The computation of marginal utility has been illustrated in Table 3.1 below.

Table 3.1: Total Utility and Marginal Utility

Units of X	*Total Utility*	*Marginal Utility*				
n	*TU*	*MUn*	=	*TUn*	–	*TUn – 1*
0	0					
1	35	35	–	0	=	35
2	60	60	–	35	=	25
3	75	75	–	60	=	15
4	80	80	–	75	=	5

The schedule given above is imaginary. In this schedule, we have assumed a cardinal measurement of utility in terms of so many units expressed in numbers. It can be seen that when our consumer in the illustration buys 4 units of *X*, he derives 80 units of total satisfaction. Total utility, thus, measures the strength of the consumer's demand for the entire stock of the given commodity.

Further, it is easy to see that marginal utility determines the rate of increase in the total utility with an increase in the units of a commodity. Thus, marginal utility may be defined as:

$MUx = \frac{dUx}{dQx}$ where, MUx is the marginal utility of a commodity X, dUx is the change in the total utility of X, dQx is the unit change in the total stock of X.

In short, marginal utility refers to the utility of the marginal unit of consumption. Marginal unit is not a fixed unit. It changes according to the change in the stock of things. It is the last unit in the sequence of consumption.

The Law of Diminishing Marginal Utility

The law of Diminishing Marginal Utility (DMU) lies at the centre of the cardinalist approach.

The law of diminishing utility or diminishing marginal utility is based on the satiability characteristic of human wants, that a single want taken separately at a time can be fully satisfied.

Statement of the Law: Other things being equal, as the quantity of commodity consumed or acquired by the consumer increases, the marginal utility of the commodity tends to diminish.

In mathematical terms, the law implies a decreasing functional relationship between the quantity of a commodity consumed and marginal utility derived.

Thus: $MUx = F(Qx)$ where, $\frac{dUx}{dQx} < 0$.

This means each additional unit of consumption adds relatively less and less to the total utility obtained by the consumer.

Illustration of the Law

To illustrate the tendency of the diminishing marginal utility, let us review the hypothetical utility schedule computed through the introspective method of enquiry into consumer's consumption experience, as given in Table 3.2.

Table 3.2: Utility Schedule

Units of Consumption of Commodity X	*Total Utility TUx (Units)*	*Marginal Utility MUx (Units)*
1	15	15
2	25	10
3	33	8
4	38	5
5	40	2
6	40	0
7	35	–5

From the schedule in Table 3.2, it appears that as units of commodity *X* consumed increase, the marginal utility derived from each successive unit tends to diminish. Eventually, the marginal utility implies the point of satiety, that is, there is complete satisfaction of a given want when marginal utility is zero. The marginal utility becomes zero only when the want's intensity is nil, as it is fully satisfied. It must, however, be remembered that though marginal utility varies inversely with the acquisition or consumption of the stock of a given commodity, the variation is not necessarily proportionate or uniform. And if any such thing is observed, it is incidental. Any further addition to consumption after zero marginal utility causes a negative marginal utility. Negative marginal utility indicates disutility or dissatisfaction resulting from excessive consumption of a commodity.

Again, viewing the schedule in its ascending order, it would be seen that with a decrease in the stock of consumption, the marginal utility increases.

Hence, when one wants to increase the marginal utility of a commodity, he should consume or purchase less of it.

When the marginal utility schedule (given in Table 3.2) is plotted on a graph, we have a diagrammatic representation of the law through the curve we get, which is called 'the marginal utility curve' (see Fig. 3.1).

In Fig. 3.1, the *X*-axis represents the units of commodity *X*, and the marginal utility is measured on the y-axis. The *MU* curve represents the marginal utility curve. The marginal utility curve slopes downward from left to right, indicating an inverse relationship between marginal utility and the stock of the commodity, *i.e.,* as the stock increases, the marginal utility diminishes.

The *MU* curve intersects at a certain point on the x-axis. This intersection point is the point of satiety, where the marginal utility is zero. After this, the curve slopes down further, denoting negative values.

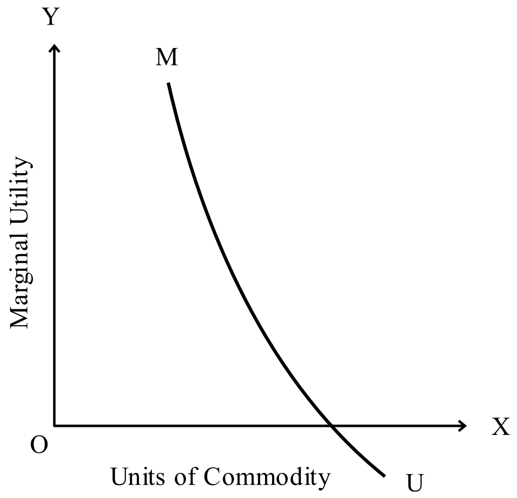


Fig. 3.1: Marginal Utility Curve

Assumptions of the Law

The law of diminishing marginal utility is conditional. Its validity is subject to the following assumptions or conditions:

(i) Homogeneity: The law holds true only if all the successive units taken in the process of consumption are homogeneous in character, like quality, size, taste, flavour, colour, etc. If there is a change in the characteristics of the units of the given commodity, it is quite likely that marginal utility may tend to increase rather than diminish with the successive additional units of consumption. For example, if the first cup of milk is ordinary, while the second cup is of masala milk, utility derived from the second cup will be more than that of the first one.

(ii) Continuity: The consumption or acquisition process is continuous at a given time, that is, units are taken one after another successively without any interval of time. Indeed, the first cup of tea in the morning and the second one in the evening will not result in the diminishing of marginal utility.

(iii) Reasonability: The units of consumption are in reasonable size, of normal standard unit. For instance, we should think of a glass of milk, a cup of tea, etc., and not a spoon of milk or tea.

(iv) Constancy: The law presumes that there is no change in income, taste, habit or preference of the consumer. Similarly, the price of the commodity is also assumed to be given.

(v) Rationality: The consumer is assumed to be a rational economic man whose behaviour is normal and one who is aiming at maximisation of satisfaction.

(vi) Constancy of Marginal Utility of Money: Throughout the operation of the law, it is assumed that not only the money income of the consumer is given, but its marginal utility remains constant so that the consumer's preference remains unchanged.

(vii) Cardinal Measurement of Utility: Marshallian exposition of the law of diminishing marginal utility is based on the cardinal measurement of utility. It is assumed that utility can be numerically expressed by the consumer, *i.e.,* he is capable of mentioning the quantum of utility derived from each additional unit consumed or acquired by him.

3.3 The Law of Equi-Marginal Utility: The Proportionality Rule

This law is an extension of the law of diminishing marginal utility. This law is also called the law of substitutional or the law of maximum satisfaction. It is obvious that the law of diminishing marginal utility is applicable only to a single want with a commodity in one use. But, in reality, there may be a number of wants (more than one) to be satisfied at a time and these various wants are to be satisfied with several goods. To analyse such a situation, we have to extend the law of diminishing marginal utility and such extended form is called the law of equi-marginal utility.

The law of equi-marginal utility is based on the three characteristics of wants, *viz.,* that wants are *comparative, substitutable* and *complementary*. The law takes the following axioms as its starting points:

1. The consumer has limited income or limited stock of a given commodity.
2. The consumer has more than one want to satisfy. This he can do either by purchasing the required number of commodities out of a given income or putting a given commodity to various uses to satisfy his different wants.
3. The consumer is rational and seeks maximum satisfaction.
4. He has no control over the price of the commodity, but the prices are given.

Under these conditions, we shall expose the law which shows how to acquire maximum satisfaction by spending a given income for purchasing various goods to satisfy a number of wants (*i.e.,* optimum allocation of income expenditure).

Statement of Law: Other things being equal, a consumer gets maximum total utility from spending his given income, when he allocates his expenditure to the purchase of different goods in such a way that the marginal utilities derived from the last unit of money spent on each item of expenditure tends to be equal.

The law essentially means, the consumer maximises his satisfaction when he obtains equi-marginal utilities from all the goods purchased at a time.

In a more analytical way, to consider the condition of consumer's equilibrium with respect to maximum total satisfaction, a *proportionality rule* (the behavioural rule) in terms of equi-marginal utility has been formulated by Marshall.

The Proportionality Rule

When the ratios of marginal utility to prices of different goods are equalised with the given marginal utility of money income of the consumer, total utility so derived would be the maximum.

Let us study the operation of this law of equimarginal utility with the help of the following diagram:

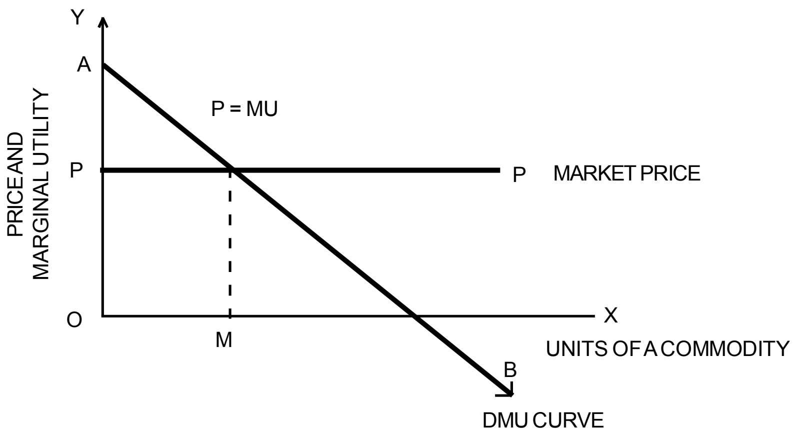


Fig. 3.2

The consumer may be willing to purchase the commodity upto *OM* quantity as the marginal utility is higher than the price represented by *PP'* line. It is assumed that all the units of that commodity are sold at the same price and the consumer purchases additional units of a commodity so long as he derives some consumer surplus or extra satisfaction than the price he has paid for the commodity. At point *E* the consumer derives that much satisfaction which is equal to price. Hence, he may not wish to purchase more units beyond the point *OM* once he reaches the point of equilibrium with one commodity. Like the point *E* in the above case he may substitute other goods in the allocation of his income. The total utility which he gets by allocating his entire income would give him maximum satisfaction in spending on goods and services of his choice.

It follows that so long as the ratios of marginal utility of money are not equalised, the consumer will go on redistributing his expenditure from one commodity to another, buying less of one and more of the other, *i.e.,* substituting one for the other, till there ratios become equal.

In symbolic terms, thus, the proportionality rule may be stated as under:

$$\frac{\text{MUx}}{\text{Px}} = \frac{\text{MUy}}{\text{Py}} = \frac{\text{MUz}}{\text{Pz}} = k$$

where *MU* = marginal utility, *P* = price, *K* = marginal utility of the given money income, assumed to be constant and x, y, z refer to different goods.

Illustration of the Law

The law may be elucidated with the help of an imaginary example as follows:

Let us assume that:

1. A consumer has a given income of ₹ 24.
2. He wishes to spend this entire income on three different goods, *x, y,* and *z*.
3. The prices of these goods are: ₹ 2 per unit of *x*, ₹ 3 per unit of *y*, and ₹ 5 per unit of *z*.
4. The consumer has a definite scale of preference as revealed by the marginal utility schedule given below:

Units	*1*	*2*	*3*	*4*	*5*	*6*
Marginal Utility of *x*	30	20	16	8	6	4
Marginal Utility of *y*	24	15	9	6	3	1
Marginal Utility of *z*	15	10	8	5	1	0

5. The consumer is rational and seeks maximum satisfaction. Now, the question is: how would this consumer spend his ₹ 24 so that he derives the maximum satisfaction.

As per the proportionality rule of the law of equi-marginal utility, we may solve the problem as under:

Table 3.3: Computation of the Ratios of Marginal Utility to Price

(Px = 2, Py =3, Pz =5)

Units	$\frac{MUx}{Px}$	$\frac{MUy}{Py}$	$\frac{MUz}{Pz}$
1	$\frac{30}{2} = 15$	$\frac{24}{3} = 8$	$\frac{15}{5} = 3$
2	$\frac{20}{2} = 10$	$\frac{15}{3} = 5$	$\frac{10}{5} = 2$
3	$\frac{16}{2} = 8$	$\frac{9}{3} = 3$	$\frac{8}{5} = 1.6$
4	$\frac{8}{2} = 4$	$\frac{6}{3} = 2$	$\frac{5}{5} = 1$
5	$\frac{6}{2} = 3$	$\frac{3}{3} = 1$	$\frac{1}{5} = 0.2$
6	$\frac{4}{2} = 2$	$\frac{1}{3} = 0.33$	$\frac{0}{5} = 0$

As per the law, the consumer would get maximum total satisfaction, when:

$$\frac{MUx}{Px} = \frac{MUy}{Py} = \frac{MUz}{Pz} = \text{k} \; \frac{6}{2} \quad \frac{9}{3} \quad \frac{15}{5} = 3$$

Evidently, the consumer's optimum allocation of expenditure is:

₹ 10 on commodity x, thus purchasing its 5 units;

₹ 9 on commodity y, thus purchasing its 3 units.

₹ 5 on commodity z, thus purchasing its 1 unit.

It follows that total utility so derived tends to be:

$TUx = 30 + 20 + 16 + 8 + 6 = 18$; $TUy = 24 + 15 + 19 = 48$;

$TUz = 15$; $\qquad TU = 80 + 48 + 15 = 143$.

143 units is the maximum aggregate satisfaction.

Diagrammatic Representation of the Law

The operation of the law of equi-marginal utility, explained above, can also be expressed graphically as in Fig. 3.3.

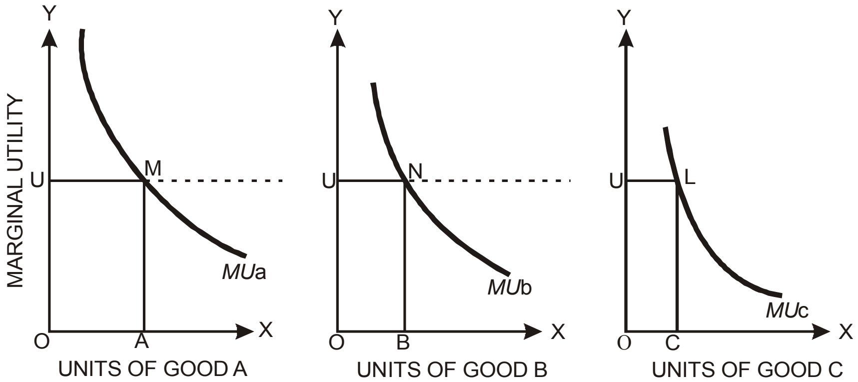


Fig. 3.3 Equi-Marginal Utility

In Fig. 3.3 money expenditure of a given income is denoted on the *x*-axis. The y-axis represents utility. Curves *MUa, MUb, MUc* are the marginal utility curves for the three assumed goods, *a, b* and *c* respectively. It can be seen that these curves are drawn in such a way that they show the relative order of preference of the given goods, *a, b* and *c* (*i.e.,* the first unit of commodity *a* gives more utility than that of *b* and so on). In graphical terms, now the consumer will purchase *OA* units of good *a, OB* units of goods *b, OC* units of goods *c*. It is easy to see that by spending his income in this way, the consumer equalises the marginal utilities of each commodity purchased. Thus, marginal utility *MA* = *NB* = *LC* or *OU* for each commodity. Obviously, his total satisfaction under such a choice is maximum.

Assumptions of the Law

The law of equi-marginal utility is based on the following assumptions:

1. The consumer is a rational economic man who seeks maximum total satisfaction.
2. Utility is measurable in cardinal terms.

3. The consumer has a given scale of preferences for the goods in consideration. He has perfect knowledge of utilities derived.
4. Prices of goods are unchanged.
5. Income of the consumer is fixed.
6. The marginal utility of money is constant. The law of equi-marginal utility is based on the following assumptions:
7. The wants and goods are substitutable.

Limitations of the Law

The law has been subject to certain criticisms and it also has certain limitations. These are outlined below:

1. The law is based on unrealistic assumptions. It being an extension of the law of diminishing marginal utility, it, too, involves all the unrealistic *ceteris paribus* assumptions and conditions such as homogeneity, continuity, constancy, etc., on which the law of diminishing marginal utility is based.
2. The proportionality rule presumes cardinal measurement of utility, but it is not a realistic approach.
3. The law cannot be applied to indivisible goods. On practical grounds, it looks ridiculous to equate utility of a TV set to coffee per rupee.
4. The consumer does not behave rationally all the time. Quite often, his behaviour is influenced by habit, social customs, fashions, advertising, propaganda, occasional requirements, etc.
5. It has also been pointed out by many critics that it is wrong to assume that marginal utility of money will remain constant. Actually, when money is spent, the remaining units of money will tend to have a greater marginal utility. Thus, here there is a backward operation of the law of diminishing marginal utility.
6. Ignorance on the part of consumer about market prices and utilities of different goods and the uncertain scale of preferences due to his wavering mind also pose a limitation to the operation of this law.

3.4 Consumer Equilibrium

The term 'consumer equilibrium' refers to the position of rest or no further movement in the behaviour of a rational consumer under the given conditions. The motive of a rational consumer is to obtain maximum satisfaction. In the cardinalist approach, the consumer is assumed to be maximising total utility while spending his income on buying a commodity or a number of commodities. The consumer is said to be in equilibrium when he maximises his total utility.

Marginal Utility and Price

A rational consumer always seeks to maximise his total satisfaction. For this purpose, he is usually found to be relating marginal utility with the price of the given commodity.

From the consumer's point of view, thus, it is the marginal utility of a commodity which determines its price. That is to say, the marginal gain derived by consuming the last unit, or marginal unit of a commodity, is equal to the sacrifice in terms of money that the consumer has to undergo in purchasing that unit of commodity. Evidently, no consumer would be ready to pay a price higher than his estimate of the marginal utility of a given commodity.

Thus, the consumer will go on purchasing units of a commodity until the marginal utility of it is equal to the disutility of the last unit of money spent (*i.e.,* the price paid for the marginal unit purchased).

The Condition of Consumer Equilibrium

A rational consumer derives maximum total utility by equating marginal utility with the price. Thus: $MUx = Px$.

The point is made clear with the help of Table 3.4 as under:

Table 3.4

Units of Commodity (x)	*Price (of Disutility of Money) (Px)*	*Marginal Utility (MUx)*	*Comparison*
1	10	15	$MUx > Px$
2	10	13	$MUx > Px$
3	10	10	$MUx = Px$ (Equilibrium)
4	10	8	$MUx < Px$
5	10	4	$MUx < Px$

From the above table of price and marginal utility, it appears that with a given market price, initially when only 1 unit of *x* is purchased, disutility of money is 10 but the gain of utility is 5 as the marginal utility is 15. Hence, the consumer is induced to purchase more. In the case of two units purchased also, there is a gain in utility. But when the third unit of *x* is purchased, marginal utility is the same, *i.e.,* price = *MU*. After that if more is purchased, marginal utility derived is less than the price paid, so that the consumer is a loser when sacrifice of money utility and satisfaction from the commodity are compared. Thus, the consumer in this case is in equilibrium when he purchases 3 units of *x*. This means satisfaction can be increased when marginal utility is greater than price. And it is maximum when the price is equal to marginal utility.

In short, for a single commodity, the cardinalists (like Marshall) state the condition of consumer equilibrium as:

Marginal Utility = Price (*e.g., MUx = Px*).

For several commodities, however, the same logic is extended further and the condition of consumer equilibrium is expressed in terms of the proportionality rule as under.

A rational consumer derives maximum total utility and attains equilibrium when the marginal utilities of commodities purchased are proportional to their prices.

Thus: $\frac{MUx}{Px} = \frac{MUy}{Py}$

3.5 Basic Assumptions of Marshallian Utility Analysis

The basic premises underlying the Marshallian theory of demand may, however, be enlisted as under:

- **Cardinal utility.** Utility is measurable cardinally or numerically.
- **Independent utility.** Utility of each commodity is experienced independently or separately in a given bundle of various commodities.
- **Additive utility.** Total utility is an additive concept. The sum total of utilities of various goods can be measured by adding their independent utilities together.

- **Constant marginal utility of money.** In order to use the monetary unit as a measure of utility, Marshall assumed marginal utility of money to be constant at all levels of income of the consumer.
- **Diminishing marginal utility.** The utility derived from each additional unit in succession tends to be lesser and lesser in the axiom of the cardinal approach.
- **Rationality.** The consumer is rational. He is seeking maximisation of the total utility from the goods he buys. Thus, the fundamental basis of consumer's demand behaviour is the maximisation of total utility.
- **Introspective analysis.** Marshall adopted the introspective method of analysis to observe the consumer's experience about marginal utility. Under this method, by observing his own behaviour or on the basis of his own mental experiment, the economist tends to draw conclusions or make inferences about the behaviour of others. Thus, under the introspective method of analysis, the economist has to use his sharp commonsense and make a psychological reading of man's economic behaviour. Marshall's law of diminishing marginal utility is derived from such introspective or psychological reading of an imaginary consumer's mind.

3.6 Limitations of the Marshallian Approach

Following are the major limitations of Marshall's marginal utility approach:

● **Untenable cardinal measurement of utility.** Marshall assumes that utility is measurable cardinally, *i.e.,* quantitatively. Critics, however, point out that utility is a subjective and abstract term which can neither be measured nor expressed quantitatively. Thus, utility being cardinally non-measurable, the theory of demand based on that assumption appears to be vague. In fact, the proportionality rule of equi-marginal utility for maximising satisfaction is impracticable and meaningless, as ratios like $\frac{MU_x}{P_x}$ etc., cannot be obtained when MU_x cannot be numerically measured or expressed.

● **Wrong conception of additive utility.** Since utility cannot be measured quantitatively, it is wrong to assume that the utility is additive.

• **Homogeneity assumption is unrealistic.** Marshall assumes that utility or satisfaction derived from different goods is qualitatively homogeneous. He, thus, considers only the difference belonging to a homogeneous group which can be easily added together. This is incorrect. Actually, different goods give different kinds of satisfaction. The satisfaction derived by seeing a movie cannot obviously be the same as that would be derived from a bus journey, or breakfast and snacks are not equal substitutes for a square meal. Heterogeneous units of satisfaction cannot be added together.

• **Separate measurement of utility.** Marshall's separate measurement of utility of each commodity is not always correct. The utility analysis assumes that utilities are independent. This is not necessarily true. Actually, utilities of different goods may be interlinked. Quite often, the satisfaction derived from the consumption of one commodity is directly or indirectly influenced by the satisfaction derived from related goods, such as complementary goods or substitutes to each other. Complementary goods are taken together. Substitute goods are used in place of one another. The utility variation in different combinations of goods is also not visualised in the Marshallian analysis. This is because in his marginal utility analysis, Marshall constructed only a single commodity model by considering substitutes and complementary goods as equal. As such, cross effects of substitutes and complementary goods were not given any thought.

• **Constancy of marginal utility of money.** Marshall assumes that marginal utility of money remains constant. Hicks argues that money is also a commodity and its marginal utility also diminishes slowly. Thus, the Marshallian assumption of constancy of marginal utility of money is not acceptable.

• **Inapplicability in case of indivisible or bulky goods.** The utility analysis is incapable of exploring the demand for indivisible or bulky goods like TV sets, refrigerators, houses, etc. Normally, a person would buy only a single unit of such goods, hence it is ridiculous to compile an individual demand schedule for such goods. Only a market demand schedule can be composed. Thus, the utility theory fails to examine individual consumption behaviour in all cases. As such, it has a limited scope.

• **Incomplete analysis of price effect.** The utility analysis does not analyse the price effect completely. Marshall talked of substitution effect implied in the process of proportionality rule associated with the law of equi-marginal utility, but he neglected the impact of income caused by a price change. In fact, when the price of a commodity falls, the real income of the consumer rises as he has to spend less than before to buy the same amount of the goods the price of which has fallen. Similarly, when the price rises, the real income of the consumer decreases. This income effect may be positive, zero or negative. A positive income effect induces a person to spend the surplus money income (when the price of a commodity falls) on the same commodity (the price of which has fallen). Thus, a consumer may be induced to buy more of the same commodity by the positive income effect. This point is missed in the Marshallian utility analysis.

● **Inadequate explanation of Giffen goods.** Again, the utility approach fails to clarify the typical cases of inferior and Giffen products. Specially, in Giffen goods, there is a paradoxical situation in which the consumer tends to buy less of such goods when their prices fall. Marshall treated them as a case of exceptional demand curve, which slopes upward. But no clear and convincing reasoning has been furnished to explain the mystery of the Giffen paradox. This is because the utility theory neglects the analysis of income effect, which may be positive or negative. Since Marshall assumes constant marginal utility of money, he could not visualise the truly composite character of the unduly simplified price-demand relationship.

● **Limited scope.** The demand curve relates only to a single good at a time. Its scope of analysis is thus limited. It cannot show the substitutability or complementarity aspects of the related goods.

● **No empirical test.** Marshallian cardinal approach is not amenable to empirical test. The psychological law of diminishing utility has been established by Marshall through the introspective method of analysis. It is not based on empirical findings. Again, utility being abstract and incapable of being measured quantitatively, it is not open to empirical tests.

3.7 Summary

- Utility : the want satisfying capacity of commodity.
- Cardinal measurement of utility: numerical measures of utility
- Marginal Utility: the extra utility obtained from an unit of consumption of a product.
- Law of DMU: Marginal utility diminishes with increasing units of consumption.

- Total Utility: increases at decreasing rate
- Proportionality Rule: Ratios or marginal utilities to prices of commodities bought/consumes are equated with marginal utility of money spend to achieve maximum satisfaction.
- Rational consumer : skcetching maximum satisfaction.
- No empiricaltal : provided by Marshal in support of the utility theory.

3.8 Key Words/Abbreviations

- DMV = Diminishing Marginal Utility
- MU = Marginal Utility
- P = Price
- K = Marginal Utility of Money

3.9 Learning Activity

1. Students trace out the term utility and its concept.

   ----

2. Draw a diagrammatic representation of law of equi-marginal utility.

3.10 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. Define utility and explain the relationship between total and marginal utility.
2. State and explain the law of diminishing marginal utility.

3. State and explain the law of equi-marginal utility.

4. State the basic assumption of marshallian uitility theory and trace the limitations of the marshallian approach.

5. Develop changes will take place in total utility when –

   (a) Marginal utility curve has above X–axis.

   (b) Marginal utility curve touches X–axis.

   (c) Marginal utility curve lies below X–axis.

6. Develop the relationship between total utility and marginal utility with the help of schedule.

B. Multiple Choice/Objective Type Questions

1. Marchallian theory of demand is based on the

   (a) Cardinal Measurement of utility (b) Ordinal measurement of utility

   (c) Marginal Utility (d) Total uitlity

2. Marginal Utility is the

   (a) Ever lasting utility (b) Extra utility

   (c) Zen utiltiy (d) All the above

3. Marginal Utility curve is sloping

   (a) Upward (b) Forward

   (c) Downward (d) Backward

4. A rational consuming is aiming at

   (a) Maximisation of satisfaction (b) Buying at a minimum price

   (c) Market survey (d) Money's worth

5. Maximum total utility is obtained when

   (a) MU = P (b) MU>P

   (c) MU<P (d) TU=P

Answers

1. (a), 2. (b), 3. (c), 4. (a), 5. (a)

3.11 References

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UNIT 4 CONSUMER BEHAVIOR PART-2

Structure:

4.0 Learning Objectives

After studying this unit, you will be able to:

- Describe the indifference curve analysis of demand.
- Compare between the Marshallian approach and Hicksian approach of the demand theory.
- Explain the Revealed Preference Theory.

4.1 The Indifference Curve Technique

The technique of indifference curves was originated by Edgeworth in 1881 and its refinement was effected by Pareto, an Italian economist, in 1906. This technique, however, attained perfection and systematic application in the demand analysis at the hands of J.R. Hicks and R.G.D. Allen in 1934. Professor Hicks, in fact, expounded and popularised the innovation of the indifference curve approach to the theory of demand in his *Value and Capital*, published in 1939.

4.1.1 Indifference Schedule

An indifference curve is based on an indifference schedule.

Definition. An indifference schedule is a list of alternative combinations in the stocks of two goods which yield equal satisfaction to the consumer.

When a consumer lays down his scale of preferences for different combinations of certain goods under consideration, he will rank them as per the higher and the lower level of satisfaction visualised in them. A combination which is estimated to give the highest level of satisfaction is assigned to the first order preference. The combination yielding comparatively a lower degree of satisfaction is assigned the second order preference. The one yielding a still lower degree of satisfaction is assigned the third order of preference and so on. However, the consumer may come across some combinations which yield the same level of satisfaction to him, so that he prefers them equally from a given order of preference. In such a case, he is said to be indifferent to such combinations of goods.

Indeed, a consumer is said to be indifferent between the various sets of combination of given goods when he experiences the same level of satisfaction or he finds the same position in his scale of preference for those set of goods. A list of such combinations of given goods to a consumer which yields equal satisfaction at a given level constitutes an indifference schedule.

Illustration. To illustrate the point, for the sake of simplicity and geometrical convenience, we may consider groups of only two commodities. Say apples and bananas, in the case of our hypothetical consumer. We assume that the combinations of these goods yield equal level of satisfaction to him, hence an indifference schedule is composed accordingly (see Table 4.1).

Table 4.1: Scale of Preferences

Combination	*Apples* (X)	*Bananas* (Y)	*Marginal Rate of Substitution* ($\Delta Y/(\Delta X)$)
(a)	1	12	—
(b)	2	8	– 4/1 = –4
(c)	3	5	– 3/1 = –3
(d)	4	3	– 2/1 = –2
(e)	5	2	– 1/1 = –1

Since, by definition, all these combinations have given him the same level of satisfaction, the consumer is indifferent to any of these combinations whether he gets, *a*, or *b*, or *c*, or *d*, or *e*. He will neither be better off nor worse off, whichever combination he has.

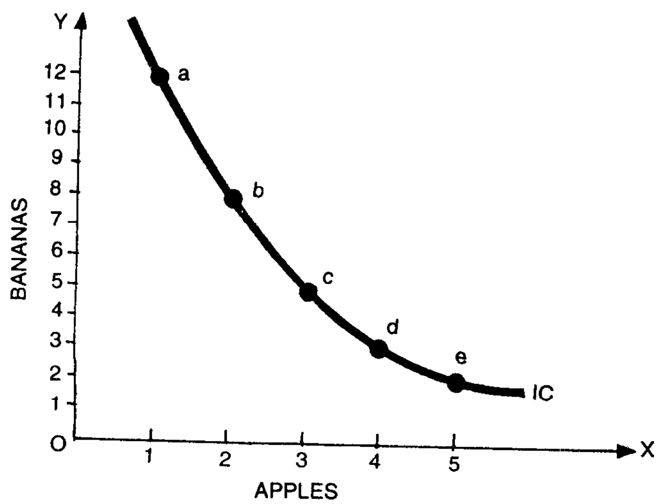
It must be remembered that an indifference schedule represents a part of consumer's "scale of preferences." The scale of preferences for a combination of goods will constitute different ranks of preference of given combinations whereas at a given rank there may be certain combinations that may be yielding equal satisfaction. An indifference schedule represents only equal satisfaction with combinations at a particular order of preference while a scale of preference represents all combinations yielding different as well as equal levels of satisfaction.

4.1.2 Indifference Curve

The indifference curve is a geometrical device representing all such combinations of two goods yielding equal satisfaction at a particular level.

Definition. An indifference curve is the locus of points representing all the different combinations of two goods (say X and Y) which yield equal utility or satisfaction to the consumer.

While plotting an indifference curve, however, it is assumed that the consumer is able to give sufficient information and the goods are perfectly divisible, so that we have an infinite number of combinations of given goods (apples and bananas in our illustration) yielding the same level of satisfaction. Thus, by graphically plotting all such combinations and joining their locus of points, we derive an indifference curve. Such an indifference curve has been diagrammatically illustrated in Figure 4.2.



It represents all possible combinations of two goods under consideration (in this illustration, apples and bananas), that give the consumer equal satisfaction.

Fig. 4.1: The Indifference Curve

An indifference curve is the curve representing the various combinations of two goods (in consideration) yielding equal satisfaction to the consumer. Obviously, different points (*a, b, c, d, e*) on the indifference curve indicate different combinations of the two goods, but all these combinations are of equal significance to the consumer. So he is indifferent to them as he will be neither better off nor worse off in choosing any of these points. Thus, the consumer is indifferent to any point on a given indifference curve. Again, an indifference curve represents a particular level of satisfaction, but all points on it represent the same level of satisfaction. Thus, if we move downwards from one point to another on the given indifference curve, the level of satisfaction remains unchanged, though combinations between the two goods change. Alternatively, therefore, an indifference curve may be described as an equal satisfaction curve or utility curve.

Now, we may generalise our illustration of indifference curve of apples and bananas by using algebraic/symbolic notations for the two goods as *X* and *Y* in general. The reader can imagine any commodity for *X* and *Y* and proceed with the analysis.

4.1.3 Indifference Map

Following the above stated principle of equal satisfaction yielding combinations of two goods *X* and *Y,* we can form various indifference schedules of these goods with more quantities that can be purchased with the higher levels of income, and set out a complete schedule of scale of preference by putting indifference schedules in the order of their levels of significance. Accordingly, we can draw several indifference curves, each representing an indifference schedule. Hence, we can have a set or a group of such indifference curves called an "indifference map." This has been illustrated in Table 4.2 and Figure 4.2.

Table 4.2: Hypothetical Data for an Indifference Curve Map

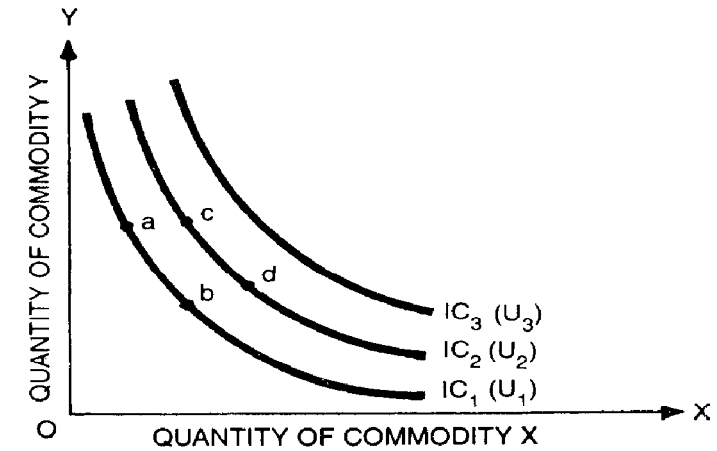
Combination of Goods (Units)					
I		*II*		*III*	
X	*Y*	*X*	*Y*	*X*	*Y*
1	10	2	15	3	20
2	6	4	10	5	14
3	3	6	6	7	10
4	1	8	3	9	7
Level of Significance		U_1 (IC_1) Third Order Preference	U_2 (IC_2) Second Order Preference	U_3 (IC_3) First Order Preference	

In Figure 4.2, the indifference curves IC_1, IC_2, and IC_3 represent different levels of satisfaction, namely U_1, U_2 and U_3 derived from the various combinations of two goods *x* and *y*. Remember U_1, U_2 and U_3 stand for the level of satisfaction which is comparable but not quantifiable. Thus, $U_3 > U_2 > U_1$. Apparently, a higher level of indifference curve represents a higher level of satisfaction.

By definition, all points on any one curve must represent the same level of satisfaction. Thus, combinations of points *a* and *b* yield the same level of satisfaction (U_1) on the curve IC_1. However, points *c*, and *d* yield equal satisfaction (U_2) at indifference curve IC_2. The consumer is, therefore, indifferent to both *a* and *b*. He is also indifferent to both *c* and *d*. But, he is not indifferent between *a* and *c*. He would prefer *c* to *a*, because *c* yields him a higher level of satisfaction than *a* ($U_2 > U_1$). As the consumer moves to the right from lower to the higher indifference curve, he derives more satisfaction because of the increased quantities of the two goods. It may be recalled here that the level of satisfaction or ordinal utility is the increasing function of the quantities of the goods under consideration.

Definition. An indifference map is a set of indifference curves.

An indifference map represents the scale of the preference of a consumer regarding various combinations of the given two goods. Since a higher indifference curve shows more satisfaction than a lower one, a consumer would prefer the higher one. Thus, IC_1 is assigned the first order preference, IC_2 the second and IC_3 is the third order one. Remember, the consumer assigns the order of preference to different indifference curves; between any points he has equal preference; so he is indifferent. Thus, an indifference map is just a pictograph of the consumer's choice and scale of preferences.



The consumer has a number of indifference curves such as IC_1, IC_2, IC_3, etc. Each of these represents a different level of satisfaction (labelled as U_1, U_2, U_3, etc.)

Fig. 4.2: An Indifference Map

4.1.4 Assumptions

Indifference curves are based on the following assumptions:

- A consumer is interested in buying two goods in combination.
- He is able to rank his preferences and give a complete ordering of the scale of preferences.
- Non-satiation, *i.e.,* the consumer always prefers more quantities of goods to lesser quantities.
- He is rational and his choices are transitive. That is to say, he is always consistent in his choice. That means, when he prefers combination *a* in the indifference map to combination *b*, and *b* to *c*, then he must also prefer *a* to *c*.

- There is ordinal measurement of utility. So the height of the indifference curve indicates the level of satisfaction without quantification.
- Continuity–Indifference curves are drawn as continuous curves by assuming infinitesimal amount of changes in the combination of two goods. This implies perfect divisibility of the goods under consideration.

4.2 Properties of Indifference Curve

Indifference curves have certain properties reflecting assumptions about consumer behaviour. Standard indifference curves generally exhibit three basic characteristics.

- Indifference curves slope downwards from left to right, *i.e.*, they are negatively sloped.
- They are convex to the origin.
- They cannot intersect each other.

4.2.1 Indifference Curves are Negatively Sloped

Indifference curves slope downwards from left to right, *i.e.,* negatively sloped, indicating that as the quantity of *X* increases in the set of combination of *x* and *y*, there should be a decrease in the amount of *y*, if the consumer is to remain at the same level of satisfaction (see Figure 4.3).

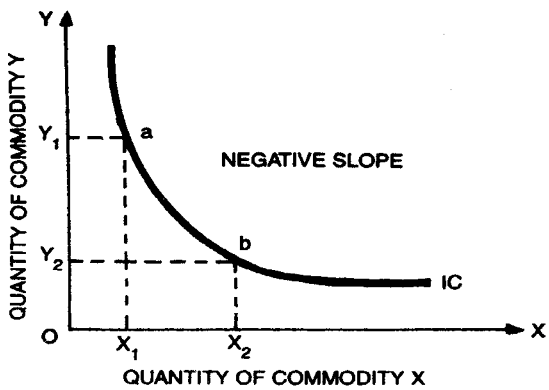
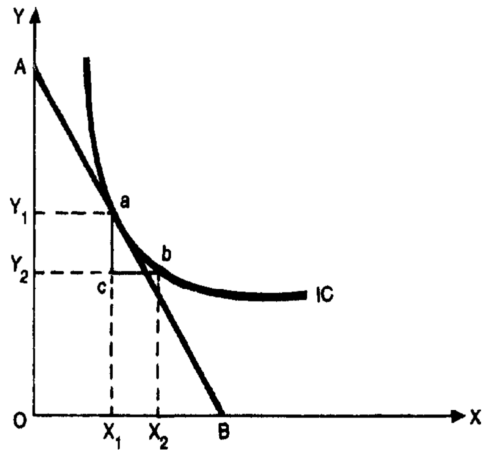


Fig. 4.3: The Negative Slope of an Indifference Curve

To measure the slope of an indifference curve at any point *a*, first draw a tangent to that point. Then measure the intercepts of the tangent on *X* and *Y* axes, as illustrated in Figure 4.4.



In Figure 4.4, *AB* is the tangent drawn at point *a*. Thus, the slope of *IC* = *OA/OB*. Between two points *a* and *b*, the slope is measured by the ratio $\Delta y/\Delta x$. Thus: y_1y_2/x_1x_2 or *ac/bc* also measures the slope.

Fig. 4.4: Measurement of Slope

In Figure 4.4, *AB* is the tangent drawn at point *a*. Thus, the slope of *IC* = *OA/OB*. Between two points *a* and *b*, the slope is measured by the ratio $\Delta y/\Delta x$. Thus: y_1y_2/x_1x_2 or *ac/bc* also measures the slope.

Thus, increase in satisfaction from *x* is compensated by the reduced satisfaction of *y*, thereby keeping the consumer's level of satisfaction (jointly experienced from these two goods) unchanged. This is true only when the indifference curve is negatively sloped.

On the crucial assumption that an indifference curve represents equal satisfaction combinations of two goods, possibilities of horizontal, vertical and upward sloping indifference curves (as in Figure 4.5) are basically ruled out. For such unusual indifference curves do not fulfil this crucial assumption of equal satisfaction in different combinations, so that a downward sloping indifference curve becomes mandatory.

In Figure 4.5, in panel (A), a horizontal indifference curve is drawn.

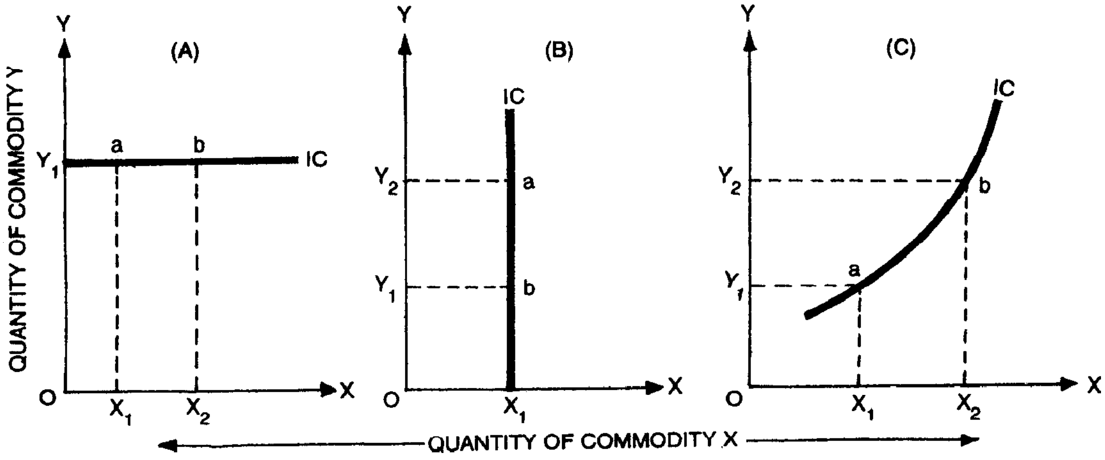


Fig. 4.5: Unusual Indifference Curve

It can be seen that an indifference curve cannot slope upward measuring a positive slope. For, this would mean that the consumer treats equal level of satisfaction in less as well as more quantities of the two goods. This is also absurd (see Figure 4.5 (C)). In Figure 4.5 (C), when we compare combinations of *X* and *Y* at point *a* and *b*, we find that the combination *b* includes large quantities of both *X* and *Y*. Obviously, when *b* will be preferred to *a*, consumer cannot be indifferent to *a* and *b*. Hence, the positive slope of indifference curve is also ruled out as it does not correspond to the definition of the indifference curve concept. We, therefore, conclude that all indifference curves must slope downward towards the X-axis.

4.2.2 Indifference Curves are Convex to the Origin

Not only is an indifference curve downward sloping, it is also convex to the origin. Convexity means that the curve is so bent that it is relatively steep towards the Y-axis and relatively flat towards the X-axis (see Figure 4.6).

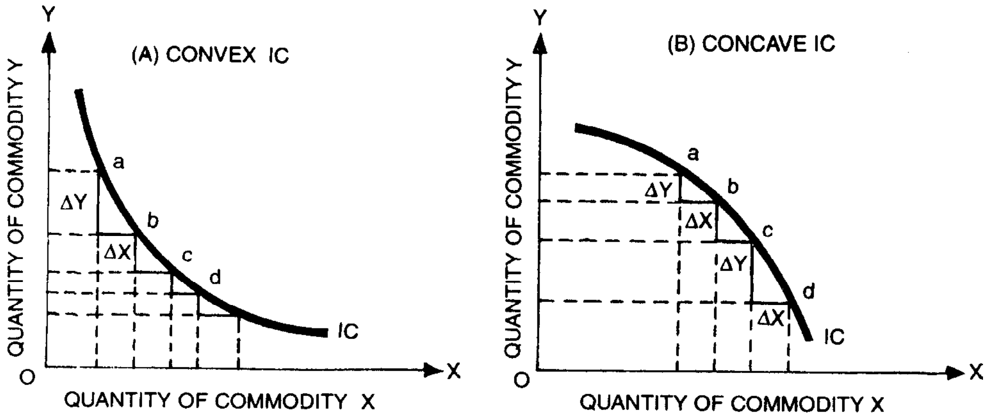


Fig. 4.6: The Indifference Curve

As in Figure 4.6 (A), an indifference curve is typically convex to the origin (orconcave upwards) like *IC* curve in panel (A). Convexity implies diminishing slope $\Delta y/\Delta x$ of the indifference curve. The slope of the indifference curve in economic sense measures the marginal rate of substitution (*MRS*). Thus, convexity illustrates the law of diminishing marginal rate of substitution.

Convexity of the indifference curve is logical because the consumer values a lesser and lesser significance of the extra unit of a commodity in a larger stock, and relatively a higher significance for the one which is a smaller stock. Thus, as we move on the indifference curve downwards, quantity of *X* becomes larger, while that of *Y* becomes smaller. Hence, to substitute *X* further for *Y*, each time the consumer will sacrifice a lesser and lesser amount of *Y* in exchange of *X*, in order to keep his level of satisfaction unchanged.

A concave indifference curve like *IC* curve in Figure 4.6 (B) is thus unrealistic for the reason given above. Because concavity implies an increasing slope of the indifference curve and an increasing marginal rate of substitution, it is unrealistic for rational consumer behaviour.

4.2.3 Indifference Curves can Never Intersect Each Other

Indifference curves can never intersect or cross each other. That means that there cannot be a common point between the two indifference curves. This is because each indifference curve represents a specific level of satisfaction, say, IC_2 representing U_1 level of satisfaction and IC_2 representing U_2 level of satisfaction in an indifference map as illustrated in Figure 4.7 (A).

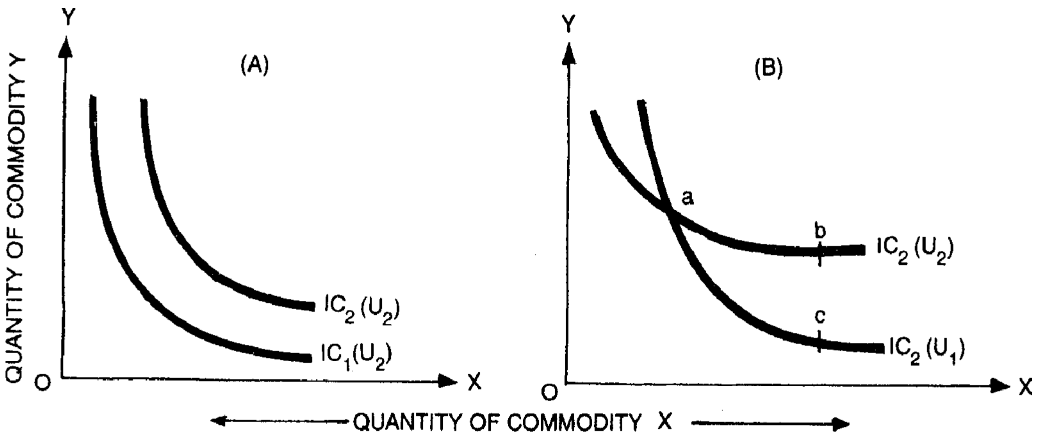


Fig. 4.7: Non-intersecting ICs and Intersecting ICs

Indifference curves are mathematically based on the assumption of transitivity in choice-making. Transitivity implies consistency in choice-making. Logically, it is assumed that a rational consumer would always prefer a larger quantity to a smaller one and this holds true in every situation.

If intersecting indifference curves are drawn, the assumption of transitivity, *i.e.,* consistency in choice-making is violated. It also involves a contradiction. Consider Fig. 4.7 panel (B).

In Figure 4.7 panel (B), IC_1 intersects IC_2 at point *a*. Now, from the indifference curves, we derive the following information:

- The consumer is indifferent between *a* and *c* because both points yield the same level of satisfaction U_1 corresponding to IC_1. Thus, $a = c$.
- The consumer is indifferent between *a* and *b* because these points yield the same level of satisfaction U_2 corresponding to IC_2. Thus, $a = b$.
- Since $a = c$ and $a = b$, it follows that $b = c$. Again, the fact that *a* is common to both the curves IC_1 and IC_2, proves that the level of satisfaction $U_2 = U_1$. This is irrational and unacceptable.

In short, if a consumer is rational and consistent in his choice (his preferences being transitive), there cannot be an intersection of indifference curves.

4.2.4 Additional Properties

In addition to the three basic properties, some writers have mentioned two more characteristics of an indifference map as follows:

- Though indifference curves cannot intersect each other, they need not be parallel. This is because there is no proportionality in the differences among the different levels of satisfaction indicated by each particular indifference curve.
- The indifference map represents an ordinal measurement of utility. Thus, a higher indifference curve represents a higher level of satisfaction of comparison with a lower indifference curves. But, there is no quantification. Again, a rational consumer prefers a point on a higher indifference curve to a point on a lower indifference curve. The distance between two indifference curves is immaterial. What is important is whether the indifference curve is the *higher* one or the *lower* one. The higher indifference curve is preferred against the lower one, because the higher indifference curve indicates a higher level of satisfaction.

4.3 The Marginal Rate of Substitution

The concept of marginal rate of substitution (MRS) or the law of diminishing marginal rate of substitution forms the core of the indifference curve analysis.

As has been seen earlier, the concept of MRS is associated with the convexity of indifference curves. The marginal rate of substitution refers to the rate of substituting one commodity (on marginal basis) for the other along an indifference curve.

Definition. The marginal rate of substitution of *X* for *Y* (*MRSxy*) refers to the amount of *Y* that must be given up per unit of *X* gained by the consumer to keep the level of satisfaction unchanged.

From an indifference curve, we can find out the marginal rate of substitution between two goods. Thus, the amount of *Y* the consumer is willing to forego in order to obtain an extra unit (the marginal unit) of *X*, with a view to remain on the same indifference curve, is technically called the marginal rate of substitution of *X* for *Y* (*MRSxy*). As in Figure 4.4, the negative slope of an indifference curve implies that in order to maintain the same level of satisfaction, the consumer gives up some units of a product (say *X*) in combination with an increase in the stock of another commodity (say *Y*). This rate of relative change between these two goods is the marginal rate of substitution. Apparently, the *MRS* measures the trade-off between two goods *x* and *y* along the indifference curve. The slope of the indifference curve measures the marginal rate of substitution.

Table 4.3: Measurement of Marginal Rate of Substitution

Commodity X	Commodity Y	$MRS = \Delta X/\Delta Y$
10	25	—
11	20	–5/1 = –5
12	16	–4/1 = –4
13	13	–3/1 = –3
14	11	–2/1 = –2

Thus, $MRSxy = \Delta y/\Delta x$, where $MRSxy$ = the marginal rate of substitution of *X* for *Y*, Δy = a small change in the quantity of *Y*, Δx = a small change in the quantity of *X*, $-\Delta y/\Delta x$ measures the slope of the difference curve which is negative, suggesting that if *X* increase, *Y* decreases and *vice versa.* The measurement of *MRS* is illustrated in Table 4.3. Also refer to Figure 4.6 (A).

As in Figure 4.6, the downward slope of the indifference curve measures *MRS*. But the indifference curve has convexity, which implies that the slope is not constant and it diminishes as we move downwards on the indifference curve. This suggests that the marginal rate of substitution of *X* and *Y* is diminishing progressively. In the indifference curve concept, thus, Hicks replaces the law of diminishing marginal utility by introducing the principle of diminishing marginal rate of substitution. The reason behind diminishing *MRSxy* is apparent.

As the consumer has an increase in the stock of commodity *X*, its marginal significance in terms of commodity *Y* tends to diminish. That is, *X* tends to become relatively less attractive than before. While the marginal significance of *Y* in terms of *X* tends to improve with a decrease in its stock, so it becomes relatively beneficial. As such, the consumer in order to remain on the same level of satisfaction is required to sacrifice or part with a lesser amount of *Y* for each additional unit of *X* acquired successively.

The principle of diminishing marginal rate of substitution is a definite improvement upon the Marshallian law of diminishing marginal utility. Unlike Marshall, Hicks does not assume the cardinal measurement of utility which is unrealistic and impracticable. The marginal rate of substitution is a measurable concept, as it is defined as the ratio of a small change in the quantity of a commodity (*Y*) to a small change in the quantity of another one (*X*).

i.e., $MRSxy = \Delta X/\Delta Y$

Thus, *MRSxy* is measured in terms of physical units of the goods.

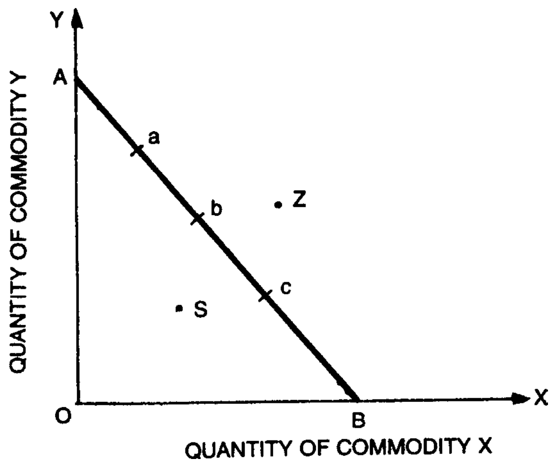
4.4 The Budget Constraint: The Price Line

What a consumer can actually buy depends on the income at his disposal and the prices of goods he wants to buy. Thus, income and prices are the two objective factors which form the budgetary constraint of the consumer. The consumption or purchase possibility of the consumer is restricted to the *budget constraint.* To illustrate the point, let us assume that a consumer has an income of ₹ 50 to be spent on two goods *X* and *Y*. The price of *X* is ₹ 5 per unit and the price of *Y* is ₹ 10 per unit. Then, his alternative spending possibilities can be assumed as under (see Table 4.4).

Table 4.4: Measurement of Marginal Rate of Substitution

	Units of Commodity Y	*Units of Commodity X*
A	5	0
	4	2
	3	4
	2	6
	1	8
B	0	10

It is clear that the consumer could spend his given income on any one of the alternative combinations of two goods *X* and *Y*. If he spends all his amount of ₹ 50 on *Y*, he will have 5 units of *Y* and none of *X*. Alternatively, he can have 10 units of *X* and none of *Y*. Or, he can allocate his entire income on two goods in different proportions and can have a combination as illustrated in Table 4.4. Now, assuming that *X* and *Y* are perfectly divisible, we can have an infinite number of possible purchase combinations of *X* and *Y* as represented diagrammatically in Figure 4.8. That is to say, the budget constraint may be illustrated by constructing a budget line, as in Figure 4.8.



The budget constraint or budget line shows all the possible combinations of two goods in consideration the consumer can by with his given income and prices of the goods. AB is such a price line or budget line in our illustration.

Fig. 4.8: The Budget Line (Price Line)

In Figure 4.8, point *A* denotes that if a consumer spends all his income on *Y*, he can buy *OA* of *Y* (in our numerical illustration, 5 units of *Y*). Similarly, point *B* denotes that *OB* of *X* can be bought by spending the entire given income on it (*i.e.*, 10 units of *X* in the illustration). By joining *A* and *B*, we derive the line *AB*, which is described as the price line or the budget line, representing various alternative purchase combinations. It exhausts all the opportunities of purchase in relation to a given income and prices of goods. So, it is called budget constraint. The consumer cannot have any point of combinations (like say, point *Z*), which is beyond the region of the budget line. This is because his income can buy only limited quantities of the goods. He can only select any point (like *a, b, c* etc.) and the relevant combination on the budget line, if he spends his entire income on these goods, *X* and *Y*. The budget line is also referred to as income line, because it represents the real income of the consumer. Any point (like point *S*) which is below the income line *AB,* indicates that the consumer does not spend his entire income on *X* and *Y*.

The budget line, in short, indicates all combinations of two goods (*X* and *Y*) for which total given money income is spent by the consumer.

4.4.1 Slope of Price Line

In a generalised form, in algebraic terms, the consumer's budget constraint can be expressed as under:

$$M = Px.Qx + Py.Qy$$

where, M = Consumer's given money income; Px = Price of X; Py = Price of Y; QX = Quantity of X; Qy = Quantity of Y

Assuming, $Qx = 0$, as at point A of the price line in Figure 4.8, we have:

$$M = Py.Qy$$

$$Qy = \frac{M}{Py}$$

Similarly, at point B of the price line,

$Qy = 0$

Hence, $M = Px.\ Qx$

$$Qx = \frac{M}{Px}$$

Graphically, $Qy = OA$ and $Qx = OB$. Now, the slope of price line is measured as: $\frac{OA}{OB_1}$

$$\frac{OA}{OB_1} = \frac{M / Py}{M / Px} = \frac{M}{Py} \times \frac{Px}{M} = \frac{Px}{Py}$$

Thus, slope of price line = $\frac{OA}{OB_1}$

The slope of the budget line $\frac{OA}{OB_1}$ represents the ratio of prices of two goods under consideration. Therefore, it is also referred to as the price line. Thus, in our illustration, the slope of price line AB represents $\frac{\text{Price of X}}{\text{Price of Y}}$ (*i.e.,* $\frac{Px}{Py}$ if we write P for the price).

Evidently, the slope and position of the budget line or price line depends on two factors:

- The money income of the consumer, and
- Prices of the two goods he wants to buy.

4.5 The Income Effect: Income Consumption Curve

A consumer's demand for goods changes when his income changes. Thus, in his demand behaviour, his reaction to changes in his income, in relation to the fixed prices of goods and his given scale of preference, is called the income effect.

In a formal sense, however, the income effect may be defined as the effect of changes in the money income on a consumer's equilibrium position in the purchases of a single good or a combination of goods, assuming that prices of goods and his taste remain constant.

> **Definition.** The income effect refers to the change in demand for a commodity resulting from a change in the income of the consumer, prices of goods being constant.

In terms of indifference curve techniques, changes in income can be interpreted through shift in the budget line. When the income rises, the budget line shifts towards its right, away from the origin. Similarly, when the income falls, the budget line shifts to its left, towards the origin. As the prices of goods *X* and *Y* are constant, the shift remains parallel (see Figure 4.9).

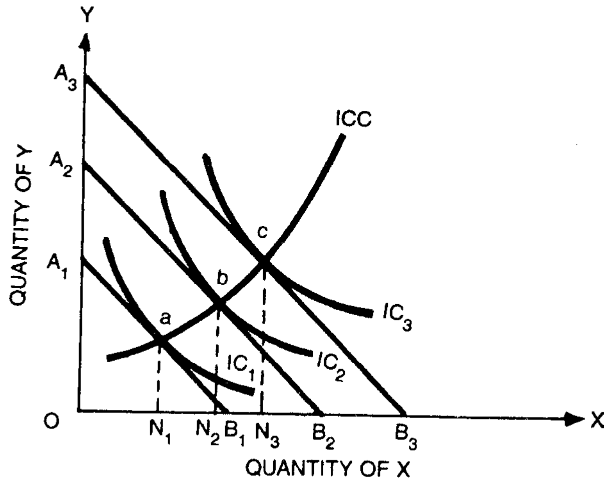
The income consumption curve shows how equilibrium positions and combinations of two goods (*X* and *Y*) change as income changes under conditions of a given scale of preference and fixed relative prices of goods.

In Figure 4.9, the budget lines are $A_1B_1 \,//\, A_2B_2 \,//\, A_3B_3$.

Their slopes are identical:

$$\frac{OA_1}{OB_1} = \frac{OA_2}{OB_2} = \frac{OA_3}{OA_3}$$

Indeed, for each level of income, the consumer will have an equilibrium position. Thus, when these income lines are superimposed on the customer's scale of preference, for each level of income there will be an indifference curve which is tangent to the relevant price line or budget line. Thus, in Fig. 4.9, we have tangency points, *a, b, c*, as the equilibrium points – assuming an indefinitely large number of possible equilibrium positions like *a, b, c,* etc., from which we may derive a curve called 'income consumption curve' (*ICC*).



ICC is income consumption curve. Its upward slope indicates positive income effect on both goods *X* and *Y*.

Fig. 4.9: Income Consumption Curve

Geometrically, an upward movement on the income consumption curve places the consumer on a higher and higher indifference curve, and a downward movement places him on a lower and lower indifference curve. Thus, through income effect, the consumer moves from one level of satisfaction to the other.

Table 4.5: Interpretation of Difference Slopes of ICC (Income consumption curve)

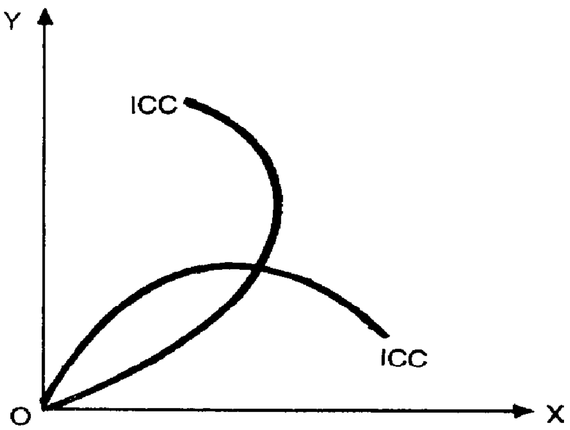
Slope of the ICC		*(i) Nature of Commodity and (ii) Kind of Income Effect*	
		X	*Y*
1. Positive (Upward-sloping curve)	(i) (ii)	Superior Positive	Superior Positive
2. Zero (Horizontal straight line)	(i) (ii)	Superior Positive	Neutral Zero
3. Infinite (Vertical straight line)	(i) (ii)	Neutral Zero	Superior Positive
4. Backward	(i) (ii)	Inferior Negative	Superior Positive
5. Downward	(i) (ii)	Superior Positive	Inferior Negative

Normally, the income consumption curve has an upward slope as in Figure 4.9. This implies a positive income effect for both the commodities, *X* and *Y*, *i.e.*, the positive income effect induces the consumer to buy more of both the goods.

In certain cases, however, there may be a negative income effect. A negative income effect implies that the consumer will tend to buy less of a commodity when his income increases above a certain level.

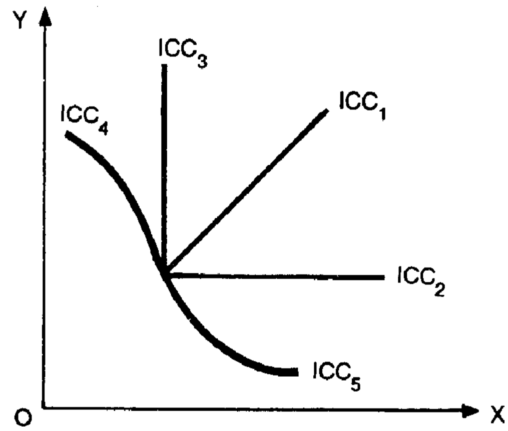
This happens in the case of inferior goods. Inferior goods refer to goods of a relatively cheap quality. In the Indian economy, inferior goods are numerous. For instance, plantains, guavas, vegetable ghee, pucca rice, *tota pairi* mangoes, maize, coarse cloth, etc., are comparatively inferior goods. These goods are common consumption items of the poor. As income rises, it may be reasonably assumed that people can afford to buy a greater and better variety of consumption goods, and less and less of these types of inferior goods will be demanded.

In the case of a negative income effect, the income consumption curve will have either a backward slope or a downward one (see Figure 4.9).



Backward slope *X* inferior commodity
Downward slope *Y* superior commodity

Fig. 4.10: Slopes of ICC



IC_3 indicate zero income effect in case of *X*
IC_2 indicate zero income effect in case of *Y*.

Fig. 4.11: Slopes of ICC

Of the two goods *X* and *Y*, if *X* is inferior and *Y* is relatively superior, then the income effect after a point will be negative in the case of *X,* so that less of *X* will be demanded with the rise in income. In that case, the income consumption curve has a backward slope (see Figure 4.11 ICC_4).

If, however, the income consumption curve has a downward slope (Figure 4.11, ICC_5), it implies a negative income effect on the purchase of commodity *Y* which is inferior as compared to *X*, which is relatively superior.

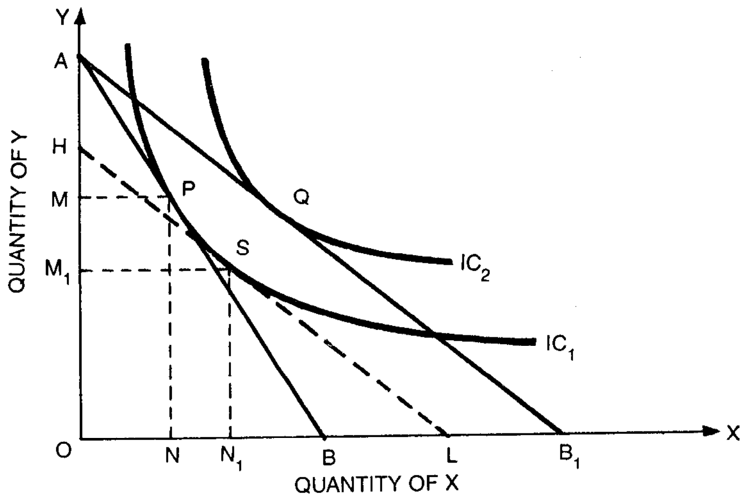
If, however, the *ICC* is a horizontal straight line (as in Fig. 4.11, ICC_2), then *X* will be superior, and *Y* neutral having zero income effect. Likewise, vertical slope of *ICC* (in Fig. 4.11, ICC_3) suggests that *X* is a neutral commodity having a zero income effect and *Y* is a superior one with a positive income effect.

4.6 The Substitution Effect

Whenever there is a change in the relative prices of goods, a rational consumer will be induced to substitute a relatively cheaper commodity for the dearer one. Such effect of the change in relative prices of goods is, thus, described as the substitution effect. Under the substitution effect, the consumer will tend to buy more of a good, the price of which has fallen and less of the good, the price of which has remained unchanged or has increased, as he would reallocate his expenditure in favour of the relatively cheaper good and substitute it for the dearer one.

The pure substitution effect is measured by rearranging the purchases made by the consumer as a result of change in the relative prices of goods, his real income remaining constant, in such a way that his level of satisfaction will remain as before. Hence, to measure pure substitution effect, we choose a model of a consumer with given money income and two goods *X* and *Y*, in which the price of *X* falls but that of *Y* remains unchanged. To measure pure substitution effect in this case, first, we will have to eliminate the change in his real income. It is obvious that as a result of a fall in the price of *X*, there is a rise in the real income of the consumer, as his given money income can now buy more than before. To eliminate the effect of a rise in income, an appropriate change in the consumer's money income must be effected so that his real income (purchasing power in terms of *X*) remains at the original level. We have, thus, to take away his surplus money income resulting from a fall in the price of *X*. When this is done, he will be neither better nor worse off than he was before.

This is called the *compensating variation in income.* Thus, the compensating variation in income may be defined as an appropriate change in the consumer's income which would just compensate for a change in the relative prices of goods so that the consumer is neither better nor worse off than he was before. In the indifference curve analysis, the compensating variation in income implies such adjustment in the income line which keeps the consumer on the same original indifference curve despite a change in the relative prices of two goods *X* and *Y*. Thus, the substitution effect can be defined as the change in the combination of the goods bought due to the change in their relative prices, despite the compensating variation in income. This means that inspite of the compensating variation in income, if the consumer increases his purchase of commodity *X* when its price falls, he can reallocate his income spending so as to produce a pure substitution effect. This is diagrammatically illustrated in Figure 4.12.



P to *S* movement on the same indifference curve measures substitution effect.

Fig. 4.12: Hick's Measurement of Substitution Effect

This means that now the consumer has rearranged his purchases due to the change in the relative prices of goods, after allowing for the compensating variation in income. The point *S* denotes that the consumer buys ON_1 of *X* and OM_1 of *Y*. He has substituted NN_1 of *X* for MM_1 of *Y*. This is pure substitution effect.

In Figure 4.12, the initial equilibrium position of the consumer is at point *X*, where the price line *AB* is tangent to IC_1. He buys *OM* of *Y* and *ON* of *X*. When the price of *X* falls, while that of *Y* remains unchanged, the price line will shift to AB_1. Because of the change in his real income, the consumer would then attain an equilibrium point on IC_2. To measure pure substitution effect, however, we have to resort to compensating variation in income. For this, a hypothetical income line *HL* is drawn, which is parallel to the new price line AB_1 and tangential to the original $1C_1$ so that the consumer is placed back on the ordinal level of satisfaction, maintaining the same real income as before. However, with respect to the *HL* price line, though the consumer is brought back on the same indifference curve IC_1, his equilibrium position has changed from *P* to *S*.

Graphically, thus, the substitution effect is measured by movement from one point to another point on the same indifference curve. Again, the substitution effect may be small or large, but it will always be positive. That is, a substitution effect always induces the consumer to buy more of the good when its price falls.

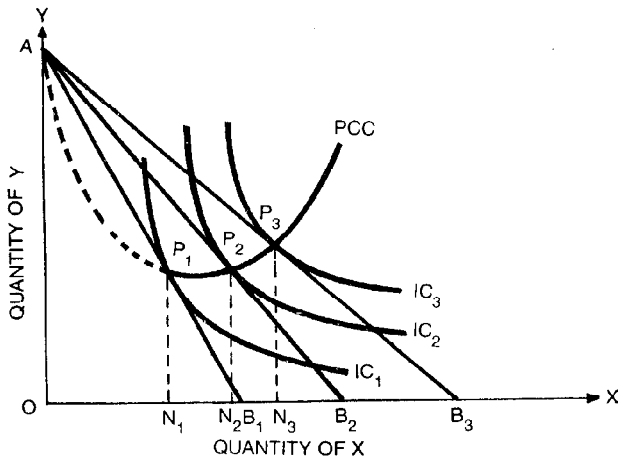
The analytical difference between substitution effect and income effect may be stated thus:

- Income effect is measured along the income consumption curve. The substitution effect is measured along the indifference curve.
- Under the income effect, the real income changes, so that the consumer moves from one indifference curve to another. By moving on the income consumption curve, while measuring pure substitution effect, the real income is kept constant through the method of compensating variation in income. The movement from one point to another on the same indifference curve measures substitution effect.
- The income effect may be positive or negative. The substitution effect is always positive.

4.7 The Price Effect: Price Consumption Curve

The consumer's reaction to a change in the price of a commodity (other things, that is, his money income, tastes and prices of other goods remaining constant) is called the price effect.

As per the law of demand, when the price of a commodity falls, more of it is demanded. In the indifference curve technique, the price effect is measured along the price consumption curve, as shown in Figure 4.13.



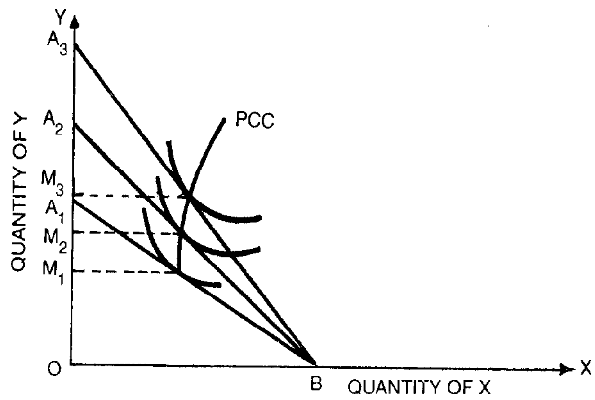
The price consumption curve depicts the price effect. In this figure, it shows the way in which the demand for *X* changes when its price changes. The movements on *PCC* from P_1 to P_2, P_3 indicates that when price of *X* falls more of *X* is purchased. Similarly, a reverse movement on the *PCC*, from P_3 to P_2, P_1 implies a rise in the price of *X* and condition in its demand.

Fig. 4.13: Price Consumption Curve

To draw the price consumption curve in Figure 4.13, we assume a successive fall in the price of commodity *X*, the price of *Y* remaining constant. Thus, there are changes in the ratio $\frac{Px}{Py}$. The ratio is decreasing. As such, the slope of the price line becomes progressively flatter. Hence, with every fall in the price of *X,* the price line tends to shift from AB_1 to AB_2 and to AB_3, etc. Assuming an unchanged scale of preference and given money income, it follows that now the consumer's equilibrium point will shift to P_1, P_2 and P_3, etc., where each new price line will become tangent to a higher indifference curve. At equilibrium point *P*, the consumer will buy *ON* of *X*, at P_2 he buys N_1N_2 more of *X* and at P_3 he buys additional quantity of N_2N_3.

By joining the loci of all such subsequent points of equilibrium like P_1, P_2 and at P_3, etc., (considering an indefinitely large number of possible equilibrium position), we derive a curve called the price consumption curve (*PCC*).

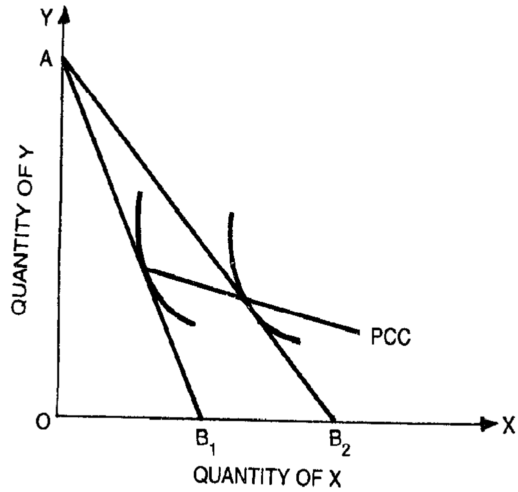
In the same way, we can draw a price consumption curve, showing the effect of a progressive fall in the price of *Y*, price of *X* remaining constant (see Figure 4.14).



The price consumption curve may have an upward slope. This indicates that when the price of *X* falls, the consumer's real income increases. This enables him to buy more of both the goods, *X* and *Y*.

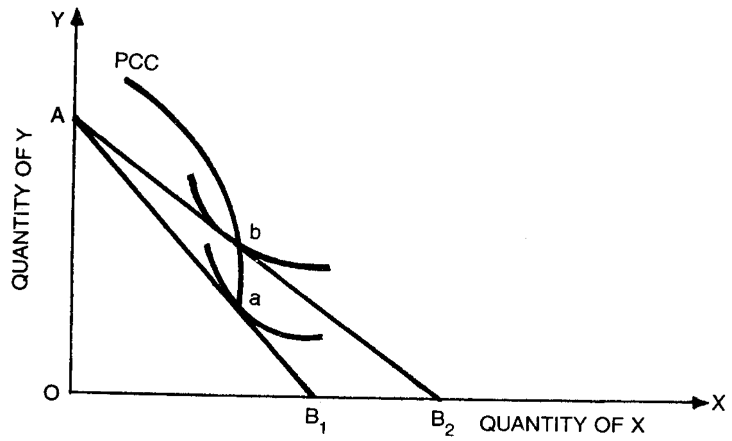
Fig. 4.14: Price Consumption Curve

Similarly, the *PCC* may slope backward as in Figure 4.14. This implies that *X* is a commodity having a negative price effect and *Y* is a commodity having a positive price effect.



The *PCC* slopes downward to the right. It suggests that with a fall in the price of *X*, more of *X* is bought, but less of *Y* is bought to attain a higher level of satisfaction when the real income rises. This means that *X* is a superior commodity having a positive price effect, and *Y* an inferior one having a negative price effect. The goods having a negative price effect are described as Giffen goods.

Fig. 4.15: Downward Sloping PCC

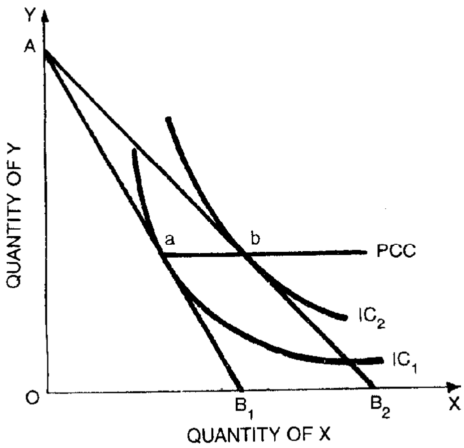


In this case, commodity *X* is a Giffen product having a negative price effect.

Fig. 4.16: Backward Sloping PCC

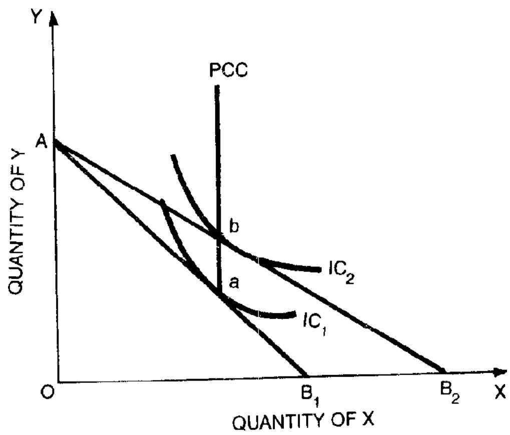
The PCC slopes downward to the right. It suggests that with a fall in the price of *X*, more of *X* is bought, but less of *Y* is bought to attain a higher level of satisfaction when the real income rises. This means that *X* is a superior commodity having a positive price effect, and *Y* inferior one having a negative price effect. The goods having a negative price effect are described as Giffen goods.

Again, *PCC* will be a horizontal straight line when *Y* is natural and *X* is superior commodity (see Figure 4.17). Similarly, when *X* is natural and *Y* is superior, *PCC* will be a vertical straight line (see Figure 4.18).



When *Y* is having zero price effect.

Fig. 4.17: Horizontal PCC



When *X* is a neutral commodity with zero price effect.

Fig. 4.18: Vertical PCC

4.8 Separation of Price Effect into Income Effect and Substitution Effect

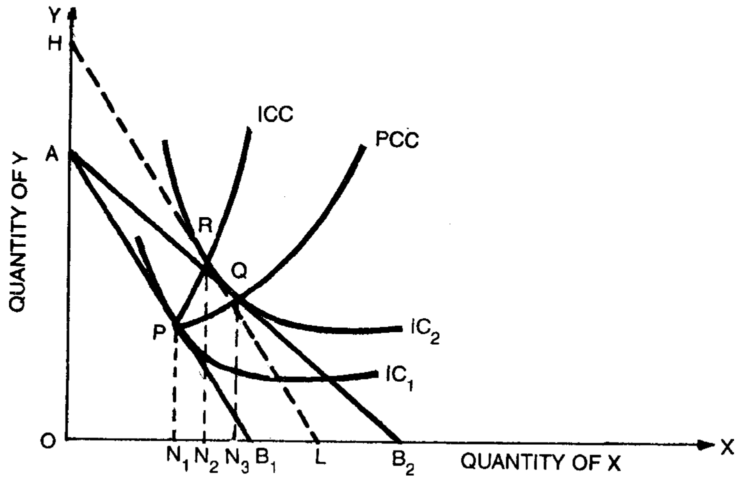
When the price of a commodity changes, the money income of consumer held constant, two separate and different forces are simultaneously altered to affect his demand behaviour:

- **The income effect.** The change in the real income or the purchasing power of consumer's money income either makes him better off or worse off.
- **The substitution effect.** When the price of a commodity falls, it becomes relatively cheaper, so the consumer is induced to buy more of it and when its price rises, the commodity become relatively dearer, so the consumer tends to buy less of it as he will replace it by buying more of other cheaper goods.

Evidently, the price effect can be interpreted as the sum of income effect plus substitution effect.

- *Price Effect (Pe) = Income Effect (Ie) + Substitution Effect (Se).*

The technique of indifference curves enables us to have analytical bifurcation and exact measurement of income effect and substitution effect resulting in a price effect. Graphically, income effect is measured along the income consumption curve which implies a movement from one indifference curve to the other, while the substitution effect is measured by a movement from one point to another on the same indifference curve. Thus, in Figure 4.19, the income substitution and effect a fall in the price of commodity *X* are depicted.



P to *R* on ICC measures positive income effect. *R* to *Q* measures substitution effect. *P* to *Q* on price consumption measures price effect.

Fig. 4.19: Normal Product

In Figure 4.19, AB_1 is the initial price line. Point *P* is the initial equilibrium point. The consumer buys ON_1 units of *X* and derives the level of satisfaction indicated by the indifference curve IC_1. However, when the price of *X* falls, the price of *Y* remaining constant, the new price line is AB_2. As such, the consumer attains a new equilibrium point *Q* placed on a higher indifference curve IC_2. He, thus, moves from *P* to *Q* on the price consumption curve *PCC*. The movement from *P* to *Q* measures the price effect. At point *Q*, the consumer buys ON_3 of *X*, thus the price effect is N_1N_3. However, the movement from *P* to *Q*, *i.e.*, price effect, is not straight. Actually, at first the consumer experiences income effect. With a fall in the price of *X*, his real income rises. This is shown by drawing a hypothetical line *(HL)* parallel to original price line *AB*, and tangential to the new indifference curve, IC_2 (*HL* // AB_1 because we express a change in real income measured in terms of constant *PX/PY*). Point *R* is thus obtained at the point of tangency and by joining point *R*, income consumption curve is derived.

Thus, on account of income effect, at first, the consumer moves from *P* to *R* on the income consumption curve *ICC*. He thus buys N_1N_2 more of *X*. This is measured as income effect.

The point *R* is, however, not a stable equilibrium point. Thus, the substitution effect induces the consumer to move farther from *R* to *Q*. Thus, the consumer moves downward on the same higher indifference curve. Since X has become relatively cheaper, the consumer feels that the marginal significance of X in terms of Y is now greater than its price in terms of Y. Hence, the consumer is induced to substitute X for Y until the marginal significance of X in terms of Y ultimately equals the price of X in terms of Y. As such, he moves along the new higher difference curve (IC_2) from R to X and buys N_2N_3 more of X.

In short, when the price of X falls, the consumer first moves from P to R along the *ICC*. The substitution effect induces him to move further from R to Q. The total effect is thus measured as P to Q on the *PCC*.

Our graphical measurement of the price effect being the sum total of income effect and substitution effect may be summarised as under:

$$Pe = Ie + Se$$

$$(N_1N_3 = N_1N_2 + N_2N_3)$$

Pe = Price effect

Ie = Income effect

Se = Substitution effect

That is, N_1N_2 increase in the demand for X is due to income effect, to this N_2N_3 demand is added by the substitution effect, so that the total price effect implies demand for X to expand by N_1N_3.

It may also be observed that the price consumption curve (*PCC*) reflects the combined influence of the income and substitution effects of the price change. Again, the price consumption curve lies between the income consumption curve and the indifference curve of the original equilibrium position. Its economic significance is that analytically, we first measure income effect and then consider the substitution effect.

It is usually found that both the income and substitution effects being positive in case of normal goods, the consumer will tend to buy more when their prices fall and *vice versa*.

4.9 Price Effect in Case of 'Inferior' Goods

Income effect tends to be negative in the case of inferior goods. Thus, when the real income of the consumer rises as a result of a fall in the price of a commodity, the negative income effect will induce him to buy less of this cheaper inferior good as he will prefer to buy superior goods instead which he can now afford. But, the price effect is the net effect of income and substitution effects combined together. The substitution effect is always there whether the commodity is superior or inferior. If the positive substitution effect is more powerful than the negative income effect, the resulting net price effect will be positive as the negative income effect is more than counter balanced by the strong substitution effect. To express it in symbolic terms:

When, *+ve Se > –ve Ie / Pe = Se + Ie = +ve* net effect. This has been illustrated in Figure 4.20.

In Fig. 4.20, AB_1 is the initial price line. *P* is the initial equilibrium point, indicating that ON_1 of *X* is bought. *X* being an inferior commodity, when its price falls, the real income of the consumer rises, but it carries a negative effect, so the consumer first moves from *P* to *R*, on the income consumption curve which is backward sloping. The *P* to *R* movement implies that he would buy less of *X* by N_1N_2. But, there is a stronger substitution effect which forces the consumer to move again from *R* to *Q*. The substitution effect causes the consumer to buy N_2N_3 of *X*.

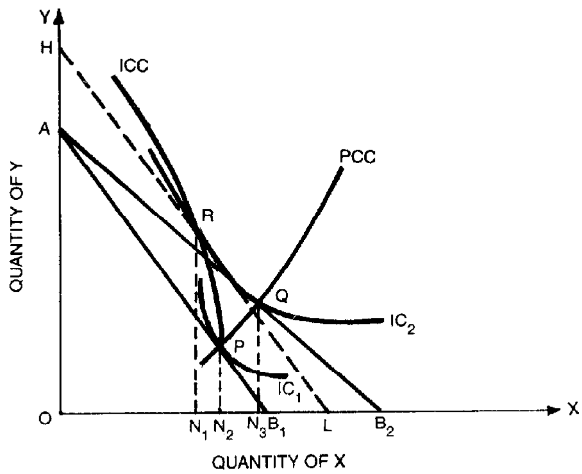


Fig. 4.20: The Giffen Paradox

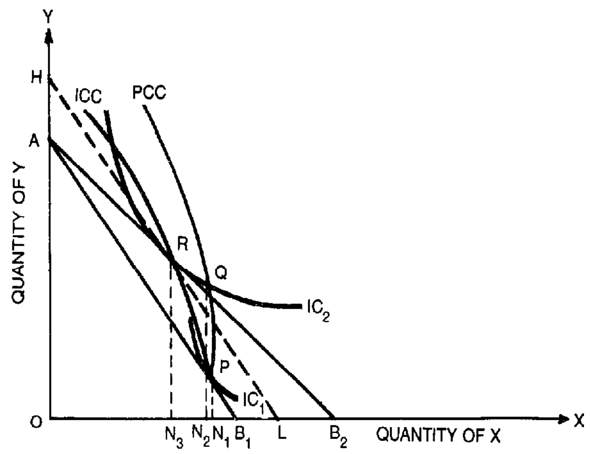
Thus: Net $Pe = Ie + Se$

$(N_1N_3 = (-N_1N_2) + (N_2N_3)$. Here, N_1N_3 is $+ve$ $(+N_2N_3) > (-N_1N_2)$

It follows that in the case of inferior goods, the price effect turns out to be positive, when income effect is negative but weak and the substitution effect is positive and strong. Graphically, therefore, the *ICC* curve has a backward slope, while the *PCC* curve has a positive slope.

4.10 Giffen's Paradox

There are a few goods called 'Giffen goods' for which the negative income effect caused by a fall in their prices is stronger and predominant while the substitution effect is positive but weak in force, so that the overall price effect tends to be negative. Thus, in the case of such typical inferior goods called 'Giffen goods', the consumer tends to buy less of them, after a point; even if their prices fall. This is a paradox of the law of demand which states that the more is bought, when the price falls. Hence, Giffen goods are exceptions to the law of demand. The demand behaviour of the consumer in respect of these typical inferior products is referred to as 'Giffen's Paradox.' In the nineteenth century, it was Sir Robert Giffen who pointed out the cases of typical inferior goods where demand contracts even with a fall in price. Giffen explained the paradoxical tendencies by citing an example of demand for bread — the cheapest need of the poorer class in England — and observed that when the price of bread was high, people consumed more of it as it was the cheapest food as compared to other expensive food items like meat, cake, etc. But when its price fell they would buy less of it, for they would like to spend the rise in their real income on a better and more varied diet. In order to honour Sir Giffen, such typical inferior commodities having a predominantly negative income effect are named as 'Giffen Goods.'



ICC ans *PCC* both slope backward. Thus, both income and price effects (*PR* and *PQ*) are negative. Substitution effect (*RQ*) is positive but weak.

Fig. 4.21: The Giffen Paradox

In Figure 4.21, commodity *X* represented on the X-axis is a Giffen product. When the price of *X* falls, the income effect forces the consumer to move along *ICC* curve. The backward sloping *ICC* implies negative income effect. The consumer's equilibrium position changes from *F* to *R*.

This means that he tends to reduce his purchase of commodity *X* by $N_1 N_3$. However, the substitution effect, which is positive, leads the consumer to move further from point *R* to *Q*. Thus, he is induced to buy more of *X* by N_3N_2 on account of substitution effect. But, N_3N_2 being lesser than N_1N_3, so the net price effect turns out to be negative, *i.e.*, $-N_1 N_2$. The observation may be summarised as under:

$$Pe = Ie + Se$$

$$(-N_1N_2) = (-N_1N_3) + (N_2N_3)$$

$(-N_1N_3) > (N_2N_3)$, N_1N_2 is negative.

The price effect in the case of a 'Giffen good' has been graphically illustrated as in Figure 4.21.

In the case of Giffen goods, a strong negative income effect outweighs the positive substitution effect, so that the net price effect is also negative. Graphically, therefore, both the income consumption curve (*ICC*) as well as the price consumption curve (*PCC*) slope backward when the goods are Giffen goods. This suggests that a consumer would buy less of such goods when its price falls. Of course, such Giffen goods are rare and are occasional exceptions to the law of demand.

Hicks in his book, *A Revision of Demand Theory,* mentions that the product is a Giffen product under the following conditions:

- The product must be typically inferior, so that it bears a strong negative income effect.
- To have a strong negative effect, the product must be a very important item in the consumer's budget. This is to say, a substantial part of total income is spent on such product. In practice, however, consumers do not spend a large part of their income on a commodity which they consider inferior. Most inferior goods have a significant negative income effect, while Giffen's Paradox requires a powerful negative income effect.
- The substitution effect is weak and insignificant.

To become a Giffen good, it should be an inferior good, but this is a necessary but not a sufficient condition. The income effect should also be greater than the substitution effect to ensure a Giffen product. Since these conditions are rarely found in real life, the Giffen's Paradox is a rare phenomenon.

4.11 Superiority of Indifference Curve Approach

The indifference curve approach is considered superior to the Marshallian utility analysis of consumer demand in the following respects:

- **It is more realistic.** Marshall assumes cardinal measurement of utility, which is unrealistic. The indifference curve technique, on the other hand, realistically makes an ordinal comparison of utility and the level of satisfaction.
- **It uses the concept of scale of preferences with lesser assumptions than the Marshallian concept of utility.** The scale of preference is laid down on the basis of a consumer's tastes and likings, independent of his income. Unlike Marshall, the Hicksian scale of preference needs no information as to how much satisfaction is gained, but it aims

only at knowing whether a consumer's satisfaction level is greater than, less than or equal to, between the various combinations of two goods.

- **It dispenses with the assumption of constant marginal utility of money.** The Marshallian analysis assumes that to the consumer the marginal utility of money remains constant. In the indifference curve analysis, such assumption is not needed.

- **It is wider in scope.** Marshallian demand theory deals with a single commodity taken exclusively. Hicks's ordinal approach, however, considers at least two goods in combination. Thus, the complementarity and substitutability aspects of goods are being explicitly considered in the Hicksian analysis.

- **It uses concept of MRS which is scientific and measurable.** The utility approach is based on the law of diminishing marginal utility. On the other hand, the indifference curve approach rests on the principle of diminishing marginal rate of substitution. The concept of marginal rate of substitution is superior to that of marginal utility because it considers two goods together and also because it is a ratio expressed in physical units of two goods and as such, it is practically measurable. As Hicks claims, the replacement of the law of diminishing marginal utility by the law of diminishing marginal rate of substitution is not a mere translation but it is a positive change in a more scientific manner.

- **It explains the conditions of consumer equilibrium in a better way**. In Marshall's analysis, the consumer equilibrium condition is:

$$\frac{MUx}{Px} = \frac{MUy}{Py}$$

Since utility cannot be measured numerically, this condition is impracticable.

In Hicksian analysis, the equilibrium condition is expressed as $MRSxy = \frac{Px}{Py}$.

This is a measurable phenomenon. Again, it is more comprehensive as it recognises the fact that equilibrium in purchasing one commodity depends on the price of other goods and their stocks as well.

- **It analyses the price effect in a better way.** The Marshallian demand curve has no means to dichotomise the price effect into income and substitution effects. In the indifference curve analysis, the price consumption curve enables us to have the bifurcation of price effect into income and substitution effects.
- **It examines the phenomenon of Giffen paradox.** Marshall views the Giffen Paradox as an exception to the law of demand, whereas the case of Giffen goods is incorporated in the price consumption curve to examine the consumer's typical behaviour caused by negative income effect. Thus, the unsolved riddle about Giffen goods in the utility analysis is solved by the indifference curve analysis. It represents the law of demand in a broader and more precise way.

4.12 Shortcomings of the Indifference Curve Approach

Many critics have observed several drawbacks in the indifference curve analysis as well. Its main shortcomings are as under:

- **It does not provide any positive change in the utility analysis.** Professor D.H. Robertson opines that the indifference curve analysis conveys nothing new about the theory of demand. It is just 'old wine in a new bottle.' It merely substitutes new concepts and equations in the old logic. For instance, in place of the concept of 'utility', it has introduced the term 'preference.' Again, in place of cardinal number system, it gives just ordinal number system to denote the scale of preference. Moreover, the concept of marginal utility is replaced by the marginal rate of substitution. All these ultimately amount to the same thing as what Marshall wanted to convey in his exposition of the law of demand. Above all, the concept of scale of preference introduced by Hicks is as subjective and unrealistic as the concept of utility itself. Thus, the indifference curve analysis has remained only an exercise of abstract thinking.
- **It retains the Marshallian assumption of diminishing marginal utility.** Again, the Hicksian principle of diminishing marginal rate of substitution is, in essence, based on the law of diminishing utility. That means, the law of diminishing marginal rate of substitution is as much determinate or indeterminate as the much criticised law of diminishing marginal

utility. Thus, strangely enough, Hicks has himself utilised Marshall's assumptions even after severely criticising them.

- **It unrealistically assumes perfect knowledge of utility with the consumer.** The indifference curve analysis assumes that the consumer has a perfect knowledge and capability of forming his scale of preference which is translated in terms of an indifference map. In actual practice, this is hardly possible. In fact, the consumer would make choices in particular situations, but he would not contemplate making choices and laying down scales of preference in an indefinitely large number of situations and determining indifferent positions.
- **It is weak in structure.** The indifference curve approach has a weak structure. It is based on the assumption of stability of consumer tastes and preferences. But if tastes and preferences change due to some influences like advertisements, propaganda, fashion, etc., the entire edifice of indifference map collapses, and the analysis becomes meaningless.
- **It has limited scope.** The indifference curve analysis has basic limitations of geometrical dimensions. Thus, it cannot be easily extended to more than two goods.
- **It is introspective.** It provides only a psychological explanation of consumer behaviour. It is not accessible to empirical tests. Again the functions involved in the indifference curve analysis are incapable of statistical verification.
- **It is not applicable to indivisible goods.** The indifference curve analysis may look absurd in the case of bulky goods which are not divisible, when we think of $^1/_3$ of TV set combined with $1^1/_2$ of refrigerators and so on.
- **It assumes transitivity condition.** Professor Armstrong points out that in drawing the indifference curve, Hicks assumes transitivity and continuity. Actually, indifference curves are non-transitive. An indifference curve is transitive if we see that the utility difference at different points of an indifference curve is not perceptible to the consumer. This may be true with very close points on an indifference curve.

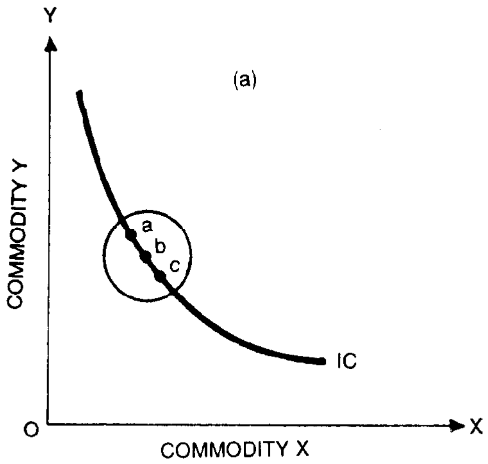


Fig. 4.22: Transitive IC

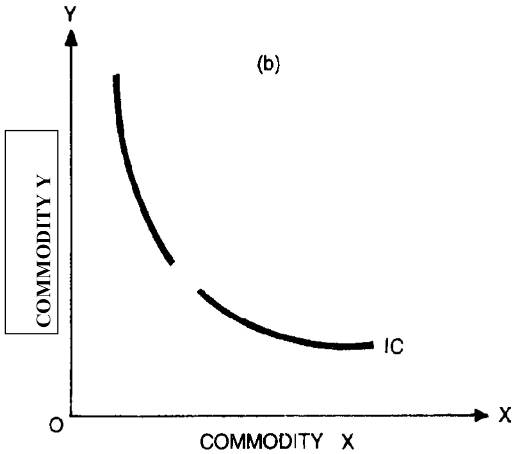


Fig. 4.23: Non-transitive IC

In Figure 4.22, *a = b, b = c*, *a = c* is visualised on the transitivity assumption. But, when the difference of utility is perceptible, *a* may not be equal to *c*. Thus, if we remove the assumption of transitivity, indifference curves will be discontinuous as shown in Fig. 4.23. With discontinuous indifference curve, it is very difficult to make a demand analysis as has been seen in the previous sections.

Despite these shortcomings of the indifference curve analysis, however, the fact remains that the technique of indifference curve has wide applications in economic analysis. It is widely used in modern welfare economics.

4.13 Summary

- J.R. Hicks systematically presented the indifference curve analysis in the theory of demand.
- Indifference curve: A graphic representation of various combinations of two goods, say X and Y, which is yielding equal satisfaction to the customer.
- Characteristics of an indifference curve: Negative slope, convexity, no intersection, need not be parallel, ordinal measurement of utility, level of satisfaction
- Definition of indifference curve: An indifference curve is the locus of points representing all the different combinations of two goods (say X and Y) which yield utility or satisfaction to the consumer.

Indifference curves have certain properties reflecting assumptions about consumer behaviour. Standard indifference curves generally exhibit three basic characteristics.

- Indifference curves slope downwards from left to right, *i.e.*, they are negatively sloped.
- They are convex to the origin.
- They cannot intersect each other.
- The marginal rate of substitution of X for Y (MRSxy) refers to the amount of Y that must be given up per unit of X gained by the consumer to keep the level of satisfaction unchanged.
- The budget line is the locus of points representing all the different combinations of the two goods that can be purchased by the consumer, given his money income and the prices of the two goods.
- Consumer equilibrium is attained when, given his budget constraint, the consumer reaches the highest possible point in the indifference curve.
- The income consumption curve (ICC) is the curve drawn through the equilibrium points corresponding to the shifting budget lines when a consumer's money income is altered, when the prices of goods are held constant. It is the curve measuring the income effect.
- The substitution effect is the change in the quantity demanded of a commodity resulting from a change in its price relative to the prices of other commodities, the consumer's real income or satisfaction level being held constant.
- The price effect is the change in quantity demanded of a commodity resulting from a change in its price, the consumer's income being held constant.
- The price consumption curve is the equilibrium point corresponding to the changing slope of price line due to changes in the relative prices of the two goods, the consumer's money income remaining constant.
- A Giffen good is a typically inferior good having a stronger negative effect than the positive substitution effect of a fall in price, inducing a reduction in the quantity demanded.
- Indivisible goods: Bulky goods

4.14 Key Words/Abbreviations

- **Indifference curve:** An indifference curve is the locus of points representing all the different combinations of two goods (say X and Y) which yield equal utility or satisfaction to the consumer.
- **Budget constraint:** income and prices are the two objective factors which form the budgetary constraint of the consumer
- **Consumer equilibrium:** Consumer equilibrium is attained when, given his budget constraint, the consumer reaches the highest possible point in the indifference curve
- **Giffen's paradox:** The demand behaviour of the consumer in respect of these typical inferior products is referred to as 'Giffen's Paradox

4.15 Learning Activity

1. Draw a indifference curve with your own example.

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2. Express the slope of price line in algebraic terms, the consumer's budget constraint.

4.16 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. Briefly explain ordinal measurement of utility.
2. Explain the indiffference curve.
3. Describe the properties of Indifference curve.
4. Explain consumer equilibrium by using indifference curve technique.
5. Explain income and substitution effect in terms of indifference curve.

6. Explain price consumption curve
7. Using indifference curve technique, demonstrate the composition of price effect constituted by income and substitution effect,
8. Explain Giffen Paradox through indifference curve analysis.
9. Indicate the superiority of indifference curve approach in comparison to Marshalling utility approach in demand theory.
10. What are the short-comings of indifference curve approach to theory of demand?
11. Explain consumer's equilibrium with utility approach when consumer is consuming one good.
12. Discuss the consumer equilibrium using indifference curve analysis.
13. Demonstrate unique characteristics of indifference curve.

B. Multiple Choice/Objective Type Questions

1. Who derived the indifference curve technique?

   (a) Marshall (b) Hicks

   (c) Pigon (d) Economist

2. Indifference curve technique represents

   (a) Ordinal measurement of utility (b) Cardinal measurement of utility

   (c) Concrete terminology (d) Numerical expression

3. Indifference curves are

   (a) Positively sloped (b) Negatively sloped

   (c) Horizontal (d) Vertical

4. Indifference curves are

   (a) Convex to the origin (b) Concave to the origin

   (c) Backward origin (d) Interesting

5. The concept of marginal rate of substitution is oriented with the

 (a) Convexity of indifference curve (b) Concavity of indifference curve

 (c) Budget of commission (d) Horizontal shape

6. Giffen goods are named to honour

 (a) Sir Robert Giffen (b) Hicks

 (c) Marshall (d) Robertson

Answers

1. (b), 2. (a), 3. (b), 4. (a), 5. (a), 6. (a)

4.17 References

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UNIT 5 PRODUCTION ANALYSIS

Structure:

5.0 Learning Objectives

After studying this unit, you will be able to:

- Explain what is production.
- Discuss what is meant by production functions.
- Differentiate between short run and long run production function.
- Explain Iso-quant analysis.
- Elaborate the production functions.

5.1 Introduction

Organising production of goods and services is an important managerial function. After ascertaining the nature of demand for goods and services, manufacturers arrange for producing them. Business managers keep their objective of maximum profits, while undertaking production of goods. In production, the business managers are involved in incurring expenditure in order to buy raw-material, fuel and power, pay wages to employees, etc. These expenditures are costs. After producing the products, they offer them for sale where they get revenue. The difference between the costs and revenues is the profit for the firm. The managers are required to keep the total cost of production within manageable limits. To do this, the managers try to produce optimum level of output and use the least cost combination of factors of production. Since the cost of production is an important determining factor in production, the managers try to find out a level of product in which the cost is minimum.

The purpose of understanding the costs is two fold; one is which helps to determine the price of the product manufactured in the factory. It provides a basis of decision making regarding the price to be fixed for the product. It also provides him an understanding whether to continue to produce the old product or to produce a new product. Cost analysis helps the managers to arrive at a correct decision. Secondly, this analysis helps him to control costs. They always attempt to keep the cost of production at the lowest level possible.

Production and cost analysis together determine the supply of the product to the market. Production is calculated in physical terms, while the costs are determined in financial terms. Production analysis shows the relationship between physical inputs of the factors of production and the output of the product and studies the least cost combination of factor inputs and returns to scale, while costs analysis deals with various types of costs and their role in decision making.

Meaning of Production

The term production is a very broad concept. It includes all those activities direclty or indirectly connected to production process.

Production in economic terms is generally understood as the transformation of inputs into outputs. The inputs are what the firm buys namely productive resources and outputs are (goods and services produced) which it sells. Production is not the creation of matter, but it is the creation of value. It means that it is the transformation of raw product into consumable product. Apart from physical transformation of matter, it includes services like buying and selling, transporting and financing. In our study, the term *production* is used to mean the production of products for which we require the services of various factors of production. The factors of production are generally known as land resources, labour, capital and entrepreneurship. These factors of production are termed as *inputs.* The firm buys inputs and sells outputs. Inputs are those things that firms buy to produce goods. Outputs are those produced goods. The theory of production centres round the concept of production function.

Production refers to the creation of value or wealth

5.2 Production Function

Production function is defined as the functional relationship between physical inputs (factors of production) and physical outputs (i.e the quantity of goods produced). As Stigler puts it, 'the production function is the name given to the relationship between the rates of input of productive services and the rate of output of the product. It is the economist's summary of technical knowledge.'

Thus, the production function expresses the technological relationship between the quantity of output and the quantities of inputs used in production.

More precisely, it can be stated that how maximum output is produced from a given input in the existing state technology. Like demand, production refers to a period of time. Accordingly, it refers to a flow of inputs resulting in a flow of outputs over a period of time leaving prices aside.

Production function depends on:

(i) quantities of resources (raw-materials, labourers, capital, machinery, etc.),

(ii) state of technology,

(iii) possible processes,

(iv) size of the firms,

(v) nature of firm's organization and

(vi) relative price of inputs and the manner in which the inputs are combined.

As these change, the production function also changes. Output can be increased by increasing the quantities of inputs used in production. Production function depicts the whole set of choices open to the producer. The adoption of new technology will also change the combination of inputs. These will materialize in the long period.

Since production function is the job of the technologist, he has to specify what quantity of inputs are to be used in order to produce a given output. A production function is expressed as under:

$Q = f(a, b, c, d............)$

where Q stands for output, a to d stand for input such as land, labour, capital and organisation and f stands for function.

The equation shows that a given quantity of output depends upon the quantities of inputs.

Every management has to make a choice of a production function, depending not only on industrial knowledge and the prices of various factors of production, but also on its own capacity to manage. The management has to select the various inputs and knit them together in economical combinations. These two choices are interlinked. The overriding consideration is to select a combination which gives him the minimum average cost and the maximum aggregate profit.

Definitions of Production Function

Different economists have defined production function in different manner. Few definitions are stated below.

Prof. Koutsoyiannis has defined as, "The production function is purely technical relation which connects factor inputs and output."

In the words of Prof. George J.Stigler, "Production function is the relationship between inputs of productive services per unit of time and outputs of product per unit of time."

According to Prof. L.R.Klein, "The production function is a technical or engineering relation between input and output. As long as the natural laws of technology remains unchanged, the production function remains unchanged."

In the words of Prof. Evans Douglas, "Production function is a technical specification of the relationship that exists between the inputs and the output in the production process."

According to McGuigan and Moyer, "A production function relates the maximum quantity of output that can be produced from given amounts of various inputs for a given technology."

Thus, from the above definitions, it is clear that production function shows the technical relation between the physical quantities of inputs and outputs produced out of it.

5.3 Types of Production Function

There are three types of production function:

(i) Fixed proportion and Variable proportion production function.

(ii) Short period and Long period production function.

(iii) Cobb-Douglas Production Function.

(i) Fixed proportion and Variable proportion production function: Types of production function may take several forms. One is the relation where quantities of inputs used are fixed. In this case of fixed proportions of production function, the factors of inputs are used in fixed proportion. For example, a fixed number of workers are employed to produce a given unit of output. This is the second type of production function, where the proportion of factor inputs are varied. The behaviour of production, when all factors are varied, is the subject matter of law of returns.

In order to produce a given amount of output, several factors of inputs have to be used. Suppose to produce 200 units of output, 10 workers are required, this amount of labour is fixed. If the management wants to increase the output to 400 units, then 20 workers will be employed. In this state of technology, there is no scope for substituting labour for other factors. This is the case of *Fixed Proportion Production Function* in which the proportion of labour and capital used are fixed. The fixed proportion production function can be shown in the following diagram.

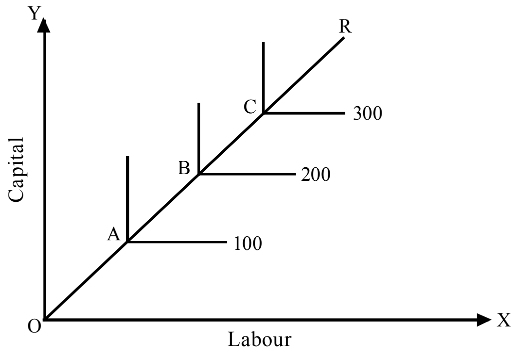

Fig. 5.1: Fixed Proportion Production Function

In this diagram, OR represents the fixed capital labour ratio and two units of capital and three units of labour produce 100 units of output. In order to produce 200 units of output, the factor units have to be doubled. In other words, four units of capital and six units of labour are required. A – B – C are isoquant curves. An *isoquant* is defined as the curve representing different combination of inputs which will yield a certain amount of output. In the above diagram, the isoquant is right angled.

If one input is substituted for another input to produce the same amount of output, then the isoquant curve moves from upwards to the downwards as shown in the following diagram. This is called as variable proportion production function.

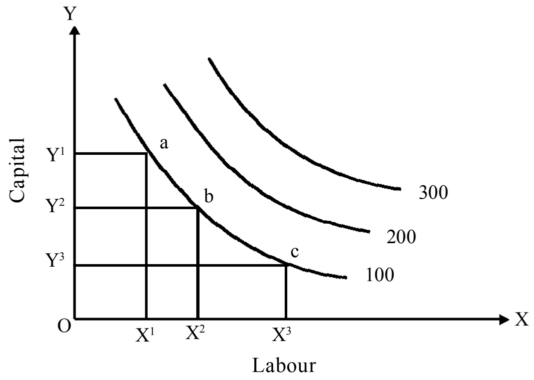

Fig. 5.2: Variable Proportion Production Function

In order to produce 100 units of output, either OY^1 and OX^1 or OX^3 or OY^3 combinations of inputs can be used. If the quantities of one input is decreased, the quantities of other inputs have to be increased, to produce a given output.

(ii) Short period and Long period production function: The production function differs between short period and long period. In the short period, one or more inputs are fixed. In order to produce more units of output, the management has to increase the variable factor. For example, machinery is fixed and labour input is variable. In this case, the quantity of machinery cannot be increased in the short period. Then the only possibility is to increase labour inputs. This is called variable proportion of production function. Diagram 5.2 refers to variable proportion of production function. In this case, the ratio in which the factor inputs are used is not fixed but it is variable.

In the long period, all factor inputs can be varied. In the long period, the management can choose between increasing production through the use of more labour or through plant expansion, depending upon which the combination of labour and plant size is more efficient in producing a given output.

(iii) Cobb-Douglas Production Function: Economists have examined several production functions and have used statistical analysis to measure the relation between changes in physical inputs and outputs. One such statistical production function is Cobb-Douglas Production function. In its original form, this concept was applied to the whole of manufacturing in U.S.A. In Cobb-Douglas production function, the output is goods produced by the manufacturing industries. The inputs are labour and capital. The Cobb-Douglas formula says that labour contributes about 75 per cent increase in manufacturing production, while capital contributes only 25 per cent. The formula is as follows:

$P = bL^{a}C^{1-a}$

Where P = Total output,

L = Index of employment of labour in manufacturing

C = Index of employment of capital in manufacturing

a and 1-a = exponents of elasticities of production

i.e., a and 1-a measure percentage response of output to percentage change in labour and capital respectively.

$P = 1.01\ L^{.75}\ C^{.25}, R^2 = 0.9499$

The production function shows 1 per cent change in labour, the capital remaining constant, is associated with 0.75 per cent change in output. Similarly, one per cent change in capital, labour remaining constant, is associated with a 0.25 per cent change in output. Returns to scale is associated with a 0.25 per cent change in output. R^2 means that 94 per cent of the variations on the dependent variable (P) were accounted for by the variations in independent variables (L and C).

According to Cobb-douglas production function Returns to scale are constant. That is, if factors of production are increased, each by 10 per cent, then the output also increase by 10 per cent.

5.4 Marginal Rate of Technical Substitution (MRTS)

The producers substitute are input in the place of other in the production process. The substituting of one input for another without changing the level of output is called as maginal rate of technical substitution. The scope of iso-quant curve is measured in terms of MRTS. The MRTS of factor x (labour) for a unit of factor y (capital) may be defined as the amount of factor y which can be substituted or replaced for a unit of factor x without changing the level of output.

Thus, in terms of inputs of capital (K) and labour (L)

$$\text{MRTS} = \frac{\Delta L}{\Delta K}$$

MRTS is similar to MRS *i.e.,* marginal rate of substitution in indifference curve analysis. MRTS dimnishes always.

ISO-Cost Curves

The management has to buy many kinds of labour, raw-material, machinery, etc. In order to buy them, the manager is expected to know the prices of the inputs. In other words, the manager has to know what it costs to produce a given output. He wants to minimize the cost of any output he produces. He is required to draw ISO cost curves. An ISO cost curve is a curve or line representing equal cost. An ISO cost line is so called because, it shows all combinations of inputs having equal total cost. The ISO cost lines are straight lines which means that the firm has no control over the prices of the inputs and the prices are the same irrespective of the units of inputs bought by the firm. Let us study the following diagram:

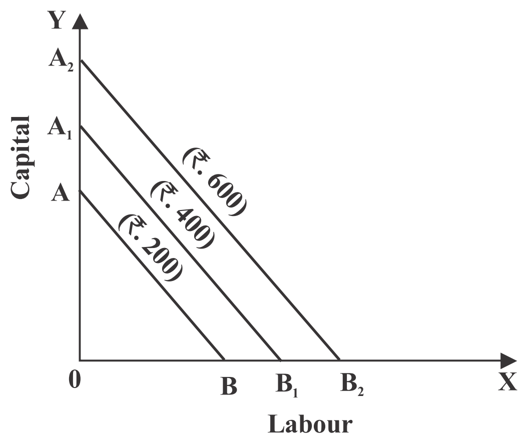

Fig. 5.3

The prices of factor inputs are given. Say, the price of factor X is ₹ 4 and that of factor Y is ₹ 5. With outlay of ₹ 200, we can buy 50 units of X or 40 units of Y. The straight line AB is the ISO cost line. If the outlay increases, then the ISO cost line moves upward. The ISO cost line will change if the prices of factors change. Outlay will be remaining the same.

Let us suppose the prices of inputs such as labour and machinery are fixed. One ISO cost curve represents the quantities of labour and machinery, which may be obtained at a fixed amount. For example ISO cost curve AB shows that quantities of X and Y inputs can be bought by ₹ 200. ISO cost curve A_1B_1 shows that quantities of X and Y can be bought by ₹ 400 and so on.

5.5 Equilibrium of the Firm or Producer's Equilibrium - Choice of Optimal Combination of Factors of Production ('Iso-quants')

A producer or a firm is said to be in equilibrium, when it is able to produce more (highest) output with the given outlay and given factors of production or inputs of production. A rational producer may attain equilibrium either by maximising output for a given cost or minimising cost subject to a given level of output.

In order to determine the producer's equilibrium, we should integrate an iso-quant map with an iso cost line. An iso-quant is the locus of all the combinations of two factors of production that yield the same level of output. Isoquant map refers a group of isoquants, each representing different levels of output. An isocost line represents various combinations of two inputs that may be purchased for a given amount of expenditure.

Maximisation of output for a given cost

A rational producer will always try to maximise his output for a given cost. This can be explained with the help of a diagram. Suppose the producer's cost outlay is C and the prices of capital and labour are 'i' and 'w' respectively. Subject to these cost conditions, the producer would attempt to attain the maximum output level.

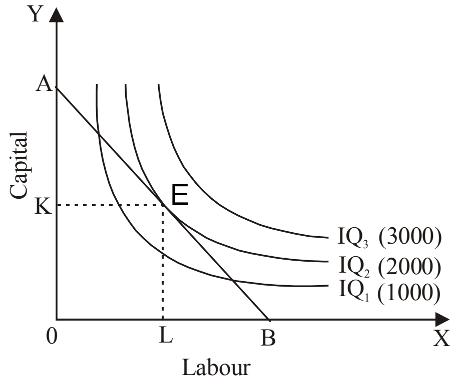

Fig. 5.4

Let AB (iso cost line) in the figure represent given cost outlay. IQ_1, IQ_2, IQ_3 are isoquants representing three different levels of output i.e 1,000, 2,000 and 3,000 units respectively. IQ_3 i.e, 3,000 units levels of output is not attainable because it is out of reach of the producer (the given cost outlay is only AB). In fact, any output level beyond isocost line AB is not attainable. Now the producers firm reaches the equilibrium position at E where the iso-cost-line is tangent to IQ_2. At this stage he employs OK amount of capital and OL of labour to produce 2,000 units of output. Though the points F and G also lie on the same isocost line, they lie on the lesser isoquant IQ_1. Since the aim of the producer is to maximize his output with the given cost outlay, he will prefer only point E and not any other point on the isocost line. Therefore, by using OK of capital and OL of labour, the producer reaches the highest level of production possible given the cost conditions.

Minimisation of Cost for a Given Level of Output

Alternatively, the producer or the firm may seek to minimize the cost of producing a given amount of output. In both the cases (maximization of output and minimization of cost) the condition of equilibrium remains the same. That is the marginal rate of technical substitution must be equal to the factor price ratio.

i.e $MRTS_{LK} = \frac{w}{i} = \frac{P_L}{P_K}$

w = wages (price for labour)

i = interest (price for capital)

P_L = price of labour

P_K = price of capital

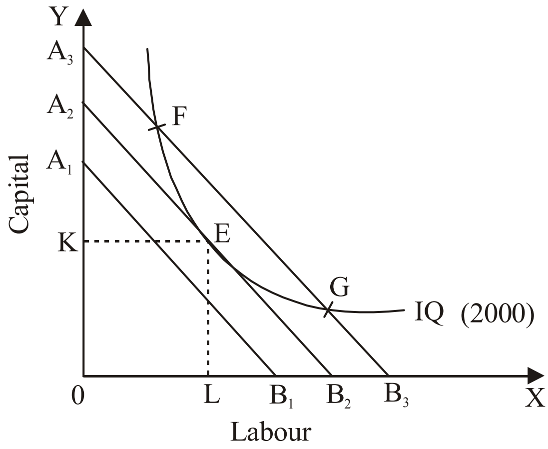

Fig. 5.5

Cost minimisation can be explained with the help of a diagram.

Here, we have one isoquant representing given level of output (i.e 2,000 units) and a set of isocost lines representing various levels of total cost outlay (A_1B_1, A_2B_2, A_3B_3). The isocost lines are parallel, and thus have the same scope because they have been drawn on the assumption of constant prices of factors.

The iso-cost line, AB is not relevant because the output level represented by the iso-quant IQ_2 (i.e 2,000 units) is not producible by any factor combination available on this iso-cost line. The same level of output can be produced by factor combination 'F' and 'G' on A_3B_3 isocost line. But he can also produce the same level of output at point 'E' (equilibrium) on A_2B_2 isocost line at a lower cost. Since the producer's aim is to minimize the cost, he will choose the point 'E' rather than 'F' and 'G' because these two points lie on the higher cost outlay. Therefore, the producer by employing OK of capital and OL of labour can reach the equilibrium 'E' by minimizing the cost for a stipulated output (2,000 units).

5.6 Expansion Path: (Choice of Optimal Expansion Path)

When the financial resources of a firm increases, it would like to increase its output. The output can be increased if there is no increase in the cost of the factors. In other words, the output produced by a firm increases with increase in its financial resources. By using different combinations of factors (inputs) a firm can produce different levels of output. Among these, the combination of factors which is optimum will be used by the firm and it is called as 'Expansion path'. It is also called as 'scale-line'. According to Stonier and Hague "Expansion path is that line which reflects least cost method of producing different levels of output."

Expansion path can be explained with the help of a diagram.

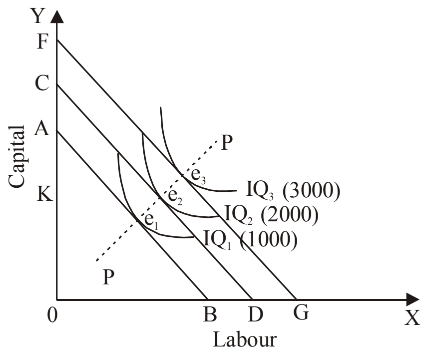

Fig. 5.6

Units of labour employed is measured along the X axis and capital employed is measured along the Y axis. The first iso-cost line of the firm is AB. It is tangent to IQ at point e, which is the initial equilibrium of the firm. Supposing the price per unit of labour and capital remains unchanged and the financial resources of the firm increases, the firm's new iso-cost line shifts to right as CD. In this situation new iso-cost line CD will be parallel to the initial iso-cost line AB and tangent to IQ_2 at point e_2 which will be the new equilibrium point now. If the financial resources of the firm further increases, but the price of the factors remaining the same, the new iso-cost line will be FG. It will be tangent to the iso-quant IQ_3 at point e_3 which will be the new equilibrium point of the firm. By joining all the equilibrium points we get a line (PP) called scale-line or expansion path. It is called so because a firm expands its output or scale of production in conformity with this line.

Cost Minimisation

The firm wants to produce any amount of output at the least cost. This is obtained by the point of tangency of the isoquant to an ISO cost line. In other words, minimum costs mean that isoquants are tangents to ISO cost lines.

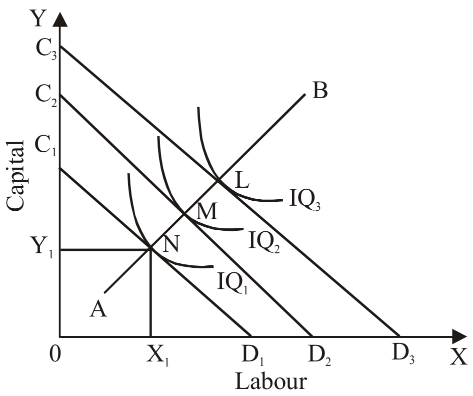

Fig. 5.7

In the above diagram, the maximum output is obtained at a point of tangency between isoquant and ISO cost lines. N, M, L are the points of tangency. The firm expands output along the line D. At the point of N output, the firm buys OX^1 and OY^1 inputs. This is the optimal combination of inputs. At this point, the marginal rate of substitution between inputs is equal to the ratio between the prices of the inputs. The minimum cost is represented by the point of tangency between the isoquant and ISO cost line.

5.7 The Law of Variable Proportions

The law of variable proportions occupies an important place in businsss economics, for it examines the production function with one variable input, keeping the quantities of other inputs fixed. It refers to input-output relation, when the output is increased by increasing the quantity of one input. When the quantities of one input is varied, keeping the other inputs constant, the proportion between the fixed factor and the variable factor is altered. When the combination of inputs are thus altered, the resulting output also changes. The effect of output of variations in factor proportions is called the *law of variable proportions.* The law examines the production function with one factor input variable, while other factor inputs remain unchanged. The law of variable proportions is defined as follows, 'As the quantity of one input is increased, keeping the quantity of other inputs fixed, the output increase in the beginning and afterwards decreases.' Alfred Marshal defined it as 'An increase in labour and capital applied in the cultivation of land causes in general a less than proportionate increase in the amount of produce raised unless it happens to coincide with an improvement in the arts of agriculture.'

Samuelson defined it as 'An increase in some inputs relative to other fixed inputs will, in a given state of technology, cause output to increase; but after a point, the extra output resulting from the same additions of extra inputs will become less and less.'

Assumptions of the Law of Variable Proportions: The law of variable proportion refers to the behaviour of the output as the quantity of one factor is increased, keeping the quantity of other factors fixed and further, it states that the marginal product and the average product will eventually decline. The law of variable proportions as stated above holds good under the following conditions:

(i) The state of technology of production remains unchanged. If there is an improvement in the technology of production, the marginal and average product may increase instead of diminishing.

(ii) Some inputs are kept fixed during the process of production. It is only in this way that factor proportions are altered to know its effect on output. The law does not apply if all factor inputs are proportionately varied.

(iii) The law is based on the possibility of varying the proportions in which various factors can be combined to produce a product. This law does not apply to cases where the factor inputs have to be used in fixed proportions to yield a product.

No. of Workers (Ws)	*Output (Q)*	*Average Product Q/N*	*Marginal Product ΔQ*	*Stages*
1 2 3	8 17 27	8 8.5 9	8 9 10	Increasing Returns - I
4 5 6 7	36 43 48 48	9 8.6 8 6.8	9 7 5 0	Decreasing Returns - II
8	46	5.7	−2	Negative Returns - III

Illustration of the Law

The production function can be expressed in the form of the schedule. In the following illustration, the amount of capital equipment employed is fixed and only the labour input is varied.

From the total output, average and marginal output can be derived. Marginal product is the addition to total product which can be produced by addition of more units of the variable input. Average output is the ratio of total output to the amount of the variable input. The behaviour of the total average and marginal output is shown in the diagram below:

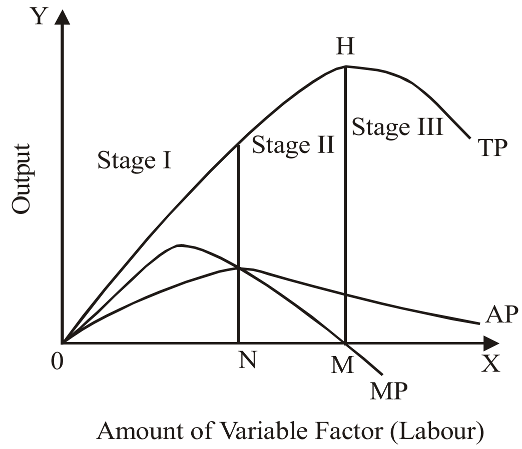

Fig. 5.8

The behaviour of total product, average product and marginal product curves is shown in the above diagram.

Increasing Returns Stage

In the stage I, total product increases at an increasing rate. Two men produce more than twice as much as one man. In this stage, both marginal product (MP) and average product (AP) are rising. Because MP is greater than AP, MP pulls up the average product. The boundary line of the I stage is reached when average product and marginal product are equal. This takes place at the point N in the diagram. The first stage is known as the stage of increasing returns, because the average product of the variable factor is increasing the throughout this period. It may be seen that the marginal product also is rising but later, it starts declining.

Decreasing Returns Stage

In the stage II, the total product continues to increase, but at a diminishing rate. When the marginal product is zero, the total product is the maximum. In this stage, both AP and MP are declining. MP being below the average product, pulls the average product down. At the end of the second stage at the point M, the marginal product to the variable factor inputs becomes zero, while the total point reaches the highest point. This stage is called the stage of diminishing returns as both the average and marginal products of the variable factor continuously fall.

Negative Returns Stage

In the stage III, total product declines and therefore the total product curve slopes downward. As a result, the marginal product is negative and the MP curve goes below OX axis. The average product decreases still further. It shows that the variable factor is too much to mixed factor. This stage is called the stage for negative returns.

It may be noted that stage I and III are completely symmetrical. In the stage I, fixed factor is too much relative to the variable factor. In this stage marginal product of the fixed factor is negative. On the other hand, in the stage III, variable factor is too much relative to the fixed factor. Therefore, marginal product of the variable factor is negative.

The Stage of Operation: The question is which stage of operation is rational to production. A rational producer will not choose to produce in the stage III. At the end of stage II at the point M, the marginal product and thus will be making the maximum use of the variable factor. In the stage I, the producer will not be making maximum use of fixed factor and he will not be utilizing fully the opportunities of increasing production by increasing the quantity of variable product, whose average product continues to rise throughout the stage I. Thus, a rational producer will not stop in the stage I, but will expand further. At the point N, the marginal product to the variable factor is the maximum and at the end point N of the stage I, he will be making maximum use of the fixed factor. So long as the average product, marginal product and total product are rising, the entrepreneur will not stop producing. Therefore, he goes to stage II, where both marginal product and the average product of the variable factor are diminishing. The stage II represents the range of rational production decisions.

5.8 The Laws of Returns to Scale

The laws of production describe the technically possible ways of increasing the level of production. These show how the output can be increased by changing the quantities of factor inputs. In the short run, only one factor can be altered, keeping the other factor unchanged. It is because, in the short period, fixed factors like machinery, cannot be altered. But it is possible to alter the fixed factors in the long period. The laws of returns to scale refer to long run analysis of production.

The laws of returns to scale are entirely different from the laws of variable proportion. In the laws of returns to scale, all productive factors or inputs are increased or decreased in the same proportion simultaneously. In returns to scale, we analyses the effect of doubling or trebling, quadrupling and so on of all inputs on the output of the product. The study of changes in the output as a consequence of changes in the scale, forms the subject matter of 'Returns to Scale'.

The Three Phases of Returns to Scale: Producers who have not studied economic analysis think that output can be doubled by doubling all the inputs or treble the output by trebling all the productive inputs. But actually, this is not so. In other words, actually the output or returns do not increase/decrease strictly according to the change in the scale.

If the increase in output is proportional to increase in the quantities of input, returns to scale are said to be constant. It means that a doubling of inputs causes a doubling of output. If the increase in output is more than proportional, returns to scale are increasing and if the increase in output is less than proportional, returns to scale are diminishing.

Returns to Scale

Sl.No.	*Scale of Inputs*	*Total Product*	*Marginal Product or Returns*	*Stage*
1	1 Worker + 3 acres of land	2	2	Increasing Returns - I
2	2 Workers + 6 acres of land	5	3	
3	3 Workers + 9 acres of land	9	4	
4	4 Worker + 12 acres	14	5	
5	5 Worker + 15 acres	19	5	Constant Returns - II
6	6 Worker + 18 acres	24	5	
7	7 Worker + 21 acres	28	4	Diminishing Returns - III
8	8 Worker + 24 acres	31	3	
9	9 Worker + 27 acres	33	2	

Let us take up an illustration:

In the table, it can be seen that as all the factor inputs are together increased to the same extent, the marginal product or returns increases first up to a point, then constant for some further increase in the scale and ultimately starts declining. At the scale of 1 workers + 30 acres of land, the total product is 2 quintals. To increase the output, the scale is doubled, the total increases to more than double (5 quintals instead of 2 quintals). When the output is trebled, the total output increases to 9 quintals, the increase this time being 4 quintals instead of 3 quintals. In other words, the return to scale is increasing. If the scale of production is further increased, the marginal product remains constant up to a certain point and beyond it, it starts diminishing. This is illustrated in the following diagram.

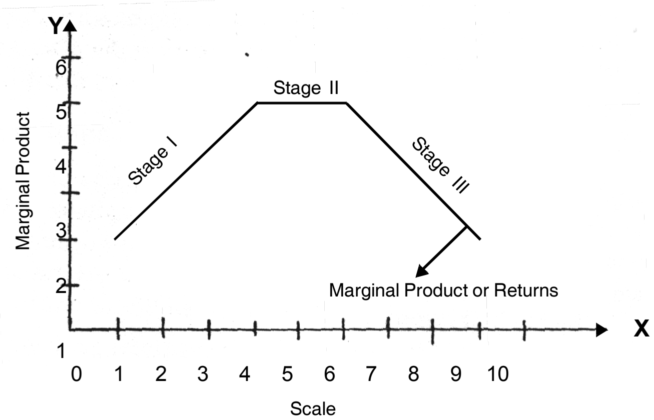

Fig. 5.9

Increasing Returns to Scale: Increasing returns to scale means that output increases in a great proportion than the increase in inputs. If, for example, all inputs are increased by 25 per cent, the output increases by 40 per cent, then the increasing returns to scale is prevailing. When the firm is expanding, increasing returns to scale are obtained in the beginning. One chief reason for this increase is the effect of technical and managerial indivisibility. Indivisibility means that equipment is available only in minimum sizes and the firm has to start producing from the minimum size of equipment. In the beginning, the firm will not be in a position to use the equipment to its optimum capacity. In other words, the equipments are under-utilised in the beginning. When the scale of operations are increased, they are put into maximum use and hence the output or return increases more than proportionately.

Another cause for increasing lies in dimensional relations. Prof.Baumol gives an interesting example. A wooden box 3 ft cube contains 9 times greater wood than the wooden box of 1 ft. cube, i.e., 3 ft cube wooden box is 27 times greater than that of 1 ft cube. In the same way, if the diameter of a pipe is doubled, the flow through it is more than double.

Lastly increasing returns to scale comes from higher degree of specialisation.

Constant Returns to Scale: If the scale of inputs are increased in a given proportion and the output increases in the same proportion, returns to scale are said to be constant, i.e., doubling of all inputs, doubles the output. In mathematics, the case of constant returns to scale is called linear and homogeneous production function or homogeneous production function of the first degree. In some industries, expansion of output produces no net economies and the cost of production remains the same. Such industries are said to be governed by the law of constant returns.

Diminishing Returns to Scale: When the output increases in smaller proportion than the increase in all inputs, decreasing returns to scale is said to prevail. When a firm goes on expanding by increasing all its inputs, then eventually diminishing returns to scale occurs. Economists give different causes for diminishing returns. Some economists view that the entrepreneur is one fixed factor, while all other inputs are variable factors. But the entrepreneur factor cannot be increased. On this view, they say that the law of diminishing returns is the special case of the law of variable proportions. In this case, they say that we get diminishing returns beyond a point, because varying quantities of all other inputs are combined with the entrepreneur as a fixed factor. Other economists do not subscribe to this view, but they say that diminishing returns to scale occur because of increasing difficulties of management, coordination and control. When the firm becomes gigantic, it is difficult to manage it with the same efficiency as before.

5.9 Summary

1. Production refers to transformation of inputs into outputs.
2. The production function expresses the technological relationship between the quantity of output and the quantities of inputs used in production.
3. An Iso-cost curve is a curve or line representing equal cost i.e., it shows all combinations of inputs having equal cost.
4. An iso-quant is the locus of all the combinations of two factors of production that yield the same level of output.
5. Expansion path is that line which reflects least cost method of producing different levels of output.

6. A producer may maximize his output for a given cost or minimize the cost for a given level of output.
7. Law of variable proportions states that, an increase in some inputs relative to other fixed inputs will, in a given state of technology, cause output to increase; but after a point, the extra output resulting from the some additions of extra inputs will become less and less.

5.10 Key Words/Abbreviations

- **Production function:** The experience of technological relationship between the quantity of output and the amount of inputs used in production.
- **Iso-product curve:** representing the different combinations of inputs yielding the same level of output.
- **MRST (Marginal Rate of Technical Substitution):** Expressing the substitution of one input of a factor in price of another, technically producing the same level of output.

5.11 Learning Activity

1. If short run production function is

   $Q = 30L + 4L^2 - 0.6L^3$

   Where Q = Quantity or output per week

   Where L = Number of workers

   Examine average and marginal productivity when 8 workers are employed

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2. Draw a diagram to show a firm's average product, marginal product and total product curve in the short period? How do these curves illustrate the application of the law of variable proportions to the firm.

5.12 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. What is production function?
2. In what way production function is different from cost function?
3. What is an iso-quant-curve?
4. What is iso-cost-curve?
5. What is meant by iso-product curves?
6. Brielfy explain the production functions.
7. Explain the law of variable proportions.
8. Write a note on the law of increasing returns.
9. Discuss the law of variable proprtions with the help of a suitable illustration.
10. Explain the least cost combination principle.
11. Formulate the law of returns to a scale with a hypothetical production schedule.
12. Explain the causes of increasing returns to scale on business.
13. Enlighten Law of Variable Proportion in Detail.

B. Multiple Choice/Objective Type Questions

1. Production refers to
   (a) Transformation of inputs into outputs
   (b) Transformation of labour into capital
   (c) Transformation of capital into profit
   (d) All of the above

2. In short run production function, one or more inputs are

   (a) Increasing (b) Variable

   (c) Constant (d) Fixed

3. An iso-quant is also called

   (a) Variable product curve (b) Equal product curve

   (c) Horizontal contribution curve (d) None of the above

4. Iso-quant are

   (a) Convex to the origin (b) Intersectiong curves

   (c) Vertical curves (d) None of the above

5. Knowledge of production function helps the manager in deciding

   (a) Wages (b) Marshal's

   (c) Production planning (d) Bank loans

Answers

1. (a), 2. (d), 3. (b), 4. (a), 5. (c)

5.13 References

1. sites.google.com/site/economicsbasics/production-analysis

2. www.investopedia.com/terms/m/marginal-rate-technical-substitut

UNIT 6 THEORY OF COST AND REVENUE ANALYSIS

Structure:

6.0 Learning Objectives

After studying this unit, you will be able to:

- Discuss the reasons for entering international markets.
- Explain different modes of entering international markets.
- Analysis of pros and cons of each mode.
- Decide the appropriate mode for an MNC.
- Analyse the functional alliances.

6.1 Introduction

Cost analysis has a key role to play in business economics as every business decision virtually involves a comparison between costs and returns.

To secure a regular supply of these factor units, a firm must compensate the factor owners in the form of payment of rent, wages, interest and profits. From the factor owners' point of view, rent, wages, interest and profit are incomes but to the firms they are costs. The volume of output that a firm produces depends upon the costs of the factors and the sale price the firm is likely to get for the output. These considerations also determine the profitability of a produced commodity. The cost of production of a good depends on the number of factor units necessary to produce a given level of output and the prevailing prices of the factor units. The number of factor units required in turn depends on the technique of production and the efficiency of factor units. As such, the cost of production is jointly determined by the technique of production adopted, the organizational efficiency of entrepreneurs and the productive efficiency of factors and their prices, along with the rate of output and the size of plant.

6.2 Cost Structure

There are different view points on the cost concepts. We shall review some of them as follows.

Outlay Cost and Opportunity Cost

Outlay cost refers to the actual financial expenditure of the firm. It is recorded in the firm's books of account. For instance, payment of wages, interest, cost of raw materials, cost of machineries, etc., are the actual or outlay costs.

Opportunity cost, on the other hand, is a notional idea. It is not the actual expenditure incurred by the firm. It is measured in terms of the opportunity cost. It represents sacrificed alternatives. Opportunity cost may be measured in terms of profits from the next best alternative venture that are foregone by the firm by using the available resources for a particular business.

Usually, the opportunity cost of investing owned capital fund in the business is measured in terms of the current interest rate, as the businessman could have lent this money instead of investing in business and earned interest thereon. Thus, interest is the sacrifice of investing owned business capital. It is its opportunity cost. It is just a notional idea which does not appear in the books of account.

Thus, the opportunity cost is measured in terms of the forgone benefits from the next best alternative use of given resource.

Definition: The opportunity cost of a given economic resource is the forgone benefits from the next best alternative use of that resource.

In other words, the opportunity cost of producing a certain commodity is the value of the other commodity that the resource used in its production could have produced instead.

It should be noted that opportunity cost of anything is just the next best alternative (the most valuable other commodity) forgone in the use of productive resources and not all alternative possible uses.

Explicit and Implicit Money Costs

Cost of production measured in terms of money is called the money cost.

"Money cost" is the monetary expenditure on inputs of various kinds - materials, labour, etc., required for the output, i.e., the money spent on purchasing the different units of factors of production needed for producing a commodity. Money cost is, therefore, the payment made for the factors in terms of money.

While analysing total money costs, economists speak of explicit and implicit money costs. To determine total costs, they include both explicit as well as implicit money costs.

Explicit or Out-of-Pocket Costs

Definition: Explicit costs are direct contractual monetary payments incurred through market transactions.

Explicit cost refer to the actual money outlay or out-of-pocket expenditure of the firm to buy or hire the productive resources it needs in the process of production.

The following items of a firm's expenditure are explicit money costs:

1. Cost of raw materials
2. Wages and salaries
3. Power charges
4. Rent of business or factory premises
5. Interest payment on capital invested
6. Insurance premium
7. Taxes like property tax, duties, licence fees, etc; and
8. Miscellaneous business expenses like marketing and advertising expenses (selling costs), transport cost, etc.

The above list of items included in money cost is an explicit payment made by the firm. These are recorded expenditures during the process of production. They are, thus, known as accounting costs or explicit money costs, as these are actual monetary expenditures incurred by the firm.

To an economists however, this is not enough for consideration. In the economic sense, there are certain costs which are implicit in nature, such as when there is an imputed value of goods and services used by the firm, but no direct payment is made for such use. Thus, from an economist's point of view, apart from explicit costs, there are implicit money costs (which are generally not considered by the accountant unless some special provision is made for it).

Implicit or Book Costs

Definition: Implicit costs are the opportunity costs of the use of factors which a firm does not buy or hire but already owns. Unlike out-of-pocket costs they do not require current cash expenditures.

Implicit cost are not directly incurred by the firm through market transactions, but nevertheless are to be reckoned in the measurement of total money costs of production. These are to be estimated on the basis of the opportunity costs, i.e., from what the factors owned by the firm itself could earn in their next best alternative employment.

Implicit money costs are payments which are not directly or actually paid out by the firm as no contractual disbursement is fixed for them. Such implicit money costs arise when the firm or entrepreneur supplies certain factors owned by himself. For instance, the entrepreneur may use his own land in production, for which no rent is to be paid in the actual sense. But this, however, is to be reckoned as a cost, assuming that if the entrepreneur had rented this land to somebody, he would have definitely earned some rent. Hence, such rent is to be regarded, as implicit money cost. Thus, implicit money costs are as follows:

1. Wages of labour rendered by the entrepreneur himself.
2. Interest on capital supplied by him.
3. Rent of land and premises belonging to the entrepreneur himself and used in his production.
4. Normal returns (profits) of entrepreneur, compensation needed for his management and organizational activity.
5. Depreciation.

These items are to be valued at current market rates for estimating the implicit money cost. These are implicit money costs, because these go to the entrepreneur himself. These are self recipient payments. And they are, in practice, unrecorded expenditure of production. But in an economic sense, we have to consider total money costs as it is composed both of explicit and implicit expenses.

The distinction between explicit and implicit money costs is important in analysing the concept of profit. In the accounting sense, profit is calculated as the residual of total sales receipts minus total costs (in an explicit sense). In the economic sense, however, normal profit is included in total cost of production which consists of explicit and implicit expenses all taken together. Under implicit costs, normal profit - a return to the entrepreneur's management function is included.

But in the economic sense, real business or economic profit is the surplus of total revenue over total economic cost:

Economic cost = Accounting cost (or explicit cost) + Implicit cost.

Money cost is also regarded as the supply price of the factors needed for producing a commodity. To some economists, thus, the money cost of production of a commodity is the money fund required to induce the factors of production to be allocated to this production, rather than to seek employment in alternative uses.

6.3 Fixed and Variable Costs (or Prime and Supplementary Costs)

It may be recalled that the short-run period refers to the time interval during which some factor units cannot be adjusted. The factors of production which cannot be adjusted during the short period are together referred to as plant and include capital equipment, top managerial personnel and minimum of subordinate staff such as watch and ward, maintenance technicians, etc. In other words, short period is the period during which the plant of a firm cannot be changed.

The short-run cost function relates to the short-run production function. A short-run production function $Q = f\,(a,b,c,d,\ldots\ldots n)$, stated in general, implies two sets of input component: (*i*) fixed inputs and (*ii*) variable inputs. Thus, factors of production employed, in the short-run, are classified as fixed factors and variable factors.

Fixed factors are unalterable. These factors are, for instance machineries, factory building, managerial staff etc., which remain unchanged over a period of time. Variable factors are labour, raw materials, power, etc., the inputs of which are varied to vary the output in the short run.

Since costs refer to the prices paid to the factors of production, prices paid for fixed factors and those paid for variable factors are termed as fixed costs and variable costs respectively.

Fixed Costs (or Supplementary Costs)

Fixed costs are the amount spent by the firm on fixed inputs in the short- run. Fixed costs are, thus, those costs which remain constant, irrespective of the level of output. These costs remain unchanged even if the output of the firm is nil. Fixed costs, therefore, are known as “supplementary costs” or “overhead costs”.

Definition: Fixed costs are those costs that are incurred as a result of the use of fixed factor inputs. They remain fixed at any level of output in the short-run.

Fixed costs, in the short-run, remain fixed because the firm does not change its size and amount of fixed factors employed. Fixed or supplementary costs usually include:

- Payments of rent for building
- Interest paid on capital
- Insurance premiums
- Depreciation and maintenance allowances
- Administrative expenses-salaries or managerial and office staff, etc
- Property and business taxes, licence fees, etc.

These costs are overhead costs in the sense that they are to be incurred even if the firm is shut down temporarily and the current production may be nil. Further, they do not change as the output increases. Thus, fixed costs are also referred to as “unavoidable contractual costs” which occur even if there is no output. In brief, the costs incurred on the business plant are called fixed costs.

Fixed costs may be classified into two categories: (i) Recurrent and (ii) Allocable.

Recurrent fixed costs are those which give rise to cash output as certain explicit payments like rent, interest on capital, general insurance premiums, salaries of permanent irreducible staff, etc., are to be made at regular time-interval by the firm. The allocable fixed costs refer to implicit money costs like depreciation charges which involve no direct cash outlays but are to be reckoned on the basis of time rather than usage.

Variable Costs (or Prime Costs)

Variable costs are those costs that are incurred on variable factors. These costs vary directly with the level of output. In other words, variable costs are those costs which rise when output expands and fall when output contracts. When output is nil, they are reduced to zero.

Definiton: Variable costs are those costs that are incurred by the firm as a result of the use of variable factor inputs. They are dependent upon the level of output.

Variable costs are frequently referred to as direct costs or prime costs. Briefly, variable costs or prime costs represent all those costs which can be altered in the short-run as the output alters.

These we regarded as “avoidable contractual costs” (when output is nil).

The short-run variable costs include:

- Prices of raw materials
- Wages of labour
- Fuel and power charges
- Excise duties, sales tax
- Transport expenditure etc.

Besides, user costs are included in variable costs for analytical purposes. User cost is the depreciation caused by the actual use of capital assets like machinery. It is linked with the rate or output.

Variable costs may be classified into: (i) fully variable costs and (ii) semi-variable costs. The former vary more or less at the same rate of output, e.g. cost of raw materials, power etc. Semivariable costs are, however, those costs which do not change with output, but they will be completely eliminated when output is nil.

The distinction between prime costs (variable costs) and supplementary costs (fixed costs) is, however, not always significant. In fact, the difference between fixed and variable costs is meaningful and relevant only in the short period. In the long-run, all costs are variable because all factors of production become adjustable in the long-run. In the short period, only those costs are variable which are incurred on the factors which are adjustable. In the short-run, however, the distinction between prime and supplementary costs is very significant because it influences the average cost behaviour of the product of the firm. Thus, it has significant bearing on the theory of firm. In specific terms, the significance of making this distinction between fixed and variable costs is that in the short period a firm must cover at least its variable or prime costs if it is to continue in production. Even if a firm is closed down, it will have to incur fixed or supplementary cost. The firm will suffer no great loss in continuing production if it can cover at least its variable costs under the prevailing price.

Behavioural Costs and their Measurement

In economic analysis the following types of costs are considered in studying behavioural cost data of firm: (A) Total Cost (TC), (B) Total Fixed Cost (TFQ), (C) Total Variable Cost (TVC), (D) Average Fixed Cost (AFC), (E) Average Variable Cost (AVC), (F) Average Total Cost (ATC), and (G) Marginal Cost (MC).

(A) Total Cost (TC): Total cost is the aggregate of expenditure incurred by the firm in producing a given level of output. Total cost is measured in relationship to the production function by multiplying the factor prices with their quantities.

If the production function is : Q = f (a,b,c, …..n), then total cost is; TC = f (Q) which means total cost varies with output.

For measuring the total cost of given level of output, thus, we have to aggregate the product of factor quantities multiplied by their respective prices.

Conceptually, total cost includes all kinds of money costs, explicit as well as implicit. Thus, normal profit is also included in total cost. Normal profit is an implicit cost. It is normal reward made to the entrepreneur for this organizational services. It is just a minimum payment essential to retain the entrepreneur in a given line of production. If this normal return is not realised by the entrepreneur in the long run, he will stop his present business and will shift his resources to some other industry.

Now, an entrepreneur himself being the paymaster, he cannot pay himself, so he treats normal profit as implicit costs and adds it to the total cost.

In the short-run, total cost may be bifurcated into total fixed cost and total variable cost. Thus, total cost may be viewed as the sum of total fixed cost and total variable cost at each level of output. Symbolically: TC = WC + TVC.

(B) Total Fixed Cost (*TFC*): Total fixed cost corresponds to fixed inputs in the short-run production costs. It is obtained by summing up the product of quantities of the fixed factors multiplied by their respective unit prices. TFC remains the same at all levels of output in the short run.

Suppose a small furniture-shop proprietor starts his business by hiring a shop at a monthly rent of ₹ 40, borrowing a loan of ₹ 1,000 from a bank at an interest rate of 12% and buys capital equipment worth ₹ 150. Then his monthly total fixed cost is estimated to be:

₹ 40 (Rent), + ₹ 150 (Equipment cost) + ₹10 (monthly interest on the loan) = ₹ 200.

(C) Total Variable Cost (TVC): Corresponding to variable inputs, in the short-run production, is the total variable cost. It is obtained by summing up the product of quantities of input, multiplied by their prices.

Again TVC = f (Q) which means total variable cost is an increasing function of output.

Suppose, in our illustration of the furniture shop proprietor, if he were to start with the production of chairs, he employs a carpenter on a wage of ₹ 30 per chair. He buys wood worth ₹ 200, rexine sheets worth ₹ 300, spends ₹ 110 for other requirements to produce 3 chairs. Then his total variable cost is measured as: ₹ 200 (wood price) + ₹ 300 (rexine cost) + ₹ 110 (allied cost) + ₹ 90 (labour charges) = ₹ 700.

(D) Average Fixed Cost (AFQ): Average fixed cost is total fixed cost divided by total units of output. This:

$$\text{AFC} = \frac{\text{TFC}}{\text{Q}}$$ where Q stands for the number of units of the product.

Thus, average fixed cost is the fixed cost per unit of output.

In the above example, thus, when TFC = ₹ 200 and Q = 3, AVC = 200/3 = ₹ 66.67.

(E) Average Variable Cost (AVC): Average variable cost is total variable cost divided by total units of output. Thus:

$AVC = \frac{TVC}{Q}$ where AVC means average variable cost.

Thus, average variable cost is variable cost per unit of output.

In the above example, TVC = ₹ 700 and Q =3,

AVC = 700/3 = ₹ 233.33.

(F) Average Total Cost (ATC): Average total cost or average cost is total cost divided by total units of output. Thus:

$$ATC \text{ or } AC = \frac{TC}{Q}$$

In the short-run, since:

TC = TFC + TVC

In the short-run, since:

TC = TFC + TVC

$$\therefore ATC = \frac{TC}{Q} = \frac{TFC + TVC}{Q} = \frac{TFC}{Q} + \frac{TVC}{Q}$$

Hence, average total cost can be computed simply by adding average fixed cost and average variable cost at each level of output. To take the above example, thus

ATC = ₹ 66.66 + ₹ 233.33 = 300 per chair.

(G) Marginal Cost (*MC*): The marginal cost is also a per unit cost of production. It is the addition made to the total cost by producing one more unit of output. Symbolically, MCn = TCn - TC_{n-1}, that is, the marginal cost of the n^{th} unit of output is the total cost of producing n units minus the total cost of producing n - 1 (i.e., one less in the total) units of output.

Suppose, the total cost of producing 4 chairs (i.e., n = 4) is ₹ 1,150 while that for 3 chairs (i.e. n - 1) is ₹ 900. Marginal cost of producing the 4^{th} chair, therefore, works out as under:

$MC_4 = TC_4 - TC_3 =$ ₹ 1,150 - ₹ 900 = ₹ 250.

Definition: Marginal cost is the cost of producing an extra unit of output.

In other words, marginal cost may be defined as the change in total cost associated with one unit change in output. It is also called “extra unit cost” or incremental cost, as it measures the amount by which total cost increases when output is expanded by one unit. It can also be calculated by dividing the change in total cost by one unit change in output.

Symbolically, thus, $MC = \frac{TC}{{}_1Q}$ Where D denotes change in output assumed to change by 1 unit only. Therefore, output change is denoted by D_1.

It must be remembered that marginal cost is the cost of producing an additional unit of output and not of an average product. It indicates the change in total cost of producing an additional unit.

Further, marginal cost is independent of the size of fixed cost in the short run. Since fixed costs are independent of output and remain constant throughout, it is obvious that increase in total costs is entirely due to variable costs. Hence, marginal costs consist of variable costs only. The change in the variable costs for producing an additional unit of output determines the marginal cost.

6.4 Short-run Total Cost Schedule of a Firm

A cost-schedule is a statement of variations in cost resulting from variations in the level of output. It shows the response of costs to changes in output. Cost schedules depend upon the length of the time interval. So they vary from short period to long period.

Short-Run Total Costs

To examine the cost behaviour in the short-run, we may begin our analysis with the consideration of the following three total cost concepts:

1. **Total Fixed Cost (TFC):** It is the cost pertaining to all fixed inputs like machinery, etc., at any given levels of output.
2. **Total Variable Cost (TVC):** It is the cost pertaining to all variable inputs like raw materials, etc., at any given level of output.

3. **Total Cost (TC):** It is the cost pertaining to the entire factor inputs at any given level of output. It is the total cost of production derived by aggregating total fixed and variable costs together.

Thus, TC = TFC + TVC.

Table 6.1 gives a hypothetical production schedule with total costs of our illustrative firm. Data in the table shows the behaviour of TFC, TVC and TC in the short-run.

Table 6.1: The Short-run Total Costs Schedule of a Firm (Hypothetical Data)

Units of Capital (Fixed Factor)	Units of Labour (Variable Factor)	Total Product (TP)	TFC (₹)	TVC (₹)	TC (₹)
4	0	0	100		100
4	1	2	100	10	110
4	2	5	100	20	120
4	3	10	100	30	130
4	4	15	100	40	140
4	5	18	100	50	150
4	6	20	100	60	160
4	7	21	100	70	170

The data are based on the following assumptions:

1. Labour and capital are the two factor inputs.
2. Labour is the variable factor.
3. Capital is the fixed factor.
4. Price of labour is ₹ 10 per unit. Price of capital is ₹ 25 per unit.
5. Since 4 units of capital are used as fixed factors, the total fixed cost (TFC) ₹ 100 remains constant throughtout (see column 4 in Table).
6. The total variable cost (TVC) varies with the variation in labour units (see column 5).
7. Column 6 measures the total cost. It is derived by the summation of TFC and TVC at all levels of output.

Behaviour of Total Costs

Examining cost schedules in Table, we may observe the following interesting points about the behaviour of various total costs:

1. TFC remains constant at all levels of output. It is the same even when the output is nil. Fixed costs are thus independent of output.
2. TVC varies with the output. It is nil when there is no output. Variable costs are, thus, direct costs of the output.
3. TVC does not change in the same proportion. Initially, it is increasing at a decreasing rate, but after a point, it increases at an increasing rate. This is due to the operation of the law or variable proportions or non-proportional output, which suggests that initially to obtain a given amount of output relatively, variations in factors are needed in less proportion, but after a point when the diminishing phase operates, variable factors are to be employed in greater proportion to increase the same level of output.
4. TC varies in the same proportion as the TVC. Thus, in the short period, the changes in total cost are entirely due to changes in the total variable costs as fixed costs, the other component of total costs remaining constant.

TFC, TVC and TC Curves

Total cost curves are derived by plotting the total cost schedules graphically. The cost curves depict cost-output behaviour of the firm in an explicit manner. In Fig., we, however, present generalized/ smoothed out types of total fixed, total variable and total cost curves to explain the short-run cost behaviour from the cost data.

A careful observation of Fig. 6.1 reveals the following important characteristics of cost behaviour.

1. The curve TFC is the curve of total fixed costs. It is a straight horizontal line, parallel to the X-axis, denoting a constant characteristic of fixed costs at all levels of output.
2. The curve TVC represents total variable costs. It reflects the typical behaviour of total variable costs, as it initially rises gradually, but eventually becomes steeper, denoting a sharp rise in total variable costs. The upward rising total variable costs are related to the size of the output.

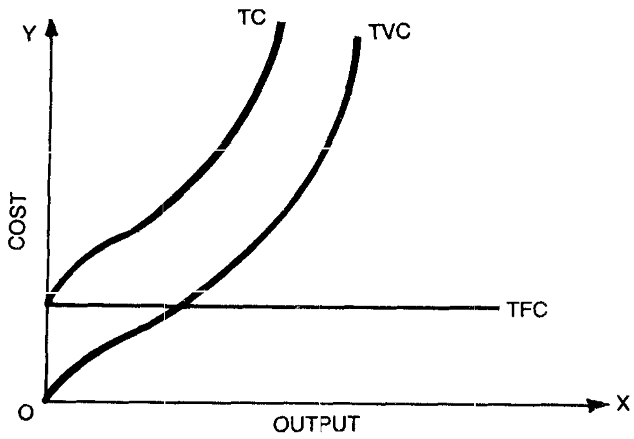

Fig. 6.1: Short-Run Total Cost Curve

3. The curve TC represents total costs. It is derived by vertically adding up TVC and TFC curves. It is easy to see that the shape of TC is largely influenced by the shape of TVC. When the TVC curve becomes steeper. TC also becomes steeper. Further, the vertical distance between TVC curve and TC curve is equal to TFC and is constant throughout because TFC is constant. Evidently, the vertical distance between TVC and TC curves represents the amount of total fixed costs.

Short-run Per Unit Cost

Per unit cost is the average cost. It refers to the cost per unit of output.

Following are the four important per unit costs in which a firm is always interested in the short period.

1. Average Fixed Cost = Total Fixed Cost + Output

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

2. Average Variable Cost = Total Variable Cost + Output.

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

3. Average Total Cost = Average Fixed Cost + Average Variable Cost

   (ATC = AFC + AVC).

4. Marginal Cost = (Total Cost associated with the quantity of output). Alternatively (Total cost associated with the quantity of output one less).

Marginal Cost = Change in total Cost + One unit change in output.

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

It must be noted that abbreviations TVC, TFC, TC, AFC, AVC, ATC and MC, respectively, are frequently used by economists to represent total variable cost, total fixed cost, total cost, average fixed cost, average variable cost, average total cost and marginal cost.

Hence, as we have also used these abbreviations in the following sections so often without qualifications, the reader should memorise the connotations of these abbreviations.

The computation of AFC, AVC, ATC and MC has been illustrated in Table Here, we have purposely taken some new data (rather than repeating those from Table) for taking the product variation unit-wise and without going into the details of factor components and factor prices, in order to make the computation simple and straightforward.

From the cost schedules given in Table, it is apparent that costs per unit are derived from the total costs. It is obvious that the firm will have four short period categories of unit costs: (i) Average Fixed Cost (AFC), (ii) Average Variable Cost (AVC), (iii) Average Total Cost (ATC), and (iv) Marginal Cost (MC).

Table 6.2: Output, Total Costs and Average or Unit Costs of a Firm (Hypothetical Data)

TP(Q)	TFC	TVC	TC	AFC (AFC/Q)	AVC (TVC/Q)	ATC (TC/Q)	MC
0	100	0	100	–	–	–	–
1	100	25	125	100	25	125	25(125–100)
2	100	40	140	50	20	70	15(140–152)
3	100	50	150	33.3	16.6	50	10(150–140)
4	100	60	160	25	15	40	10(160–150)
5	100	80	180	20	16	36	20(180–190)
6	100	110	210	16.3	18.3	35	30(250–210)
7	100	150	250	14.2	21.4	35.7	40(250–210)
8	100	300	400	12.5	37.5	50	150(400–250)
9	100	500	600	11.1	55.6	66.7	200(600–400)
10	100	900	1000	10	90	100	400(1000–600)

Analysing the various cost data, economists have generalized the following relationships:

1. AFC decreases as the output increases. Since the total fixed costs remain the same, average fixed costs decline continuously. It is the outcome of "spreading the overhead over more units". Since AFC=TFC/Q, it is the pure arithmetical result with the numerator remaining unchanged. The increasing denomination causes a diminishing product. TC thus, spreads over each unit of output with the increase in output, (Q). Hence, AFC diminishes continuously.
2. AVC first decreases and then increases as the output increases.
3. ATC also decreases initially. It remains constant at a point for a while, but then goes on increasing as output increases.
4. Marginal Cost (MC) also decreases initially but then increases as the output is increased.
5. The MC is determined by the rate of increase in the total variable cost (TVC). In the beginning, for the very first unit, thus average variable cost and marginal cost are the same (because AVC = TVC for the first unit).
6. When the average cost is minimum, MC = AC.

6.5 The Behaviour of Short-run Average Cost Curves

The behaviour patterns and relations of short-run unit costs become more explicit when we plot the cost data on a graph and draw the respective cost curves.

Fig. 6.2, however, depicts a generalized form of cost behaviour in the short-run. Here, the cost curves are drawn as the idealized or smoothed out versions of the cost data.

Fig. 6.2 illustrates four short-period cost curves:

(1) AFC curve, (2) AVC curve, (3) ATC curve, and (4) MC curve.

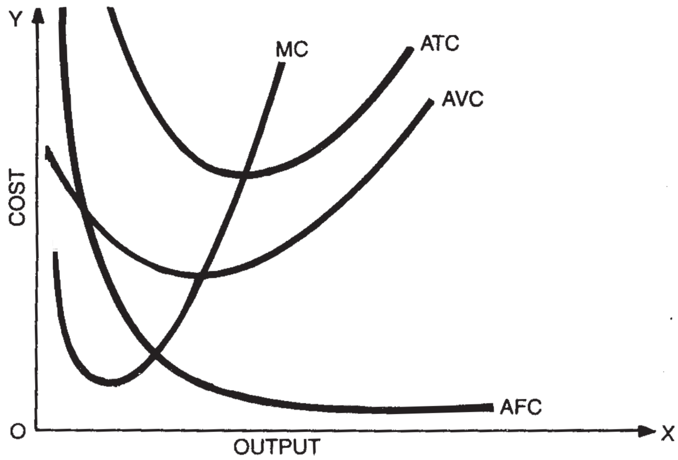

Fig. 6.2: Short-Run Average Cost Curve

Average Fixed Cost Curve (AFC Curve)

As the output increases, the total fixed costs get spread over a large and larger output, and therefore, the average fixed cost goes on progressively declining. Consequently, the average fixed curve slopes downwards from the left to the right throughout its entire stretch. In mathematical terms, AFC curve approaches both the axes asymptotically, i.e., it gets very close to but never touches either axis.

An important characteristic of a average fixed cost is that the product of average fixed cost for a given level of output multiplied by the given level of output always remains constant. In our illustrative cost schedule, if we multiply the average fixed cost for chairs by the corresponding number of chairs, the product would be in all cases ₹ 200 which is the total fixed cost. Geometrically, a curve representing such data is always a rectangular hyperbola. Hence, the AFC curve is a rectangular hyperbola. It, thus, implies that any point on the curve gives the same total cost as the product of multiplication of average fixed cost by the units or output. This property of the curve signifies the fact that total fixed cost is constant throughout.

Average Variable Cost Curve (AVC Curve)

The average variable cost generally declines in the initial stages as the firm expands and approaches the optimum level of output. After the plant capacity output is reached, the average variable cost begins to rise sharply. Thus, usually the average variable cost curve declines initially, reaches the minimum and then goes on rising. The AVC curve is , thus, slightly U-shaped, indicating that as the output increases initially, the average variable cost is decreasing, then it remains constant for a while and again starts increasing. There are , thus, three phases of the AVC curve: (i) decreasing phase, (ii) constant phase and (iii) increasing phase. These stages in the AVC curves corresponding the stages of increasing, constant and decreasing average product (returns to the variable factors) underlying the law of variable proportions.

Average Total Cost Curve (ATC Curve)

Since the average total cost is the sum of fixed average variable costs, the ATC curve is also a vertical summation of the AFC and AVC curves. Hence, the curve ATC is derived by the superimposition of the AVC curve over the AFC curve. As such, the ATC curve is U-shaped, indicating that if the output of the firm is increased, initially the average total decrease up to a point, then it remains constant for a while and, thereafter, it starts rising.

Explanation of the U-shape of ATC Curve

The reasons why the ATC curve is U-shaped are not far to seek. Since, ATC=AFC + ATC, it follows that the behaviour of the ATC curve is determined by the AVC curve and AFC curve. The AFC curve is a rectangular hyperbola, which implies that the average, fixed cost diminishes continuously as output expands. In the initial stage, the AVC curve also slopes downward. As such, in the beginning, the ATC curve tends to fall when output expands. At a certain point, however, the AVC starts rising, so the AVC curve has a positive slope, yet the ATC curve continues to fall. This is due to the predominant influence of the falling AFC curve. Since the falling effect of AFC curve is stronger than the rising effect of AFC curve at this stage, the net effect causes ATC to fall. But, as the output expands further to a higher level, the AVC curve tends to rise sharply due to the operation of the law of diminishing returns. Now, the rising effect of AVC being predominant, it more than discounts the falling effect of AFC curve, so the next effect is that the ATC starts rising. Indeed, at the point where that rise of AVC exactly nullifies the fall of AFC, the balancing effect causes ATC to remain constant first and then when the rising effect of AVC becomes more pronounced, the ATC starts rising. As such the overall ATC curve assumes U-shape. The falling path of ATC is largely due to the falling AFC curve, while its rising path is largely influenced by the rising AVC curve. It may be noted that the distance between ATC and AVC curve becomes narrow as the curves move upward. This is a clear indication of the increasing influence of AVC on ATC in the later stage. In this way, the slopes of the ATC curve, initially negative and thereafter positive, reflect the combined influence of fixed and variable cost curves. The economic reason underlying the U-shape of the average cost curve is that there is greater importance of fixed costs in any firm till the normal capacity is exhausted and the normal point or the point of least combination of various factors (fixed and variable) is reached. The average cost, therefore, declines in the beginning. But once the normal output of the plant is reached, more and more variable factors are to be employed due to the diminishing returns so that the variable costs rises sharply to increase the output further which outweighs the effect of falling average fixed cost so that the ATC starts moving with AVC. This is how the ATC curve assumes U-shape in the short-run period.

Again, as we have already seen, the ATC curve is the reciprocal of the AP curve. The AP curve is formed by the operation of the law of diminishing returns in the short-run. The occurrence of non-proportional output is basically due to the indivisibility of fixed factors and imperfect substitutability between fixed and variable factors.

Marginal Cost Curve (MC Curve)

The marginal cost curve also assumes U-shape indicating that in the beginning, the marginal cost declines as output expands, thereafter, it remains constant for a while and then starts rising upward.

Marginal cost is the rate of change in total costs when output is increased by one unit. In a geometrical sense, marginal cost at any output is the slope of the total curve at the corresponding point.

Apparently, the slope of the MC curve also reflects the law of diminishing returns.

In the short-run, the marginal cost is independent of fixed cost and is directly related to the variable cost. Hence, the MC curve can also be derived from the MC curve. In fact, the TC and TVC curves have an identical slope at each level of output, because TC curve is derived just by shifting TVC curve at TFC level. Thus, MC can be derived from the TVC curve and AVC curve is also derived from the TVC curve. However, MC will not be the same as AVC. As a matter of fact, AVC curve and MC curve are the reflection and the consequence of the law of non-proportional output operating in the short run.

Thus, the AVC curve is exactly the reverse of AP curve, whereas MC curve is exactly the reverse of MP curve.

6.6 Relationship Between Marginal Cost and Average Cost

Focussing their attention on average and marginal costs data, economists have observed a unique relationship between the two as follows:

1. When AC is minimum, the MC is equal to AC. Thus, MC curve must intersect at the minimum point of ATC curve.
2. When AC is falling, MC is also falling initially, after a point MC may start rising but AC continues to fall. However, AC is greater than MC, (AC >MC). Hence, ultimately at a point both costs will be equal. Thus, when MC and AC are falling, MC curve lies below the AC curve.
3. Once MC is equal to AC, then as the output increases AC will start rising and MC continues to rise further but now MC will be greater than AC. Therefore, when both the costs are rising, MC curve will always lie above the AC curve.

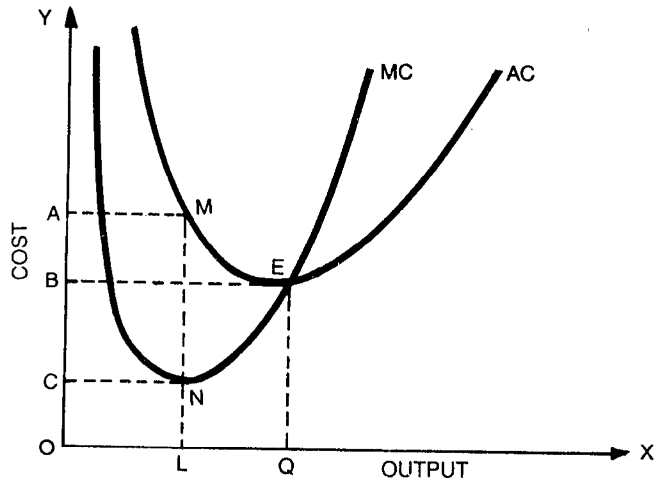

Fig. 6.3: Relationship between AC and MC Curves.

The above-stated relationship is easy to see through geometry of *AC* and *MC* curves, as shown in Fig.

It can be seen that -

1. Initially, both MC and AC curves are sloping downward. When AC curve is falling, MC curve lies below it.
2. When AC curve is rising, after the point of intersection, MC curve lies above it.
3. It follows thus that when MC is less than AC, it exerts a downward pull on the AC curve. When MC is more than AC it exerts an upward pull on the AC curve. Consequently, MC must equal AC, while AC is at the minimum. Hence, MC curve intersects at the lowest point of AC curve. It may be recalled that MC curve also intersects the lowest-point of AVC curve. Thus, it is a significant mathematical property of MC curve that it always cuts both the AVC and ATC curves at their minimum points.

In above Fig. thus MC curve crosses the AC curve at point E. At this point P, for OQ level of output the average cost is EQ which is the minimum.

It should be noted that no such relationship can ever be traced between the MC curve and the AFC curve simply because by definition, the MC curve is independent.

Further, the area underlying the MC curve is equal to the total variable cost of a given output.

In fact, the point on each average cost curve measures the average cost but the area underlying them denotes total costs as under:

1. Total area underlying the AFC curve measures the total fixed cost.
2. The area underlying the AVC curve measures the total variable cost.
3. The area underlying the MC curve measures the total cost.
4. The area underlying the ATC curve measures the total cost.

Finally, the MC curve is important because it is the cost concept relevant to rational decision-making. It has greater significance in determining the equilibrium of the firm. In fact the increasing MC due to diminishing returns sets a limit to the expansion of a firm during the period. Further, it is the MC curve which acts on the supply curve of the firm.

From the above discussion of cost behaviour, we may conclude that short-run average cost curves (AVC, ATC and MC curves) are U-shaped, except the AVC curve, which is a rectangular hyperbola.

6.7 Characteristics of Long-run Costs

The long-run period is long enough to enable a firm to vary all its factor inputs. In the long-run, a firm is not tied to a particular plant capacity. It can move from one plant capacity to another whenever it is obliged to do so in the light of changes in demand for its products. The firm can expand its plant in order to meet the long-term increase in demand or reduce plant capacity if there is a drop in demand.

In the long-run, there are only the variable costs or direct costs as total cost. There is no dichotomy of total cost into fixed and variable costs as we see in the short-run analysis.

In the long run, when we examine the unit cost of a firm, we come across only the average marginal costs. Hence, we have only to study the shape and relationships of the long-run average cost curve and the long-run marginal cost curve.

As a matter of fact, the long-run is a ‘planning horizon.’ All economic activity actually operates in the short-run, the long is only a perspective view for the future course of action. Thus, an economic entity-entrepreneur or consumer-can plan his course of action in the long-run, but in the real course or operation chooses actually numerous aspects of the short-run. This means, the long run comprises all possible short-run situations from which a choice is made for the actual course of operation.

In reality, thus, the long-run consists of perspective planning for the expansion of the firm; hence, it involves various short-run adjustments visualised over a period of time.

Derivation of the LAC Curve

Methodologically, the long-run average cost curve (LAC) is the envelope of the various short-run average cost curves. It is drawn as a tangent to the short-run average cost curve (SACs) as depicted in Fig.

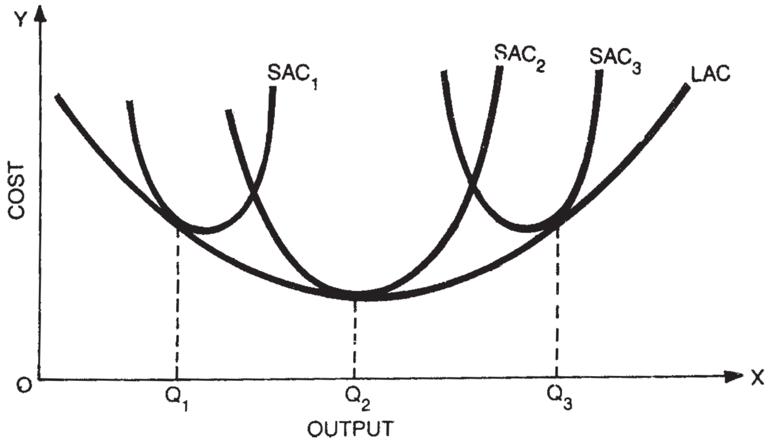

Fig. 6.4: Derivation of the *LAC* Curve

In Fig. 6.4: the LAC is derived as tangent to SAC_1. SAC_2 and SAC_3. The LAC is, thus, a flatter U-shaped curve.

Features of the *LAC* Curve

Following are the main features of the *LAC* curve:

(A) Tangent Curve: By joining the loci of various plant curves relating to different operational short-run phases, the *LAC* curve is drawn as a tangent curve.

The *LAC* approximates a smooth curve, if the plant sizes can be varied by infinitely small capacities and there are numerous short-run average cost curves to each of which the *LAC* is a tangent. In other words, the long-run average cost curve is the locus of all these points of tangency.

(B) Envelope Curve: The *LAC* curve is also referred to as the 'envelope curve', because it is the envelope of a group of short-run average cost curves appropriate to different levels of output.

In Fig. the LAC curve is enveloping or tangential to a number of plant sizes and the related SACs.

In Fig. the LAC curve is drawn on the basis of three possible plant sizes. This is a much simplified assumption. Normally, however, the firm may come across with a choice among a large variety of plants. Thus, more realistically, the LAC is to be drawn with reference to a large number of possible plant sizes, as shown in Fig.

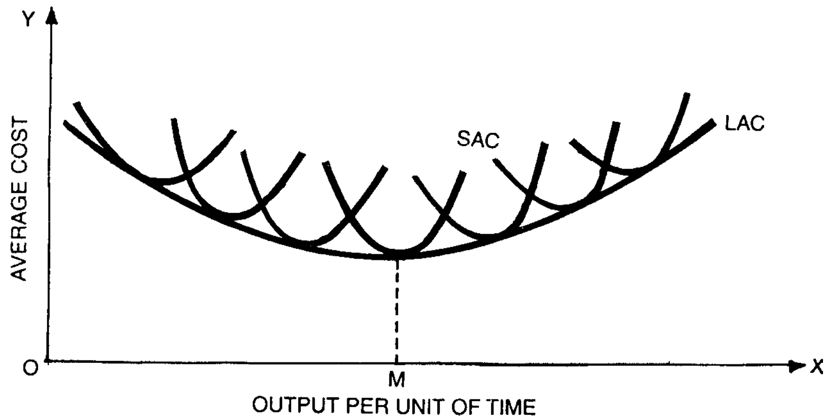

Fig. 6.5: The LAC Curve drawn from many Plant Sizes

(C) Planning Curve: LAC curve is regarded as the long-run planning device, as it denotes the least unit cost of producing each possible level of output. The entrepreneur would determine his course of expansion of output and the size of the plant in relation to the LAC curve. A rational entrepreneur would select the optimum scale of plant. The optimum scale of plant is that plant size at which SAC is tangent to LAC, such that both the curves have the minimum point of tangency. In Fig. at OQ_2 level of output SAC is tangent to the LAC, at both the minimum points. Thus, OQ_2 is regarded as the optimum scale of output , as it has the minimum per unit cost. It should be noted that there will be only one such point on the LAC curve to which an SAC curve is tangent as well as both have the minimum points at the point of tangency. And as such this particular SAC phase is regarded as the most efficient one. All other SAC curves are tangent to the LAC but at the point of tangency neither LAC nor SAC curve has the minimum point. In fact, at all these points SAC curves are either rising or falling, showing a higher cost.

Anyway, the optimum scale of plant will inevitably be adopted in the long-run by the firm under perfect competition. But the firms under monopoly and monopolistic competition are less likely to select the optimum plant size.

(D) Minimum Cost Combinations: Since *LAC* is derived as a tangent to various *SAC* curves under consideration, the cost levels represented by the *LAC* curve for different levels of output reflect minimum cost combinations of resource input to be adopted by the firm at each long-run level of output.

(E) Flatter U-Shapped: The *LAC* curve is less U-shaped or rather dishshaped. This means that in the beginning it gradually begins to slope upwards. This implies that in the long-run when the firm adopts a larger scale of output, its long-run average cost in the beginning tends to decrease. At a certain point, it remains constant, and then rises. This behaviour of long-run average costs is attributed to the operation of law of returns to scale. Increasing returns in the beginning cause decreasing costs, constant returns, constant costs and then decreasing returns and increasing costs.

Long-run Marginal Curve (LMC)

Like the short-run marginal cost curve, the long-run marginal cost curve is also derived from the slope of total cost curve at the various points relating to the given output each time. The shape of *LMC* curve has also a flatter U-shape, indicating that initially as output expands in the long-run with the increasing scale of production, *LMC* tends to decline. At a certain stage, however, *LMC* tends to increase. The behaviour of the *LMC* curve is shown in Fig. 6.7.

From Fig., the relationship between LAC and LMC may be traced as follows:

1. When LAC curve decreases. LMC curve also decreases and LMC < LAC.
2. At a certain stage, LMC tends to rise, though LAC continues to fall. Indeed, LMC is still less than LAC.

3. When LAC is the minimum, LMC = LAC. Thus, the LMC curve intersects at the lowest point of the LAC curve.

4. Thereafter, both the LAC and LMC curves slope upwards. Now LMC > LAC. So, the LMC curve lies above the LAC curve.

In Fig. 6.7 the LAC refers to the log-run average cost curve. And the LMC refers to the long-run marginal cost curve.

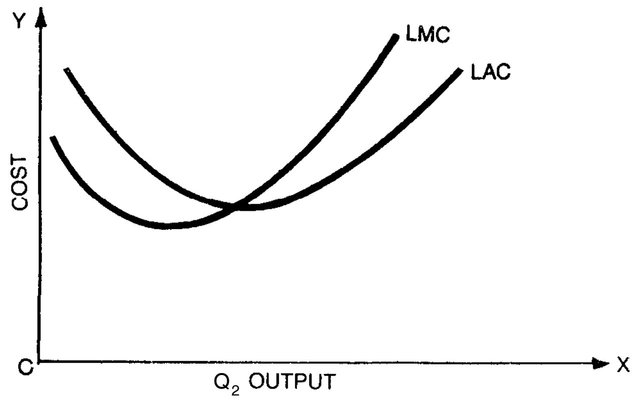

Fig. 6.7: The LMC Curve

6.8 Revenue Concepts

Revenue means sales receipts. It is the receipts obtained by a firm from selling various quantities of its products.

Revenue depends on the price at which the quantities of output are sold by the firm.

A firm revenue can be categorized as*: (i)* total revenue, *(ii)* average revenue and *(iii)* marginal revenue.

Total Revenue

Total revenue is the total sales receipts of the output produced over a given period of time. Total revenue depends on two factors: (i) the price of the product and (ii) the quantity of the product. It is obtained by multiplying the quantity sold (Q) by its selling price, (P) per unit. In symbolic terms:

TR = P × Q

(Quite often, the symbol R is used to denote total revenue.)

For example, when a producer sells 30 units of commodity X at a price of ₹ 200 each, his total revenue is ₹ 200 × 30 = ₹ 6,000.

Average Revenue

Revenue obtained per unit of output sold is termed 'average revenue'. It is simply the total revenue divided by the number of units of output sold. Thus:

$$AR = \frac{TR}{Q}$$

where *AR* = average revenue, *TR* = total revenue, *Q* = total units of output.

In the above example, total revenue is ₹ 6,000 and total output sold is 30 units of *X*. Thus:

$$\text{Average revenue} = \frac{₹6000}{30 \text{ Units of X}} = ₹\ 200$$

Thus, the revenue earned per unit is ₹ 200. Is this average revenue always equal to the price? If the seller sells all the units of the goods at the same price, average revenue would be equal to the price. However, if he sells different units of the goods at different prices, the average revenue will be different from the price. For example, in the above illustration, if the seller sells 10 units of X for ₹ 250 each, 10 units for ₹ 200 each and the remaining 10 units for ₹ 150 each, his total revenue will be ₹ 6,000 and average revenue will be ₹ 200. But, in this case, as 30 units are sold at different prices, average revenue is not equal to the prices charged for the commodity X.

Average Revenue = Price

By definition, 'average revenue' is the price. Price is always per unit. And per unit sales receipt is also called average revenue. Since sellers receive revenue according to price, price and average revenue are one and the same thing.

To prove it:

$$AR = AR = \frac{TR}{Q}, \text{ since } TR = P' Q$$

$$AR = \frac{P \times Q}{Q} \quad \therefore \quad AR = P$$

Marginal Revenue

Marginal revenue is the addition made to the total revenue by selling one more unit of the item. Or simply, it is the revenue or sales receipt of the marginal unit of he firm's output. Algebraically, the marginal revenue of nth unit per period of time of a given product is the difference between the total revenue earned by selling n units and the total revenue earned by selling n - 1 units per period of time i.e.,

$$MRn = TRn - TRn\text{-}1$$

(where MR stands for the marginal revenue, and n stands for the number of units of output sold). If the firm were to sell 10 units of X for ₹ 250 each, its total revenue would be ₹ 2,500. If it were to sell one more unit, i.e. a total of units of x, it could do it at a lower price, say, ₹ 240 per set. Its total revenue in that case would be ₹ 2,740. In other words, the eleventh unit has made a net addition of only ₹ 240 to its previous total revenue of ₹ 2,500 from the sale of 10 units.

To express this measurement through the above given formula, thus:

$$MR_{11} = TR_{11} - TR_{10} \backslash MR = ₹\,2{,}740 - ₹\,2{,}500 = ₹\,240$$

Marginal revenue is the rate of increase in total revenue when the increment in the sell of output is assumed unit-wise. Thus, marginal revenue is also defined as the ratio of change in total revenue to a unit change in output sold. Symbolically, thus:

$$MR = \frac{dRT}{dQ}$$

The concept of marginal revenue is of high significance in the theory of firm. It denotes the rate of change in total revenue as the sale output changes per unit, per period of time. Further, it is equated with marginal cost, at least theoretically, by the firm to maximize its profit.

6.9 Relationship between Price and Revenues under Perfect Competition

A firm under perfect competition is a price-taker. It sells its output at the prevailing market price over a period of time. Thus, price is constant in a competitive firm's model. Assuming a given price, from a revenue schedule of a firm as in Table (hypothetically constructed), we can trace the unique relationship between price, total average and marginal revenues.

Table 6.3: Revenue Schedule of a Competitive Firm

Quantity Sold (Q)	Price i.e. Average Revenue (P = AR)	Total Revenue (TR = PQ)	Marginal Revenue (MR)
1	250	250	250
2	250	500	250
3	250	750	250
4	250	1000	250
5	250	1250	250
6	250	1500	250
7	250	1750	250
8	250	2000	250
9	250	2250	250
10	250	2500	250

In a generalized form, the graphical presentation of revenue schedules gives the respective revenue curves as shown in Fig. 6.8.

Under conditions of perfect competition, a firm's average revenue will be identical and constant. Therefore, in the case of a firm operating under conditions of perfect competition, its average and marginal revenue curves will form one identical curve parallel to the X-axis or the quantity-axis. In such a case, where average revenue, i.e., price, remains constant, the average revenue curve will be a horizontal straight line parallel to the X-axis as depicted in Fig. 6.1 The slopes of AR and MR curves are zero.

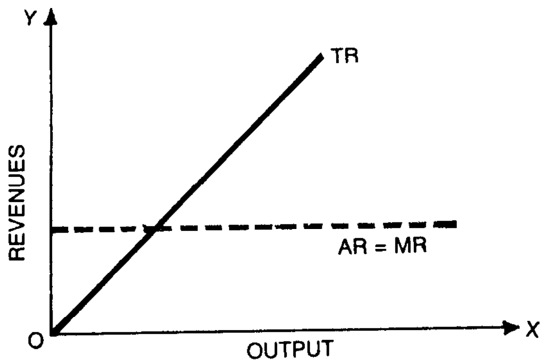

Fig. 6.8: Revenue Curves

Hence, both the curves coincide. The *TR* curve moves upward to right, but its slope is constantly positive at 45° level. It thus, implies that revenue increases in direct proportion to the output sold.

Following points may be noted in this context:

1. Price is constant.
2. Since price is constant, the average revenue is also constant. *AR* is the same as *P*.
3. Since price is unchanged, for each additional unit sold, the same addition is made to the total revenue; therefore, the marginal revenue *(MR)* also remains constant. *MR* is, thus, the same thing as *P* or *AR*.
4. Total revenue *(TR)* increases at a constant rage (since *MR* is constant) as the units of output sold increase.

6.10 Monopoly Demand

The demand condition under monopoly is crucially different from that of a competitive firm. Under competition, a producer faces a perfectly elastic demand. So he is a price-taker, as he can sell whatever he produces at the ruling market price. However, the demand curve faced by a monopolist is identical with the industry demand curve for the product, which is downward-sloping. Further, in the absence of competing substitutes for the monopolist's product, its demand usually tends to be highly inelastic; but it cannot be perfectly inelastic due to the influence of the elasticity which determinants like income, taste, habit, preference, remote substitutes, etc.

In short, the monopolist's demand curve is the same as the market demand curve for the product. The inelastic demand curve (with a negative slope) of a monopolist has the following major implications:

1. The downward-sloping market demand curve suggests that less quantity is demanded at a higher price and more is demanded at a low price. This means that the monopolist can increase the sale of his product only by lowering the price And, if he wishes to charge a high price, he has to remain satisfied with lower sales.

2. Due to the absence of competition and inelasticity of demand for the product, a monopolist acts as a 'price-maker' in the market. As the market supply of the product is under his control, by restricting output he can charge a high price.

   It follows that depending on the demand, monopolist can either dictate a high price and sell less or can produce more and allow the price to take its own course in relation to the given demand position. Thus, a monopolist can either control quantity or price but not both at the same time.

3. On account of inelasticity of the demand curve, the relationships of monopoly output are of a distinct nature.

6.11 Relationship between Price and Revenues under Monopoly

A monopolist has a complete control over the market supply. So, he is in a position to determine the price for his product. The demand curve for the monopoly product is not perfectly elastic. Thus, a monopolist can sell more only by lowering the prices. Price is the average revenue. Thus, the average revenue tends to decline as price declines at each level of increase in output. Obviously the total revenue increases at diminishing rate as price (= *AR)* tends to decline. Marginal revenue is the addition to total revenue by selling an extra unit. Thus, marginal revenue also decreases and it will be less than average revenue or price at all output levels. A set of imaginary data given in Table clarifies the relationship between marginal, average and total revenue of a monopoly firm.

It can be observed that $MR < AR$. Again, data assumed here are linear. So, when the average revenue (or price) falls the marginal revenue falls at twice the rate of fall in price.

Table 6.4: A Monopolist's Demand and Revenue Situation

Output (Q)	Price (P)	Total Revenue (TR=PQ)	Average Revenue (AR=TRQ) or P=AR	Marginal Revenue ($MR=TR_n-TR_{n>1}$)
1	25	25	25/1 = 25	25
2	24	48	48/2 = 24	23
3	23	69	69/3 = 23	21
4	22	88	88/4 = 22	19
5	21	105	105/5 = 21	17
6	20	120	120/6 = 20	15
7	19	133	133/7 = 19	13

Geometrically, this typical relationship between *AR* and *MR* of a monopoly firm is represented through their respective curves as shown in Fig. 6.9.

In Fig. 6.9 AR is the linear demand curve as well the average curve. *MR* is the marginal revenue curve, which is obviously linear. It can be seen that since the *AR* curve has a downward slope, the *MR* curve too slopes downward. Again, the *MR* curve lies below or to the left of the demand or *AR* curve. This implies that the *MR* of any monopoly output is less than its price Furthermore, an important economic theorem is also containing by the linear *AR* and *MR* curves, that the *MR* curve lies at half the distance between the *AR* *curve* and *Y*-axis.

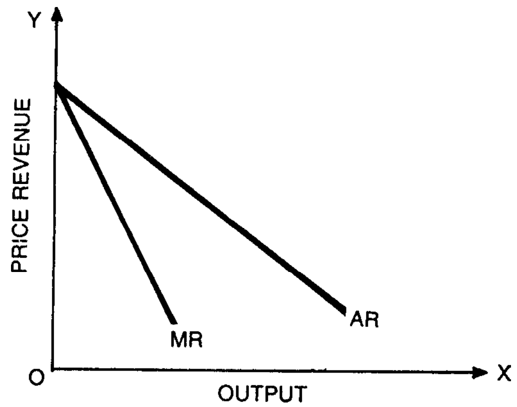

Fig. 6.9: Monopoly Revenues

Geometrical Relationship between *AR* and *MR* Curve

A typical geometrical relationship is observed between the linear AR and MR curves.

Geometrically, this typical relationship between AR and MR of a monopoly firm is represented through its respective curves as shown in Fig.

In Fig., 6.10: DA is the linear demand curve as well as the average revenue curve. DM is the marginal revenue curve, which is obviously linear. It can be seen that since the AR curve has a downward slope, the MR curve too slopes downward. Again the MR curve lies below or to the left of demand or AR curve. This implies that the MR of any monopoly output is less than its price. Furthermore, an important economic theorem is also reflected in the linear *AR* and *MR* curves.

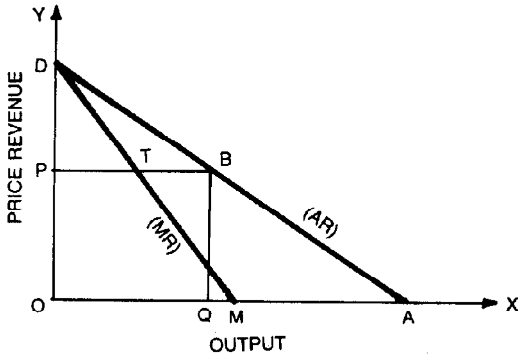

Fig. 6.10: AR and MR Curves

In the case of linear data, the marginal revenue falls twice of the fall in price at each level of output. Thus, when the demand curve (or the AR cure) is a straight line, the AM curve is also straight and lies mid-way between the price –axis (Y-axis) and the average revenue curve.

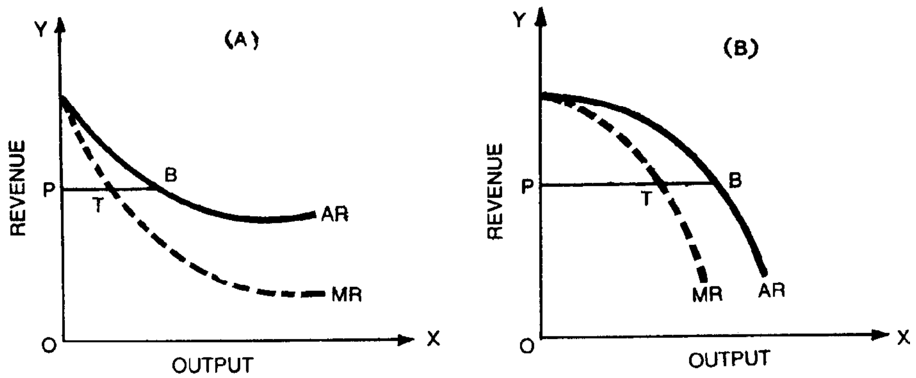

Fig. 6.11: Convex and Concave AR, MR Curves

6.12 Summary

1. Opportunity cost refers the cost so a given economic resource is the forgone benfits from the next best alternative use of that resources.
2. Money cost refers the cost of production measured in terms of money.
3. Implicit costs are not directly on actually paid-out costs.
4. Fixed cost remain fixed in the short run: costs of machinery, factory plant.
5. Variable cost: prime cost, varying with the level of output - for example labout cost, raw material cost.
6. In long-run, all cost tend to become variable costs.
7. Total cost = total fixed cost + total vairble cost.
8. Marginal cosrt: the cost of producing an extra unit of output.
9. Average total cost (ATC: U-shaped curve
10. When AC is minimum: MC = AC

6.13 Key Words/Abbreviations

- **AFC:** Average Fixed Cost
- **AVC:** Average Variable Cost
- **MC:** Marginal Cost
- **ATC:** Average Total Cost
- **SAC:** A short-run Average Costs
- **LAC:** Long Run Average Cost

6.14 Learning Activity

1. Trace the relationship between price, total, average and marginal revenues of a competitive run.

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2. Trace the relationship between price and revenue under monopoly.

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3. Trace the rehabiliting between MC and AC

6.15 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. Define opportunity cost and trace its economics significance.
2. Explain the phenomenon of fixed and variable cost.
3. Compare a hypothetical short-run, total costs shcedule of a firm.
4. Explain the behaviour of short-run average cost curves.
5. Trace the relationship between MC and AC.
6. Indicate the main features of the LAC curve.
7. Define
   (a) Total revenue;
   (b) Average revenue; and
   (c) Marginal revenue.

8. Explain the geometrical relationship between the linear *AR* and *MR* curves.

9. Define opportunity cost and trace its economic significance

10. Explain the phenomenon of Fixed and variable costs.

11. Compare a hypothetical short-run total costs schedule of a firm.

12. Explain the behaviour of short-run Average Cost Curves.

13. Explain diagrammatically the relationship between Average cost, Average variable cost and Average fixed cost.

14. Explain the changes that will take place in total revenue when

    (a) Marginal revenue is falling but is positive.

    (b) Marginal revenue is zero.

    (c) Marginal revenue is negative

15. Discuss marginal revenue. Explain the relationship between average and marginal revenue when price is constant at all levels of output.

B. Multiple Choice/Objective Type Questions

1. The concept of opportunity cost is useful in explaining

    (a) Determination of cost structure

    (b) Relative price of different goods

    (c) Determination of economic significance

    (d) Trend of business behaviour

2. Entrepreneurial Remuneration signifies

    (a) Implicit cost (b) Explicit cost

    (c) Out of pocket cost (d) All of the above

3. Office rent is regarded as
   (a) Prime cost (b) Supplementary cost
   (c) Property cost (d) None of the above
4. Raw-material cost are
   (a) Fully variables (b) Semi-variable
   (c) Fixed (d) Out of total cost
5. Incremental cost is the cost caused by
   (a) Introduction of new product (b) Charge of manager
   (c) Property tax (d) None of the above
6. Revenue means:
   (a) sales receipts (b) post office reveneue
   (c) goverment revenue (d) total revene
7. Revenue obtained per unit of output is termed as:
   (a) Sales Revenue (b) Average Revenue
   (c) Marginal Revenue (d) All of the above
8. The concept of marginal revenue is of high significance in the theory of
   (a) Industry (b) Business
   (c) firm (d) None of the above
9. A monopolist can eith central quantity or :
   (a) price (b) demand
   (c) supply (d) output

10. Marginal Revenue Curve lies:

    (a) Above the AR Curve (b) below the AR curve

    (c) backward sloping (d) none of the above

Answers

1. (b), 2. (a), 3. (b), 4. (a), 5. (a) 6. (a), 7. (b), 8. (c), 9. (a), 10. (b)

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UNIT 7 MARKET STRUCTURE

Structure:

7.0 Learning Objectives

After studying this unit, you will be able to:

- Explain meaning and different types of market.
- Analyse different features of market structures and able to identify which type of market is a reality.
- Answer how pricing and output decision are taken under different market conditions.
- Discuss the meaning of different concept like firm, industry equilibrium etc.
- Elaborate the approaches to equilibrium: MC & MR approach.
- Analyse Profit Maximisation case study.

7.1 Introduction

In a market economy pricing is basically conditioned by the market structure. There are many different market structures. Perfect competition is a very important type of market structure assumed by the classical and neo-classical economist as a theoretical model.

The market is a set of conditions in which buyers and sellers come in contact for the purpose of exchange. The market situations vary in their structure. Different market structures affect the behaviour of buyers and sellers (firms). Further, different prices and trade volumes are influenced by different market structures. Again, all kinds of markets are not equally efficient in the exploitation of resources and consumers' welfare also varies accordingly. Hence, the aspects of pricing process should be analysed in relation to the different types of market.

Ordinarily, a market is understood as a place where commodities are bought and sold at retail or wholesale prices. Thus, a market place is thought to be a place consisting of a number of big and small shops, stalls and even hawkers selling various types of goods.

In economics, however, the term "market" does not refer to a particular place as such but it refers to a market for a commodity or commodities. Thus, economists speak of, say, a wheat market, a tea market, a gold market and so on.

Definition. An arrangement whereby buyers and sellers come in close contact with each other directly or indirectly to sell and buy goods is described as market.

It follows that for the existence of a market, buyers and sellers need not personally meet each other at a particular place. They may contact each other by any means such as telephone or telex.

Thus, the term "market" is used in economics in a typical and a specialised sense:

- It does not refer only to a fixed location. It refers to the whole area of operation of demand and supply.
- It refers to the conditions and commercial relationships facilitating transactions between buyers and sellers. Thus, a market signifies any arrangement in which the sale and purchase of goods take place.
- Thus, to create a market for a commodity, what we need is only a group of potential sellers and potential buyers; they may be at different places.
- Markets may be physically identifiable, e.g., the cutlery market in Mumbai situated at Jumma Masjid Street or one which is identified in a general sense, without any reference to a particular commodity, such as the labour market, the stock market, etc.
- Existence of different prices for a specific commodity means existence of different markets.

Types of Market – Structures Formed by the Nature of Competition

Traditionally, the nature of competition is adopted as the fundamental criterion for distinguishing different types of market structures.

The degrees of competition may vary among the sellers as well as buyers in different market situations.

The nature of competition among the sellers is viewed on the basis of two major aspects : (1) The number of firms in the market; and (2) The characteristics of products, such as whether the products are homogeneous or differentiated.

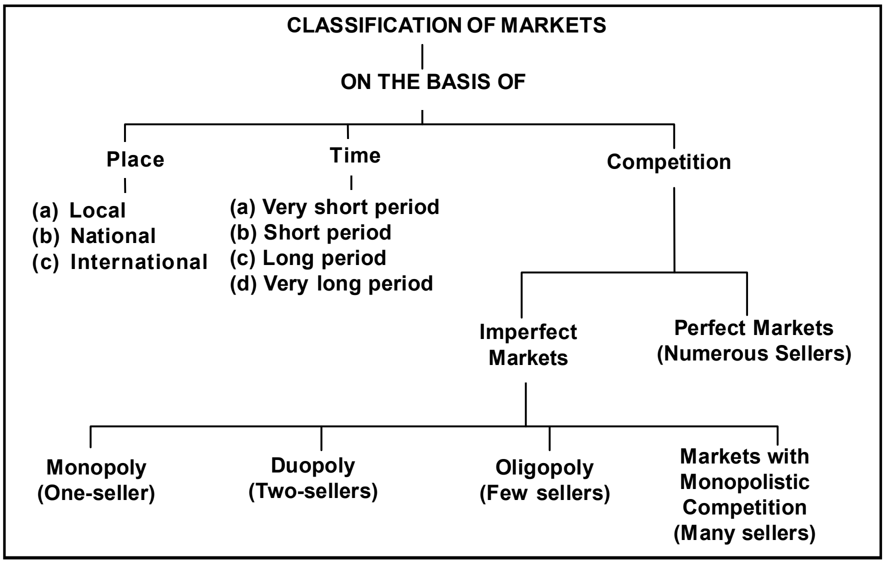
Individual seller's control over the market supply and his hold on price determination basically depends upon these two factors.

On the selling side or supply side of the market, the following types of market structures are commonly distinguished: (1) Perfect competition; (2) Monopoly; (3) Oligopoly; and (4) Monopolistic competition.

Perfect competition and monopoly are the two extremes of the market situations. Other forms of market such as oligopoly and monopolistic competition fall in between these two extremes. Oligopoly and monopolistic competition are the market situations characterised by imperfect competition.

Markets can be classified on the basis of place or region, time or competition. The following chart gives a clear picture about the classification of markets.

Chart 7.1



7.2 Classification of Market Structures

The market is a set of conditions in which buyers and sellers come in contact for the purpose of exchange. The market situations vary in their structure. Different market structures affect the behaviour of buyers and sellers (firms). Further, different prices and trade volumes are influenced by different market structures. Again, all kinds of markets are not equally efficient in the exploitation of resources, and consumers welfare also varies accordingly. Hence, the different aspects of the pricing process should be analysed in relation to the different types of markets.

Markets may be classified on the basis of different criteria, such as geographical space or area, time element and the nature of competition.

Chart pinpoints the classification of different types of market structures.

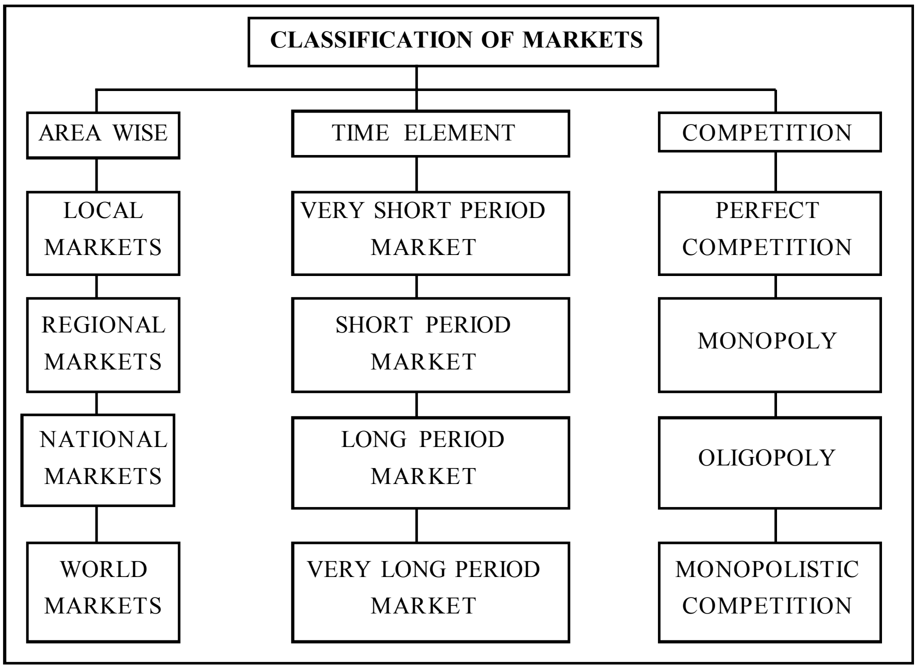


Fig. 7.1

7.3 Markets Based on Time Element

Time element to the functional or operational time period pertaining to production processes and market forces at work. The time element may be distinguished by the following functional time periods of varying durations, namely:

- market period,
- short period,
- long period, and
- very long period or secular time. Considering these time periods, markets may be distinguished as: (1) Very short period market, (2) Short period market, (3) Long period market, and (4) Very long period market.

Very Short Period Market

The market for a commodity during the market period is referred to as "the very short period market." On functional basis, the market period is regarded as a very short time period during which it is physically impossible to change the stock of a commodity even by a single unit further. The basic characteristic of a very short period (or market period) market is that in this market it is not possible to make any adjustments in the supply to the changing demand conditions.

In a very short period market, the equilibrium price of a commodity is referred to as the "market price" which is established by the intersection of market period demand and market period supply.

Short Period Market

The market of a commodity during short period is referred to as "the short period market." The short period is a functional time period during which it is possible for a firm to expand output of a commodity to some extent by changing the variable inputs such as labour, raw materials, etc., under its fixed plant size. Thus, the firm is in a position to make some adjustment in the supply in the changing demand conditions. In the short period market, the equilibrium price is established by the intersection of short period demand and short period supply.

Long Period Market

The market for a commodity in the long period is referred to as "the long period market." The long period refers to a functional time period which is sufficient to permit changes in the scale of production to a firm by changing its plant size. In the long period market, the firm is in a position to make better and sufficiently well and even full adjustments in supply in the changing demand conditions. In the long period market, the equilibrium price of a commodity is established by the interaction of long period demand and long period supply. It is referred to as the normal price.

Very Long Period Market

The market for a commodity in the very long period is referred to as "the very long period market." The very long period market is a secular time period which runs over a series of decades. During such a very long functional time period, dynamic changes take place in demand and supply situations. There can be perfect adjustment between demand and supply in the secular period. Thus, secular equilibrium is determined between demand and supply in the secular period. However, the secular period is of little theoretical significance on account of the too long period involved in its operation.

7.4 Perfect Competition

Perfect competition refers to the market structures where competition among the sellers and buyers prevails in its most perfect form. In the perfectly competitive market, a single market price prevails for the commodity, which is determined by the forces of total demand and total supply in the market. Under perfect competition, every participant (whether a seller or a buyer) is a price-taker. Everyone has to accept the prevailing market price as individually no one is in a position to influence it.

Conditions or Characteristics of Perfect Competition

The following conditions must exist for a market structure to be perfectly competitive. These are also the distinct features or distinguishing marks of perfect competition:

- **Large Number of Sellers.** A perfectly competitive market structure is basically formed by a large number of actual and potential firms and sellers. Their number is sufficiently large and as the size of each firm is relatively small, so the individual seller's or firm's supply is just a fraction of the market supply. Consequently, any variation in individual supply has a negligible effect on the total supply. Thus, an individual firm or seller cannot exert any influence on the ruling market price. In a perfectly competitive market, thus, a firm is a price-taker.

- **Large Number of Buyers.** There are a very large number of actual and potential buyers so that each individual buyer's demand constitutes just a fraction of the total market demand. Hence, no individual buyer is in a position to exert his influence on the prevailing price of the product. From the above two conditions, it follows that though an individual buyer or seller cannot affect the price, all firms together or all buyers together can change the market supply or demand as a whole, so that the market price will be affected.

- **Product Homogeneity.** The commodity supplied by each firm in a perfectly competitive market is homogeneous. That means, the product of each seller is virtually standardised, i.e., there is no identification of the product of each seller, as there is no product differentiation. Since each firm produces an identical product, their products can be readily substituted for each other. Hence, the buyer has no specific preference to buy from a particular seller only. His purchase from any particular seller is a matter of chance and not of choice, on account of the homogeneity of goods.

- **Free Entry and Exit of Firms.** There is free entry of new firms into the market. There is no legal, technological, economic, financial or any other barrier to their entry. Similarly, existing firms are free to quit the market. Thus, the mobility of firms ensures that whenever there is scope in the business, new entry will take place and competition will remain always stiff. Due to the natural stiffness of competition, inefficient firms would have to eventually quit the industry.
- **Perfect Knowledge of Market Conditions.** Perfect competition requires that all the buyers and sellers must possess perfect knowledge about the existing market conditions, especially regarding the market price, quantities and sources of supply. When there is such perfect knowledge, no buyer could be charged a price different from the market price. Similarly, no seller would unnecessarily lose by selling at a lower price than the prevailing market price. This way, perfect knowledge ensures transactions at a uniform price.
- **Perfect Mobility of Factors of Production.** A necessary assumption of perfect competition is that factors of production are perfectly mobile. Perfect mobility of factors alone can ensure easy entry or exit of the firms. Again it also ensures that the factor costs are the same for all firms.
- **Government Non-Intervention.** Perfect competition also implies that there is no government intervention in the working of market economy. That is to say, there are no tariffs, subsidies, rationing of goods, control on supply of raw materials, licensing policy or other government interference. Government non-intervention is essential to permit free entry of firms and for automatic adjustment of demand and supply through the market mechanism.
- **Absence of Transport Costs Element.** It is essential that competitive position of no firm is adversely affected by the transport cost differences. It is thus assumed that there is

absence of transport cost as all firms are closer to the market or there is equal transport cost faced by all, as all firms are supposed to be equally far away from the market.

7.5 Monopoly

Monopoly is the other extreme form of market situation. Pure monopoly is just the opposite of perfect or pure competition. Pure monopoly is a market structure in which there is only one seller. He controls the entire market supply of a product. Because, there is no rival producing a close substitute, the monopoly firm itself is an industry, so its output constitutes the total market supply. In a monopoly market, the seller (the monopolist) is faced with a large number of competing buyers. But, being the sole supplier, the monopolist has a strong hold over price determination. He usually tries to set the price and output of his product entirely in his own interests of profit maximisation.

Features of Monopoly

The following are the main characteristics of a pure monopoly market:

- There exists only one seller but there are many buyers.
- The monopoly firm is the industry.
- There are many entry barriers such as natural, economic, technological or legal, which do not allow competitors to enter the market. The monopolist has, therefore, complete hold over the market supply and price determination.
- A monopoly firm is a “price-maker.” In a monopoly market, the price is solely determined at the discretion of the monopolist, since he has control over the market supply.
- There are no closely competitive substitutes for the product of the monopolist. So the buyers have no alternative or choice. They have to either buy the product from the monopolist or go without it.
- Monopoly is a complete negation of competition.
- Since a monopolist has a complete control over the market supply in the absence of a close or remote substitute for his product, he can fix the price as well as quantity of output to be sold in the market. Though a monopolist is a price-maker, he has no unlimited power to

charge a high price for his product in the market. This is because, he cannot disregard demand situation in the market. If buyers refuse to buy at a very high price, he has to keep a lower price. He will produce that level of output which maximises the profits and charge only that price at which he is in a position to dispose of his entire output. Thus, the monopolist sets price for his product in relation to the demand position, and not just fix any price he likes.

7.6 Types of Monopoly

The following are the important types of monopoly:

Pure Monopoly and Imperfect Monopoly

Pure monopoly means a single firm which controls the supply of a commodity which has no substitutes, not even a remote one. It possesses absolute monopoly power. Such a monopoly is very rare. Imperfect monopoly means a limited degree of monopoly. It refers to a single firm which produces a commodity having no close substitutes. The degree of monopoly is less than perfect in this case and it relates to the availability of a close substitute. In practice, there are many cases of such imperfect monopoly. Pure monopoly is a complete negation of competition. Imperfect monopoly, however, does not totally rule out the possibility of competition. It implies a threat of competition from the rivals producing remote substitutes. Hence, imperfect monopoly lacks absolute monopoly power in deciding price and output policy. Pure monopoly is referred to as absolute monopoly, while imperfect monopoly is referred to as limited or relative monopoly.

Legal, Natural, Technological and Joint Monopolies

On the basis of the sources of deriving monopoly power, monopolies may be classified as: (i) legal, (ii) natural, (iii) technological, and (iv) joint. Legal monopolies emerge on account of legal provisions like patents, trade marks, copyrights etc. The law forbids the potential competitors to imitate the design and form of products registered under the given brand names, patents or trade marks. Natural advantages like good location, old-age establishment, involvement of huge investment, business reputation etc. confer natural monopolies on many firms. Technological expertise, economies of large scale and efficiency of superior capital use and the process of mechanisation etc., confer technological monopolies to big firms. Through business combinations like trusts, cartels, syndicates, etc., some firms may unite in a group and acquire joint monopolies in the market.

Simple Monopoly and Discriminating Monopoly

A simple monopoly firm charges a uniform price for its product to all the buyers. A discriminating monopoly firm charges different prices for the same product to different buyers. A simple monopoly operates in a single market. A discriminating monopoly operates in more than one market.

Private Monopoly and Public or Social Monopoly

Considering the nature of ownership, monopolies may be grouped into: (i) private monopolies, and (ii) public or social monopolies. When an individual or a private body controls a monopoly firm, it is regarded as a private monopoly. When production is solely owned, controlled and operated by the state, it is regarded as a social or public monopoly. Public monopolies are confined to nationalised industries.

7.7 Imperfect Competition

Theoretically, perfect competition is the simplest market situation assumed by the economists. Modern economists like Mrs. Joan Robinson and Prof. Chamberlin have, however, challenged the very concept of perfect competition. They regard it as a totally unrealistic model, something imaginary, without any relation whatsoever to economic reality. All conditions of perfect competition do not exist simultaneously. So, in reality there is imperfect rather than perfect competition.

In reality competition is never perfect. So, there is imperfect competition when perfect form of competition among the sellers and the buyers does not exist. This happens as the number of firms may be small or products may be differentiated by different sellers in actual practice. Similarly, there is no pure monopoly in reality. Imperfect competition covers all other forms of market structures ranging from highly competitive to less competitive in nature. Traditionally, oligopoly and monopolistic competition are categorised as the most realistic forms of market structures under imperfect competition.

Oligopoly

Oligopoly refers to the market structure where there are a few sellers (more than two but not too many) in a given line of production. Fellner defines oligopoly as "competition among the few." In an oligopolistic market, firms may be producing either a homogeneous product or may have product differentiation in a given line of production. The oligopoly model fits well in such industries as automobile, manufacturing of electrical appliances, etc., in our country. Following are the distinguishing features of an oligopolistic market:

- There are a few sellers supplying either homogeneous products or differentiated products.
- Firms have a high degree of interdependence in their business policies in fixing price and determining output.
- Firms under oligopoly have always the fear of retaliation by rivals.
- Competition is of a unique type in an oligopolistic market. Here, each oligopolist faces competition, and has to wage a constant struggle against his rivals.
- Advertising and selling costs have strategic importance to oligopolist firms.

Monopolistic Competition

Monopolistic competition refers to the market structure in which there are a large number of firms producing similar but not identical products. Monopolistic competition is a blend of monopoly and competition. Monopolistic competition is similar to perfect competition in that it has a large number of sellers, but its dissimilarities lie in its product differentiation. In perfect competition, goods are identical or homogeneous, while in monopolistic competition, products are differentiated through trade marks, brand names, etc. For example, in the soft drink market, products are distinguished by brand names such as Thums Up, Limca, Gold Spot, etc. Product differentiation confers a degree of monopoly to each seller in a market under monopolistic competition. Thus, in such a market, many monopolists compete with each other on the selling side. There are a large number of buyers too. But each buyer has preference for a particular seller or a brand of the product in the market. For instance, a smoker may prefer Panama brand cigarettes to Wills.

Following are the major characteristics of monopolistic competition:

- There are a large number of sellers.
- There are a large number of buyers.
- There is product differentiation. Each seller tries to distinguish his product from the rest.
- Each seller resorts to advertising and sales promotion efforts. Thus, selling costs are a unique feature of monopolistic competition.
- Monopolistic competition has two aspects: (i) price competition, i.e., sellers compete in price determination, and (ii) non-price competition, i.e., sellers compete through product improvements and advertising sales promotion efforts.

7.8 'Firm' and 'Industry'

Firm and industry are the basic concepts in price theory. In economics, the terms 'firm' and 'industry' connote some special meanings than what is understood in common parlance.

Firm

Firm refers to a business unit — an enterprise undertaking the production of a commodity. In economic theory the term firm connotes a particular production unit. It symbolises a unit of control over a group of factors of production co-ordinated for the purpose of producing a commodity.

A firm may be a small one or a very large one. The term *'small firm'* refers to a single plant, factory, business or retailing unit, which has small capital investment, producing small quantities of a product per unit of time. On the other hand, a large firm is one which has a number of plants under a complex managerial organisation, with a diversity of financial capital investments, which may produce a wide variety of products and in large quantities per unit of time.

Industry

The term industry refers to a group of firms engaged in the production of a specific commodity, including its close substitutes. Thus, an industry is a set of firms producing homogeneous goods. Here, the term '*homogeneity*' implies similarity of productive activity, results, and satisfaction of similar wants by similar kinds of goods. Thus, there are firms, which are engaged in the same type of production. All these firms together constitute the industry. A firm's production plant has a specific location. An industry is spread over a wide region.

In short, a firm is an individual productive unit. An industry is a set of all such firms, big or small, engaged in identical productive activity. In fact, grouping all the firms, big and small, according to the most prominent characteristics that they have in common constitutes an industry. In this way, an industry may be considered just a classification of a number of firms having common characteristics in regard to the production activity.

7.9 Profit Maximisation

In determining the equilibrium of a firm, it is assumed that the firm aims at maximisation of its profits. This assumption is fundamental to the analysis of the behaviour of a firm whose entrepreneur is assumed to act rationally. It is, therefore, necessary to define clearly the meaning of profit maximisation.

Profit in the ordinary sense is understood as the excess of the firm's total revenue of sales proceeds of a given output over its cost of production. Symbolically,

$$p = R - C$$

where, p = profit,

R = total revenue, and

C = total cost

when $R > C$, then $R - C$ is a positive value; it is called profit. If, however, $R < C$, then $R - C$ is negative, it is called loss. This is the interpretation of the term profit in the accounting sense. But when an economist calculates total cost, he includes all explicit as well as implicit costs. Economists have, therefore, two distinct notions of profit: (i) normal profit and (ii) super-normal profit.

Normal Profit

It refers to that amount of earnings which is just sufficient to induce the firm to stay in the industry. Normal profit is, thus, the minimum reasonable level of profit which the entrepreneur must get in the long run, so that he is induced to continue the employment of his resources in its present form.

Normal profit is the opportunity cost of entrepreneurship. It is equivalent to the transfer earnings of the entrepreneur. That means, if the entrepreneur fails to earn the normal rate of profit in the long run, he will close down the operation of his firm and quit the industry in order to shift his resources elsewhere.

Normal profit is considered as the least possible reward which in the long run must be earned by the entrepreneur, as compensation for his organisational services as well as for bearing the insurable business risks.

Normal profit is always regarded as a part of factor costs. Since entrepreneurial service is a factor of production, the price paid for it is the normal profit and it is to be incorporated while calculating the total cost. Of course, normal profit is the implicit money cost. Thus, in the economic sense, when the total cost (C) is measured, it also covers the normal profit of the firm. As such, when $R = C$, ordinarily it will be inferred that there is no profit. In the economic sense, though we may say, there is no pure business profit, but there is normal profit, which is already embedded in the total cost.

It must be remembered that the entrepreneur desires a fixed amount as normal profit, which is independent of the output. So, normal profit as a factor cost is a fixed implicit cost element. Evidently, when output expands, total normal profit like *TFC* gets spread over the range of output. This has a bearing on the shape of the average cost curve (*AC*), as shown in Figure 7.2.

Following Stonier and Hague (1966), in Figure 7.2, we have drawn two *AC* curves, one excluding normal profit-cost element (*AC*) and another by including it ($AC + NP$). It may be observed that as we move from left to right, the vertical distance between *AC* and $AC + NP$ curves tend to become narrow in a steady manner. This implies that as output increases, normal profit per unit of output, diminishes. However, the total normal profit at all levels of output remains the same. Geometrically, thus, when output is *OA*, the average normal profit is *QR*. When output rises to *OB*, the average normal profit diminishes to *VW*. Total normal profit is *PQRS* in the former case and *TVWZ* in the latter case. However, $PQRS = TVWZ$.

Normal profit is measured by the difference between $AC + NP$ and *AC* curves.

In economic theory, thus, whenever the average cost curve is drawn, the normal profit as the factor cost element of a fixed nature is always included; hence, *ATC* curve means *AC* + *NP* curve.

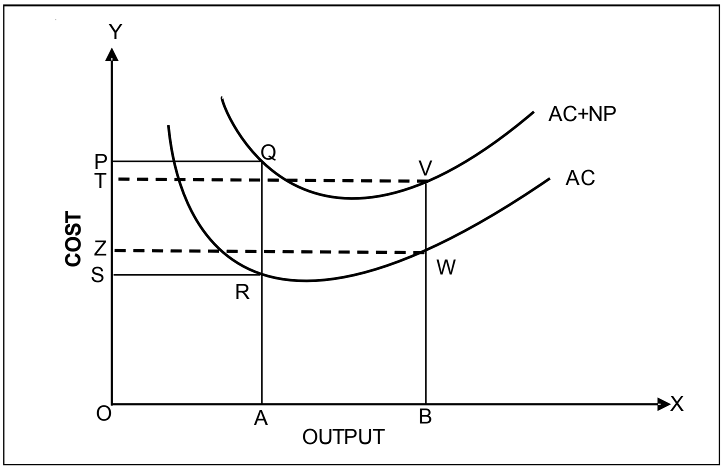


Fig. 7.2: Normal Profit and *AC* Curve

A theoretical importance of the concept of normal profit is for determining the industry's equilibrium. When only normal profit is earned by the existing firms there will be no new entry in the competitive market or the industry.

Supernormal Profit

Profits in excess of normal profit are considered as supernormal. Since normal profit is included in the cost of production, supernormal profit is obtained when total revenue exceeds total costs (i.e., $TR > TC$). It is also called pure business profit or "excess profit."

Supernormal profit depends on the demand conditions in the business, which are uncertain and unpredictable. Thus, supernormal profit is the reward for bearing uncertainties and unpredictable risks of business. Sometimes, in a competitive market, supernormal profit is also earned due to extraordinary efficiency on the part of the entrepreneur.

When the existing firms earn supernormal profit, new entries will be attracted to the industry, so the equilibrium of the industry is threatened.

Incidentally, when *TR* > *TC,* such that only a part of normal profit is earned by the firm, it is called subnormal profit. Subnormal profit is the profit below the normal profit earned when total revenue covers up explicit costs fully and a part of implicit cost of entrepreneurial services.

Profit Maximisation

From the above analysis, it follows that an entrepreneur's income consists of two elements: normal profits and surplus of total revenue over total cost, which is termed as residual income. Normal profits are the minimum income which the entrepreneur must receive if he is to continue to remain in his line of production. They are a part of the costs, and in pursuing the objective of profit maximisation, the entrepreneur does not aim at maximising normal profits. What he aims at maximising is the residual income, *i.e.,* the difference between the total revenue and the total cost, which is known as 'supernormal profit.'

A firm is said to be in equilibrium when it has no inclination to expand or to contract its output. The firm will reach such a state when it maximises its residual profits. Residual profits are the difference between total revenue and total cost. The firm will, therefore, reach equilibrium when it maximises the difference between its total revenue and total cost.

The behavioural rule of profit maximisation or the equilibrium output of the firm is explained by the Marginal Revenue-Marginal Cost equality approach (*MR: MC* Approach).

7.10 Case Study

PROFIT MAXIMISATION PROBLEM: A HYPOTHETICAL CASE STUDY

A practical significance of marginal analysis is highlighted by the following hypothetical business problem on profit-maximisation. Sai Baba Plastic Works is a small firm producing buttons. It is seeking profit maximisation. At the prevailing market price, say ₹ 12 per box it can sell as many buttons as it produces. It has, however, a limited capacity of a single manufacturing plant. It is operating at full capacity on all working days, except Sundays. If it has to work on Sunday, the firm has to pay overtime (double) wage rates to the workers. As such, the marginal costs of production on weekdays remain constant, but tend to be higher on Sundays.

Suppose, the firm gets a contract from 'Big-Boss' a garment producing firm to supply the buttons with its brand-name and ready to pay ₹ 18 per box for weekly order of 1000 boxes. The firm's full capacity daily output is 1000 boxes, which it can sell at ₹ 12 per box in the market. The firm's weekly fixed costs amount to ₹ 1000 (rent + interest + insurance). Variable costs is ₹ 10 per box (raw materials ₹ 5 + labour cost ₹ 5).

Assuming no cost difference between ordinary and brand-name imposed buttons, what should be the output determination by the firm? Should the firm produce more by working on Sundays?

The rational decision can be guided by the marginal approach of profit maximisation rule suggested by the economic theory.

In this case, the marginal costs (*MC*) remain constant at ₹ 10 for the normal working days — Monday to Saturday. On Sunday, however, the *MC* tends to be ₹ 15 per box. (₹ 5 raw materials costs and ₹ 10 labour cost).

The rational approach to the business lies in doing the most cost effective activity first on *MC* consideration of the supply side; while the most revenue enhancing output should be sold first looking to the demand side.

As such, the firm should produce brand-name buttons first to cater to the high-priced order at ₹ 18. Thereafter, decision should be made on whether it is worthwhile to work on Sunday to produce ordinary buttons.

In this case, the marginal revenue initially for six days tend to be higher than the marginal cost. (Monday: MR = ₹ 20 > MC = ₹ 10, other five days Tuesday through Saturday MR = ₹ 12 > MC = ₹ 10). But, on Sunday the marginal cost (₹ 15) tends to be higher than the marginal revenue (₹ 10); therefore, on Sunday the firm should not work.

The two alternative situations in this case can be reviewed as under:

1. The firm operates on 6 days: Monday to Saturday.

Day	Output (Q)	Price (P) (TVC)	Total Revenue (TR)	Total Variable Cost
Monday	1000*	18	18,000	10,000
Tuesday	1000	12	12,000	10,000
Wednesday	1000	12	12,000	10,000
Thursday	1000	12	12,000	10,000
Friday	1000	12	12,000	10,000
Saturday	1000	12	12,000	10,000
Weekly Total			78,000	60,000

*with brand-name

In this case

$\therefore$ Total Cost = $TFC + TVC$

= 1,000 + 60,000 = ₹ 61,000

p = $TR - TC$

$\therefore$ p = 78,000 – 61,000 = ₹ 17,000 per week

2. The firm operates on 7 days including Sunday

For Monday to Saturday total revenue and total cost should remain the same.

On Sunday variable cost per box is ₹ 15, therefore, total variable cost for 1000 boxes:

15 × 1000 = ₹ 15,000

Against this, total revenue is ₹ 12,000. Hence, there is a loss by ₹ 3,000.

Alternatively speaking, profits when the firm operates for 7 days will be measured as:

TR = ₹ 78,000 (Monday to Saturday output sold) + ₹ 12,000 (Sunday's out-sold)

= ₹ 90,000

TVC = ₹ 60,000 (Monday to Saturday) + ₹ 15,000 = ₹ 75,000

TC = ₹ 1,000 (TFC) + ₹ 75,000 = ₹ 76,000

p = $TR - TC$

∴ p = 90,000 − 76,000 = 14,000

It follows that when the firm operates for 6 working days its weekly profit is ₹ 17,000 but it tends to be less (at ₹ 14,000) when it works on Sunday as well. The right decision, therefore, is: do not operate on Sunday. The weekly equilibrium output, therefore, will be 60,000 boxes of buttons.

7.11 Summary

- Market refers to a situation where the buyers and sellers contact either directly or indirectly and conduct exchange transactions. Market need not be a particular area, or a place.
- Market can be classified on the basis of an area, the nature of business transactions, the volume of business and time.
- Market can also be classified on the basis of competition as perfectly competitive market, monopoly market and imperfectly competitive market.
- Firm refers to a business unit — an enterprise undertaking the production of a commodity. In economic theory the term firm connotes a particular production unit.
- The term industry refers to a group of firms engaged in the production of a specific commodity, including its close substitutes.
- Normal profit is the opportunity cost of entrepreneurship. It is equivalent to the transfer earnings of the entrepreneur.
- Supernormal profit depends on the demand conditions in the business, which are uncertain and unpredictable.
- The marginal cost-marginal revenue (MR : MC) approach clearly shows the behavioural role of profit maximisation by using price as an explicit variable.

7.12 Key Words/Abbreviations

- **Market:** contact arrangement for buying and selling transactions between the buyer and seller
- **Market period:** very short period
- **Monopoly:** A single seller controlling the entire market supply
- **Oligopoly:** a few sellers
- **Monopolistic competition:** many sellers with product differentiation.
- **Firm:** a business unit run by and entreprenuer
- **Industry:** Aggregation of firms in the same line of production
- **Normal profit:** Reasonable amount of profit in business tradition
- **Super-normal profit:** in excess of normal profit
- **Profit maximisation:** MR=MC

7.13 Learning Activity

1. Perfect competition, monopoly, monopolistic competition and obligpoly are the types of market structures considered in economic analysis.

   Which of these types would you relate to the following markets?

   (i) Foodgrains: Rice and Wheat, (ii) Stock market, (iii) Market for bus transport in New Delhi, (iv) Passenger Cars, (v) Petrol, (vi) Confectionery, (vii) Fireworks, (viii) Cigarettes, (ix) Market for liquor in Goa, (x) Branded fast-food in Mumbai.

   ----

2. Classify the market structure and visit a local market at your area.

   ----

3. Hypothetical firm data are given as under:

   (i) $P = 10 - 0.3Q$

   (ii) $TC = 6 + 4Q + 0.7Q^2$

   where

   P = price, Q = output and TC = Total cost

   Determine profit maximising output level, also price, a total revenue, total cost and profit at this optimum level.

   ----

4. State the difference between firm and industry at your point of view.

7.14 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. What do you mean by the term "market" in economics?
2. Explain the different types of market structures.
3. Write notes on:
   (a) Types of monopoly.
   (b) Oligopoly.
   (c) Monopolistic competition.
   (d) Features of monopoly.
   (e) Market Economy Paradigm.
4. Explain the terms firm and industry.

5. How would you perceive normal profit?
6. Explain profit maximising condition of a firm.
7. Do business people equal MR=MC for profit maximisation in reality?
8. Illustrate a case study of profit maximisation.
9. Elucidate the term of market and discuss the factors which determine the size of market for different commodities.
10. Throw a light on various stages of law of variable proportions and also develop the importance of it.
11. Develop the law of supply and highlights the various determinants of supply with respect to organization.

B. Multiple Choice/Objective Type Questions

1. A market refers to contact arrangements between

   (a) Buyer and seller (b) Merchants and traders

   (c) Wholeseller and retailers (d) Business people

2. In international trade, buying from abroad is termed as

   (a) Export (b) Imports

   (c) duty paid (d) Custom approval

3. Selling goods abroad is termed as

   (a) Imposts (b) exports

   (c) custom duty paid (d) Governmentsaction

4. Monopoly implies

   (a) A simple seller (b) A few sellers

   (c) Free entry (d) Blocked entry

5. Oligopoly implies
   (a) A few sellers (b) Two sellers
   (c) only three sellers (d) No control
6. Market refers to
   (a) The arrangements of enacting contacts between buyer and seller of a product
   (b) Bhendi bazar
   (c) Crowford market
   (d) Fromal condition
7. Free entry in market implies
   (a) Government non-intervention (b) Tichetlen entry
   (c) No charges (d) Open door policy
8. Market period is
   (a) One month time (b) Very short period
   (c) Fixed period (d) Absence of time
9. Firm refer to
   (a) A business unit (b) A market entity
   (c) A production company (d) A member of group
10. Homogenity implies
    (a) Industry (b) The same type of production
    (c) Firm's activity (d) None of the above
11. Normal profit is
    (a) The opportunity cost of entrepreneurship
    (b) The norm of perfect business

(c) Profit after tax

(d) All of the above

12. Profit is maximised when

    (a) MR>MC (b) MR=MC

    (c) MC<MR (d) TC=TR

13. MR=MC is termed as

    (a) The behavioural role of profit maximisation

    (b) The ideal approach

    (c) The business

    (d) All of the above

Answers

1. (a), 2. (b), 3. (b), 4. (a), 5. (a), 6. (a), 7. (a), 8. (b), 9. (a), 10. (b), 11. (a), 12. (b), 13. (a)

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UNIT 8 MACRO ECONOMICS

Structure:

8.0 Learning Objectives

After studying this unit, you will be able to:

- Explain the Concept of National Income
- Discuss the Concepts Associated With National Income Total
- Analyse the Methods of Estimating National Income
- Explain the simple circular flow model
- Describe the Circular Flow of Income in a Three-Sector Model
- Analyse the Circular flows in a Four-Sector Model: A Model with Foreign Sector

8.1 Introduction

The total income of the nation is called "national income." The aggregate economic performance of the whole economy is measured by the national income data. In fact, national income data provide a summary statement of a country's aggregate economic activity.

In real terms, national income is the flow of goods and services produced in an economy in a particular period — a year.

Modern economy is a money economy. Thus, national income of the country is expressed in money terms. A National Sample Survey has, therefore, defined national income as: "money measures of the net aggregates of all commodities and services accruing to the inhabitants of a community during a specific period."

A simple circular flow model of the macro economics containing two sectors (business and household) and two markets (product and factor) that illustrates the continuous movement of the payments for goods and services between producers and consumers. The payment flow between the two sectors and two markets is conveniently divided into four segments representing consumption expenditures, gross domestic product, factor payments, and national income.

The modern economy is a monetary economy. In the modern economy, money is used as a medium of exchange.

8.2 Concept of National Income

More elaborately, however, we may say that national income is a money measure of value of net aggregate of goods and services becoming available annually to the nation as a result of the economic activities of the community at large, consisting of households or individuals, business firms, and social and political institutions.

An important point about national income is that it is always expressed with reference to a time interval. It is meaningless to speak of the income of an individual without mentioning the period over which it is earned, say per week, per month, or per year. Similarly, it is meaningless to talk of national income without mentioning the period over which it is generated. This is because national income is a flow and not a stock, i.e., income is generated every year, and at different rates and, therefore, it is necessary to mention the period during which that income is generated. National income is usually measured and shown with reference to a year or as annual flow; it is, thus, an amount of total production per unit of time.

Like many other terms in common use, the concept "national income" has various connotations. For instance, national income is variously described. Sometimes, it is known as "national income" at other times, "national product", or "national dividend." As a matter of fact, all these terms mean one and the same thing.

In national income accounting, thus, the concept of national income has been interpreted in three ways, as: (1) National Product, (2) National Dividend, (3) National Expenditure.

National Product. It consists of all the goods and services produced by the community and exchanged for money during a year. It does not include goods and services which are not paid for, such as hobbies, housewives' services, charitable work, etc.

National Dividend. It consists of all the incomes, in cash and kind, accruing to the factors of production in the course of generating the national product. It represents the total of income flow which will exactly equal the value of the national product turned out by the community during the year.

National Expenditure. This represents the total spending or outlay of the community on the goods and services (of all types, capital as well as consumption) produced during a given year. Since income is the source of expenditure, national expenditure constitutes the disposal of national income, which is evidently equal to it in value or in other words, National Expenditure equals National Income.

Indeed, one man's income is another man's expenditure. When a person buys milk, it is his expenditure, but this very expenditure is the milkman's income. When the milkman spends part of this income in buying sugar, it becomes income for the sugar merchant and so on. In a sense, therefore, the sum of expenditure of all agents of production is equal to the total income received by the factors of production during that year. National Income can, therefore, be also defined as a sum of the expenditure on producer goods, consumer goods and services of agents of all production.

In fact, there is a fundamental equality between the total income of the community and its total expenditure, as one's expenditure becomes another's income in the economy. Hence, there is a large circular flow established in which each expenditure creates an income, which in its turn is spent and creates other incomes. Therefore, this total national income will be equal to the total national expenditure.

Briefly, thus, the identity of the three factors of the flow of national income may be expressed as follows:

National Expenditure = National Product = National Income or Dividend.

When we analyse, the above three concepts, we find that national income is nothing but "the total flow of wealth produced, distributed and consumed." National income is not a stock but it is a flow. It is not that the income is first earned and then gradually spent or distributed, or alternatively, it is not that the expenditure first takes place and then an income is earned. As a matter of fact, the process of income creation and income distribution goes on at one and the same time.

There are, thus, three alternative definitions of national income. The first definition is that it is the money value of goods and services produced by agents of production during the course of a year. We might call this "total production approach."

The second definition is that it is the sum of incomes of agents of production, profits of public enterprises, income from government companies. This we might describe as "income approach."

The third definition is that national income is the sum of total expenditure of agents of production. We might call it "Total expenditure approach."

8.3 Concepts Associated with National Income Total

Gross National Product (GNP)

In calculating national income, we add up all the goods and services produced in a country. Such a total represents the gross value of final products turned out by the whole economy in a year, which is technically called Gross National Product. The word "gross" indicates the inclusion of the provision for the consumption of capital assets, i.e., depreciation or replacement allowances.

GNP, thus, may be defined as the aggregate market value of all final goods and services produced during a given year. The concept of final goods and services stands for finished goods and services, ready for consumption of households and firms, and exclude raw materials, semi-finished goods and such other intermediary products. More specifically, all sales to households, business investment expenditures, and all government expenditures are treated as final products. But, intermediary goods purchased by business firms are obviously regarded as final goods. For example, when a textile mill purchases a machine or showroom, it is regarded as final goods, but when it buys cotton, it is not regarded as final goods. This is to avoid double counting because when cotton is transformed into cloth, its value will be included in the price of cloth.

In an open economy (an economy subject to international trade), GNP may be obtained by adding up:

1. The value of all consumption goods which are currently produced.
2. The value of all capital goods produced which is defined as Gross Investment. Gross investment, in the real sense, here implies the increase in inventories plus gross products of buildings and equipment. It, thus, includes the provision for the consumption of capital assets, i.e., depreciation, or replacement allowances.
3. The value of government services which are measured in terms of governmental expenditure on various goods and services for rendering certain services to the benefit of the entire community.

4. The value of net products, viz., the difference between total exports and total imports of the nation. This value may be positive or negative.
5. The net amount earned abroad. This represents the difference between the income received by the nationals from abroad on their foreign investment, minus the income paid by them abroad on the foreigner's investment.

   GNP at market price, thus, represents:

   GNP = C + I + G + (X – M) + (R – P),

   where,

   C stands for consumption goods,

   I stands for capital goods/or gross investment,

   G stands for government services,

   X stands for exports,

   M stands for imports,

   R stands for income receipts from abroad, and

   P stands for income paid abroad.

   In a closed isolated economy, however, GNP = C + I + G.

   GNP is the basic social accounting measure of the total output. It represents the final products, ready for consumption, valued at current market prices.

Gross Domestic Product (GDP)

When we take the sum total of values of output of goods and services in the country, without adding net factor incomes received from abroad, the figure so obtained is called Gross Domestic Product (GDP).

GDP = C + I + G + (X – M).

This is measured at market prices.

A measurement of GNP has been illustrated in the Table 8.1 below.

Table 8.1: Final Output (GNP)

Item	Value of Current Market Price (₹ Crores)
Consumption (C)	654
Investment (I)	334
Government Purchases (G)	123
Net Exports (X - M)	+ 15
Net Income from the rest of world (R - P)	+ 2
Total	**1128**

In measuring GNP, each finished product is multiplied by its price. Thus, the relative importance of particular good is expressed by its relative price. Further, with changes in prices the GNP also changes. During inflation, thus GNP appreciates simply on account of rising prices. To know the real GNP, therefore, we must deflate a given GNP total from the market price to the constant price.

GDP at factor cost is obtained as follows:

GDP at market price + (S – T), where, S = Government subsidies, and T = Indirect taxes.

GNP represents the measure of the economic output in an economic system. The final output included in the GNP is composed of the following uses: (1) Consumption, (2) Investment, (3) Government spendings, and (4) Net exports. As Schultze points out, all output flows to one of these four uses.

The consumption expenditure component of national product constitutes the expenditure on durable goods, perishable goods, and services which are marketed during the year.

The investment component implies that part of the current product which is not consumed but used for adding further or replacing the real capital assets. It refers to gross investment. Gross investment minus depreciation (for replacement requirement) is equal to net investment.

Schultze lists the following main categories of investment in the GNP accounts:

1. Fixed investment, relating to the purchase of durable capital goods by firms.
2. Inventory investment, representing that part of output which is absorbed by firms as an increase in their stocks of finished goods, intermediary products and raw materials.
3. Residential building constructions for households. Here only new buildings are to be accounted for.

Full employment level of GNP is the potential GNP. Potential GNP is, thus, the value of final goods and services which a country can produce by operating at a point of its production possibility frontier by fully exploiting its available resources and industrial capacities. Actual GNP is rarely equal to potential GNP. Thus, potential GNP minus actual GNP is the measure of the size of unemployment of excess capacity in the economy.

Net National Product (NNP)

It refers to the value of the net output of the economy during one year. NNP is obtained by deducting the value of depreciation or replacement allowance of the capital assets from the GNP. To put it symbolically: NNP = GNP - D, where D = depreciation allowances. This value is measured at current prices, while GNP is expressed at current market prices. Net National Product, in fact, is the value of total consumption plus the value of net investment of the community.

What is the difference between GNP and NNP? In our definition of Gross National Product, we have not made any allowance for depreciation, capital appreciation and obsolescence. Depreciation means wear and tear of machinery in the process of production. Machines used for production have to be replaced at some future time, as due to their constant use they become useless over time. In other words, fixed assets are not everlasting and must be constantly renewed to keep production running smoothly and steadily. Similarly, some machinery becomes out of date with the passage of time. This old type of machinery needs to be replaced by an up-to-date one, if competitive efficiency is to be maintained. Capital appreciation means an increase in the value of fixed assets like machinery, building, tools, etc. due to rise in their prices. It usually happens during the period of inflation. A rise in the value of fixed assets does not mean that there is any increase in national income, because the total quantity of fixed assets remains the same. Thus, when the amount of estimated depreciation and obsolescence, i.e., capital consumption, is subtracted from Gross National Product, we get Net National Product.

However, national income, in its technical sense, is obtained by deducting indirect taxes from the net product measured at current market prices. Such a figure is also called NNP at factor cost, as it represents payments made to the factors of production during the process of production.

National Income at Market Price and National Income at Factor Costs

In the national income analysis, usually a distinction is made between national income at market price and national income at factor costs. National income at market price means the money value of goods and services produced. It is the price of the aggregate output and services at current market prices. This price also includes some element of taxes and subsidies. A simple example will illustrate this point.

Let us suppose that the price of a bottle of beer is ₹ 6. In this case, the national income at market price is ₹ 6. But there is some element of tax in the above price. Let us suppose, the tax is ₹ 2. Then, the national income at factor cost is ₹ 4, because the factor of production which has contributed to the production of one bottle of beer will get only ₹ 4 and the balance of ₹ 2 will go to the government as tax.

Let us now analyse the implications of the elements of subsidy. Let us suppose the fair price of a kilogram of sugar is ₹ 4, but its actual cost of production is ₹ 5. The differences of ₹ 1 between the actual cost of production (₹ 5) and the fair price shop price (₹ 4) is borne by the State. In this case, the national income at market price is ₹ 4, but it is ₹ 5 at factor cost because the factors of production would receive ₹ 5 for the production of one kilogram of sugar.

Gross domestic product at factor cost = Income earned by the factor of production + Depreciation.
Net Domestic Product at factor cost = Income earned by the factor of production – Depreciation + Taxes – Subsidy.
National Income at market price + National Income at factor cost + Taxes – Subsidies – Depreciation.

We are now in a position to examine the interrelationship between the three definitions of national income given above. There is close relation between national income as a flow of goods, as a flow of expenditure, and as a flow of income. In fact, they are so interrelated that total production, total income and total expenditure are described as a circular flow of income activities. The firms hire the factors of production to produce goods and services. The factors of production create real income. The factors of production are paid out of this real income, in terms of money as a reward for their services. They, in turn, spend this income. Thus, income leads to expenditure, i.e., expenditure creates demand for goods. This demand, in turn, leads to production. The flow is from production to income generation to expenditure, and from expenditure, to production. National income is, therefore, the total flow of wealth produced, distributed and consumed by the economy as a whole during the course of a year. These three things **total production, total income and total expenditure** are really one and the same thing when reviewed from different angles. Each approach with suitable adjustment, will give exactly the same GNP or NNP.

8.4 Other Related Concepts

(1) Personal Income

Personal income is the total money income received by individuals in the community. Personal income is the aggregate earned and unearned income. Undistributed profits of the corporations reduce the personal income of individuals to that extent. Thus, personal income (PI) = NI – undistributed profits, (U). Again personal income includes transfer payments made by government as well as the private business sector to individuals.

Thus, personal income (PI) = NNP + transfer payments (R)

$\therefore$ PI + NI + R – U.

(2) Disposable Personal Income

Disposable personal income is the sum of the consumption and saving of individuals. Thus, DI = C – S.

Disposable personal income (DPI) rather than National Income is the determinant of consumption, because the consumption of a person depends on his take home pay.

Disposable income includes an unearned element (transfer payments) which is excluded in community's earned income estimates, i.e., national income. Disposable income is the total income, earned and unearned, of individuals minus direct taxes.

Thus, DPI or simply DI = PI – Td where Td = direct personal taxes such as income tax, wealth tax, etc. DPI is also symbolised as Yd by money economists.

PI = Yd = C + S

Keynes, however, assumed that Td = 0.

$\therefore$ Y = Yd $\therefore$ Y = C + S

(3) Personal Savings

Personal savings refer to the difference between disposable personal income and personal consumption expenditure.

A bird's eyeview of the calculation of related concepts in national income data is presented in Table 8.2.

Table 8.2: Relation of GNP, NI, Personal Income Saving (Imaginary Data)

	(₹) Crores
GNP	500
Capital Consumption allowance	– 50
Net National Product (NNP)	450
Indirect Taxes	– 60
Subsidies	10
National Income (NI)	400
Corporate Profits	– 70
Dividends	15
Government Transfer payments and business transfer payments	25
Personal Income	370
Personal direct taxes	– 70
Disposable personal income (DPI)	300
Personal Consumption expenditure	– 275
Personal savings	25

8.5 Methods of Estimating National Income

In national income estimates, by definition, we have to count all those goods and services produced in the country and exchanged against money during a year. Thus, whatever is produced is either used for consumption or for saving. Thus, national output can be computed at any of the three levels, viz., production, distribution and expenditure. Accordingly, we have three methods of estimating national income: (i) the census of products method, (ii) the census of income method and, (iii) the expenditure method.

The Census of Products Method or Output Method

This method measures the output of the country. It is also called the inventory method and involves the assessment, through census, of the gross value of production of goods and services produced in different economic sectors by all the productive enterprises in the economy. (For instance, the producing sectors in India are agriculture, forestry, fisheries, mining, industries, transport, commerce and other services.)

To the aggregated value of total output, real income earned from abroad is added (i.e., add the net difference between the value of exports and imports). And indirect taxes like excise and customs duties, plus depreciation allowances are to be reduced from the total obtained. Thus, to this net difference of the income earned from the rest of the world, a symbolic expression for this method may be given as follows:

$Y = (P - D) + (S - T) + (X - M) + (R - p)$

where,

Y = Total income of the nation,

P = domestic output of all production sectors,

D = depreciation allowance,

S = subsidies,

T = indirect taxes,

X = exports,

M = imports,

R = receipt from abroad, and

p = payments made abroad.

Mostly, this method is adopted in the calculation of national income. However, there are certain precautions against the danger of double counting, etc., which must be strictly avoided if a correct result is to be achieved.

The following precautions are necessary:

1. To avoid double counting, we must add only the final products. Raw materials and intermediate goods should not be included, as that would lead to double counting.
2. Goods for self-consumption by the producer should be excluded; they have not been marketed, so it is difficult to ascertain their true market value.
3. While evaluating the output, changes in the price levels between the years must be taken into account. It is usual to denote national income with reference to prices of a particular year.
4. Indirect taxes, included in prices, are to be deducted for getting the exact value of the products. Similarly, subsidies given by government to certain products should be added in evaluation of the product.
5. Add the value of exports or the income earned abroad and deduct the value of imports.

This method is widely used in the underdeveloped countries, but it is less reliable because the margin of error in this method is large. However, in India, this method is applied to agriculture, mining and manufacturers, including handicrafts. But the census of product method is not applied for the transport, commerce and communication sectors in India.

Value added vs. Final Goods Approach

There are two approaches to avoid the possibility of double counting in the measurement of GNP:

(i) Final goods method, and

(ii) Value added method.

In the final goods method of estimating GNP, only final values of goods and services are computed, ignoring all intermediate transactions. Intermediate goods are involved in the process of producing final goods — the final flow of output purchased by consumers. Thus, the value of final output includes the value of intermediate products. Hence, to avoid double counting, only final values relating to final demand of the consumers should be reckoned. For example, the price of bread incorporates the cost of wheat, flour etc. Wheat and flour are both intermediate products and are not treated as the final consumer's demand. Their values are paid up during the process of production. In the value of final product, bread, the values of these intermediate goods are hidden. Hence a separate accounting of the values of intermediate goods, along with the accounting of the value of final product, would mean double counting. To avoid this, the computation of the value of final products only has been suggested.

Another method, however, is the "value added" method in which a summation of the increase in value (the value added), at each separate production stage, leading to output in final form, gives the value of GNP.

To avoid double counting of intermediate goods, one must carefully estimate the value added at each stage, of the production process. From the total value created at a given stage, we should thus subtract all the costs of materials and intermediate goods not produced in that stage. Or, the value of inputs, at a given stage, should be deducted from the value of output. Even the value of inputs purchased from other firms or sectors should be subtracted. In short, GNP is obtained as the sum total of the values added by all the different stages of the production process till final output reaches the hands of consumers to meet the final demand. The point may be clarified further with the help of an illustration as given in Table 8.3.

Table 8.3: Value Added Method

(1) Production Stages	*(2)* Firm	*(3)* Sales Receipts	*(4)* Cost of intermediate *goods*	*(5)* Value added (Net Income) *(3) - (4)*
1. Wheat	Farmer	500	0	500
2. Flour	Flour Mill	700	500	+200
3. Bread	Baker	900	700	+200
4. Trading	Merchant	1000	900	+100
	Total:		Sum of value added	=1000

In Table 8.3 we have assumed a much simplified method or model of an economy, producing only a single final product, bread. In satisfying the consumers' final demand for bread, it is assumed that there are four productive stages. First, a farmer cultivates wheat and sells it at ₹ 500. Thus, ₹ 500 is the value added to the economy's output. We assume that this wheat is purchased by the flour mill to grind into flour. The mill sells the flour to the baker and fetches ₹ 700. So, its net income is ₹ 700 – ₹ 500 = 200. Thus, in turning wheat into flour (that is, the creation of form utility), the value added is ₹ 200. The baker bakes a quantity of bread out of the flour and sells it to the merchant for ₹ 900. In the process, the value added is ₹ 200. The merchant renders trading service of creating place and time utility, and thus sells the stock of bread to the final consumer at ₹ 1,000. The net income of the merchant is ₹ 100 which is his profit for merchandise business, a "productive" activity. Thus, the value added is ₹ 100 in the economic system. Obviously, the sum total of value added at each stage of production, ₹ 500 + 200 + 200 + 100 = ₹ 1,000 is the final value.

Evidently, the value of that product is derived by summation of all the values added in the path of the productive process. To avoid double counting, either the value of the final output should be taken in the estimate of GNP or the sum of values added should be taken. Value added is the difference between value of output and input at each given stage of production. The final product method reckons the quantum of goods and services and the aggregate of their values (measured at market prices) at the end of the year, while the value added method measures the flow of output and takes the sum total of net values created at each production stage during the year. Apparently, both the methods give the same results, because both relate to the same phenomenon, though each in a different manner. Some economists, however, prefer the value added method on the following counts:

(i) It provides a method to check up or tally the accuracy of GNP estimates.

(ii) It enables us to know the contribution of each productive sector to the creation of GNP. Thus, national income at industrial origin can be easily compiled from the value added approach. Again, it is also helpful in constructing the input-output table and tracing inter-industry transactions.

Circular Flow of Activity

Incidentally, the economic system contains the flow of goods and services in the transactions between two economic sectors: households and firms. There is a circular flow of economic activity. Households sell their productive services as factors of production to the firms and earn their income. Thus, firms' spendings become households' income. Households buy the final goods and services produced by the firms. Thus, households' total expenditure becomes the income of the firms which is equal to the value of final output by the firms. The range of transactions which take place within the boundaries of firms — "the productive area" — are regarded as intermediate transactions or inter-industry relations. Values are created in the productive area. All net values added together determine the value of the final output, i.e., GNP. The final output flows from the productive area of firms to the consumption area of households. This point has been illustrated diagrammatically in Fig. 8.1.

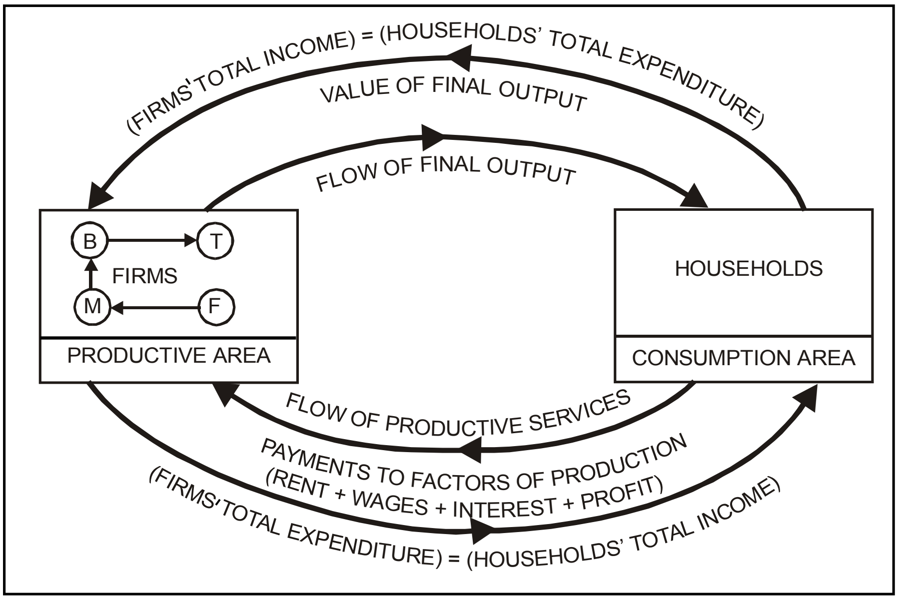

Fig. 8.1: Circular Flow of Activity

In Fig. 8.1, one can observe that intermediate transactions occur within the productive area or firms. It represents intermediate transactions from the farmer (F) to the flour mill (M), to the baker (B), to the trader or merchant (T) — all taking place within the boundaries of the firms. The firms sell their final output to consumers — the households. Thus, there is a flow of final goods from the productive area or firms to the consumption area of households. Households' total expenditure = the value of final output – the income of the firms' sector. Again, there is a flow of productive services of factors from households to firms. The factors are rewarded in the form of rent, wages, interest and profits. The total factor income = the aggregate value of factor services = the total expenditure of firms = the total income of households. In short, total expenditure of firms = total income of households and total expenditure of households = total income of firms = the value of final output. Thus, the final value of output is just the same as final expenditure. It follows thus:

Total output = Total expenditure ... (1)

Again, total expenditure = total income ... (2)

$\therefore$ Total output = total income ... (3)

Census of Income Method

In this method, income of all factors of production is added together. The data are compiled from books of accounts, reports, and published accounts. The following classification of incomes is considered as comprehensive: (a) wages and salaries, (b) supplemental labour income (social security, etc.), (c) earnings of self-employed or professional incomes, (d) dividends, (e) undistributed profits, (f) interest, (g) profit of state enterprises. However, transfer payments like gift subsidies etc. are to be deducted from the total of factor incomes. Thus, National Income is equal to the factor incomes minus transfer payments.

This method is also called the Factor Cost Method. Thus, the national income of a country, at factor cost, is equivalent to the sum total of the disbursements of their (factors) income. The symbolic expression of this method is as follows:

$Y = (w + r + i + n) + (X - M) + (R – P)$ where

w = wages, r = rent, i = interest, n = profits.

However, certain precautions are necessary while following this method.

1. All transfer payments (government and personal) like gifts pension, etc., are to be deducted. Similarly, gambling, being transfer activity, is to be excluded.
2. All unpaid services (like services of housewife) are to be excluded. Thus, only those services for which payments are made should be included.
3. Financial transactions and sales of old property (including land) are to be excluded, as they do not add anything to the real national income. Thus, all capital gains and losses which are related to wealth, but not to real income, should be excluded.
4. Direct tax revenue to the government should be subtracted from the total income as it is only a transfer of income. Or else, it should not be reckoned at all.
5. Similarly, government subsidies should be deducted.
6. Add the value of exports and deduct the value of imports.
7. Add undistributed profit of companies, income from government property, and profits from public enterprises.

In India, the National Income Committee used the income method for adding up the net income from trade, transport, public administration, professional and liberal arts, and domestic services. Since, under Indian conditions, due to lack of popularity of personal accounting practices, it is difficult to ascertain the personal income of individuals, the income method is not wholly practicable.

The Expenditure or Outlay Method

National income on the expenditure side is equal to the value of consumption plus investment. In this method, we have to: (i) estimate private and public expenditure on consumer goods and services, (ii) add the value of investment in fixed capital and stocks, with due consideration for net positive or negative inventories, and (iii) add the value of exports and deduct the value of imports. This method is not as popular as the previous ones.

To express it in symbolic terms,

$$Y = (C + I + G) + (X - M) + (R - P)$$

where,

C = Consumption Expenditure,

I = Investment Expenditure, and

G = Government Purchases.

The Bowley-Robertson Committee has suggested the adoption of the Census of Products Method for major sectors of India, and the Census of Income Method for some minor sectors, while the National Income Committee relied mainly upon the Census of Income Method. However, none of the above methods alone is perfect. Therefore, an integrated computation of them will give a wider perspective of the estimate.

The process of calculation of national income (by using the above discussed three methods) has been illustrated in a summarised way, with hypothetical data of an imaginary economy, in Table 8.4 (A, B and C).

Table 8.4: Estimate of the National Income of Country X during a given year

A	Income Method	₹ (Crores)
	Income: Wages, salaries, etc.	1,000
	Profits: Private and Public Operations	500
	Rent	200
	Interest	100
	Total domestic income:	1,800
	Less: Stock appreciation	– 250
	Residual error	– 50
	Net property income from abroad	100
	FNP	1,600
	Less: Capital consumption	– 150
	National Income	1,450
B	**Expenditure Method**	**₹ (Crores)**
	Consumer's expenditure (C)	1,100
	Public authorities' current expenditure on Goods/services (G)	600
	Gross Capital formation (Investment) at home including increase in stocks (I)	500
	Total domestic expenditure at market prices	2,200
	Plus exports and income from abroad	600
	Minus Imports and income paid abroad	– 250

	Less Taxes in expenditure	– 1,000
	Plus subsidies	50
	GNP at factor cost	1,600
	Less: Capital consumption	– 150
	National Income	1,450
C	**Output Method**	**₹ (Crores)**
	Agriculture, Forestry and Fishing	250
	Mining and quarrying	100
	Manufacturing	200
	Construction	100
	Gas, electricity and water	50
	Transport and communication	200
	Distributive Trades	300
	Insurance, banking and finance	200
	Public administration and defence	150
	Other services	100
	Total domestic output	1,800
	Less: Stock appreciation	– 250
	Residual error	– 50
	Net property income from abroad	100
	GNP at factor cost	1,600
	Less: Capital consumption	– 150
	National income	1,450

8.6 Assumptions of Circular Flow Model

(i) There are only two sectors in the economy, household sector and business sector.

(ii) The business sector (or the firms) hires factors of production owned by the household sector and it is the sole producer of goods and services in the economy.

(iii) The household sector (or the households) is the sole buyer of goods and services. It spends its entire income on the goods and services produced by the business sector. They are also suppliers of labor and several of other factors of production.

(iv) The business sector sells the entire output to households. It does not store. There are, therefore, no inventories.

(v) There are no savings and investment in the economy.

(vi) The household sector receives income by selling or renting the factors of production owned by it.

(vii) Government does, not exist for all such practical purposes (No public expenditures, no taxes, no subsidies, no social insurance contribution, etc.).

(viii) The economy is closed one having no international trade relations.

8.7 Simple Circular Flow Model with Two-Sector, Two-Market

According to circular flow of income in a two-sector economy, there are only two sectors of the economy, i.e., household sector and business sector. Government does not exist at all, therefore, there is no public expenditure, no taxes, no subsidies, no social security contribution, etc. The economy is a closed one, having no international trade relations. Now we will discuss each of the two sectors:

(i) Household Sector: The household sector is the sole buyer of goods and services, and the sole supplier of factors of production, i.e., land, labour, capital and organisation. It spends its entire income on the purchase of goods and services produced by the business sector. Since the household sector spends the whole income on the purchase of goods and services, therefore, there are no savings and investments. The household sector receives income from business sector by providing the factors of production owned by it.

(ii) Business Sector: The business sector is the sole producer and supplier of goods and services. The business sector generates its revenue by selling goods and services to the household sector. It hires the factors of production, i.e., land, labour, capital and organisation, owned by the household sector. The business sector sells the entire output to households. Therefore, there is no existence of inventories. In a two-sector economy, production and sales are thus equal. So long as the household sector continues spending the entire income in purchasing the goods and services from the business sector, there will be a circular flow of income and production. The circular flow of income and production operates at the same level and tends to perpetuate itself. The basic identities of the two-sector economy are as under:

$$Y = C$$

Where Y is Income

C is Consumption

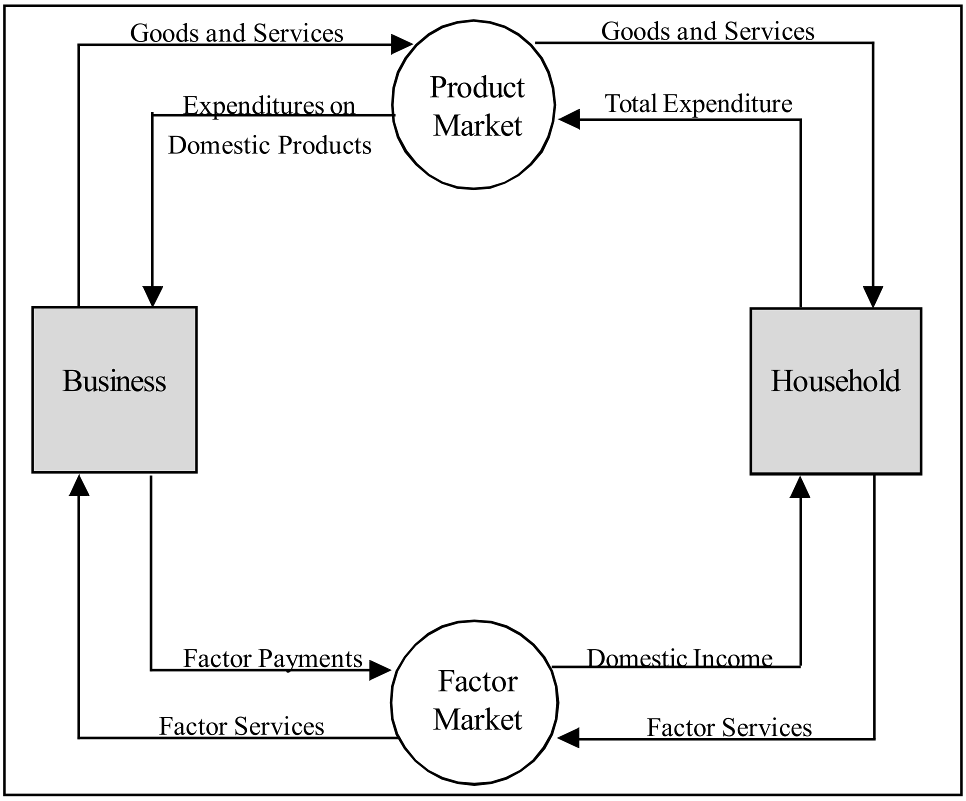

Fig. 8.2: Circular Flow of Income in a Two-Sector Economy

In a two-sector macro-economy, if there is saving by the household sector out of its income, the goods of the business sector will remain unsold by the amount of savings. Production will be reduced and so the income of the households will fall. In case the savings of the households is loaned to the business sector for capital expansion, then the gap created in income flow will be filled by investment. Through investment, the equilibrium level between income and output is maintained at the original level. It is illustrated in the following figure:

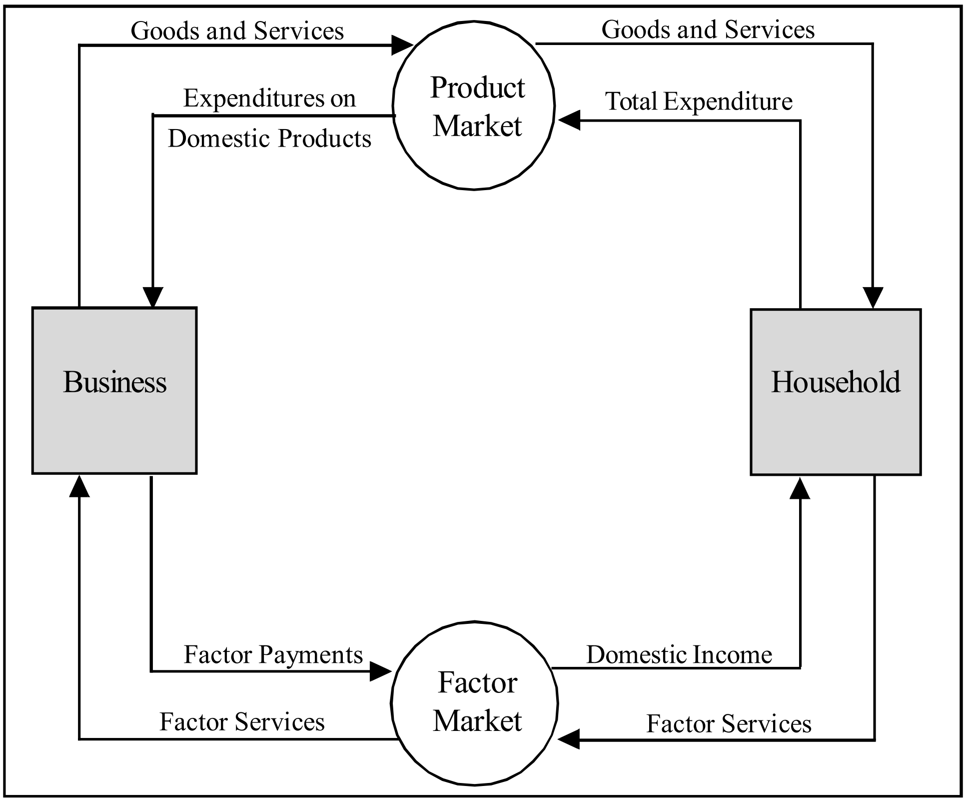

Fig. 8.3: Circular Flow of Income in a Two-Sector Economy (Saving)

The equilibrium condition for two-sector economy with saving is as follows:

$Y = C + S$ or $Y = C + I$ or $C + S = C + I$

or

$S = I$

Where	Y	is	Income
	C	is	Consumption
	S	is	Saving
	I	is	Investment

When saving and investment are added to the circular flow, there are two paths by which funds can travel on their way from households to product markets. One path is direct, via consumption expenditures. The other is indirect, via saving, financial markets, and investment.

Savings: On the average, households spend less each year than they receive in income. The portion of household income that is not used to buy goods and services or to pay taxes is termed 'Saving'. Since there is no government in a two-sector economy, therefore, there are no taxes in this economy.

The most familiar form of saving is the use of part of a household's income to make deposits in bank accounts or to buy stocks, bonds, or other financial instruments, rather than to buy goods and services. However, economists take a broader view of saving. They also consider households to be saving when they repay debts. Debt repayments are a form of saving because they, too, are income that is not devoted to consumption or taxes.

Investment: Whereas households, on the average, spend less each year than they receive in income, business firms, on the average, spend more each year than they receive from the sale of their products. They do so because, in addition to paying for the productive resources they need to carry out production at its current level, they desire to undertake investment. Investment includes all spending that is directed toward increasing the economy's stock of capital.

Financial Market: As we have seen, households tend to spend less each year than they receive in income, whereas firms tend to spend more than they receive from the sale of their products. The economy contains a special set of institutions whose function is to channel the flow of funds from households, as savers, to firms, as borrowers. These are known as 'financial markets'. Financial markets are pictured in the center of the circular-flow diagram in the above figure.

Banks are among the most familiar and important institutions found in financial markets. Banks, together with insurance companies, pension funds, mutual funds, and certain other institutions, are termed 'financial intermediaries', because their role is to gather funds from savers and channel them to borrowers in the form of loans.

8.8 Circular Flow of Income in a Three-Sector Model

Under three-sector model, the additional sector is the government. Two-sector economy is a hypothetical economy, whereas the three-sector economy is much more realistic. The inclusion of the government sector is very essential in measuring national income. The government levies taxes on households and on business sector, purchases goods and services from business sector, and attain factors of production from household sector. The following figure illustrates three-sector economy:

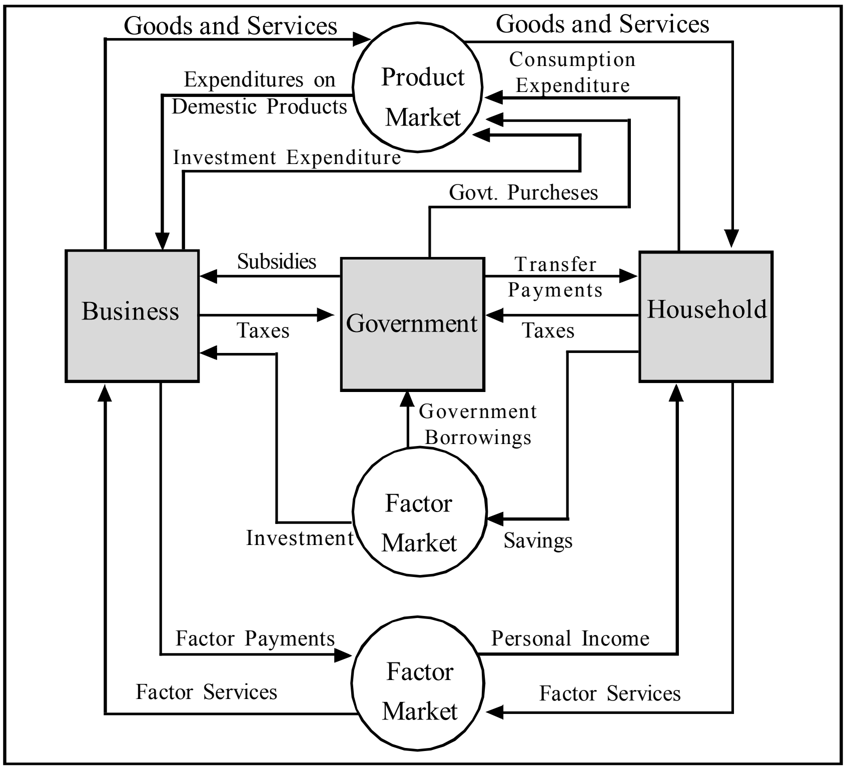

Fig. 8.4: Circular Flow of Income in a Three-Sector Economy

In the above diagram, in one direction, the household sector is supplying factors of production to the factor market. Business sector demands the factors of production from factor market. Inputs are used by the business sector, which produces goods and services that are purchased back by the households and the government. Personal income after tax or disposable income that is received by households from business sector and government sector is used to purchase goods and services and makes up consumption expenditure (or C). The money spent in the product market is the market value of final goods and services (or GDP). That money goes to business sector that pays it back in the form of wages, rent, profits and interests.

Total spending on goods and services is known as 'aggregate demand'. The total market value of output produced and sold is also known as 'aggregate supply'. To measure aggregate demand in a closed economy, we simply add consumption spending (C), investment spending (I) and government spending (G). Therefore:

Y = C + I + G

Where	Y	is	Income,
	C	is	Consumption,
	I	is	Investment, and
	G	is	Government Spending.

Note that government spending (G) includes its buying of labour from factor market, buying of goods and services from product market, and transfer payments to the household sector. Transfer payments are payments the government makes in return for no service, for example, welfare payments, unemployment compensation, pension, etc. The government collects its money in the form of tax, which makes up most of the government revenue. But the government does not always balance their budgets. The government always tends to spend more than it takes in as taxes. The federal government almost always runs a deficit. The government deficit must be financed by borrowing in financial markets. Usually this borrowing takes the form of sales of government bonds and other securities to the public or to financial intermediaries. Over time, repeated government borrowing adds to the domestic debt. The 'debt' is a stock that reflects the accumulation of annual 'deficits', which are flows. When the public sector as a whole runs a budget surplus, the direction of the arrow is reversed. Governments pay off old borrowing at a faster rate than the rate at which new borrowing occurs, thereby creating a net flow of funds into financial markets.

8.9 Circular Flow of Income in a Four-Sector Model

Two-sector economy and three-sector economy are briefly discussed in previous sections. These are hypothetical economies. In real life, only four-sector economy exists. The four-sector economy is composed of following sectors, i.e.:

(i) Household sector,

(ii) Business sector,

(iii) The government, and

(iv) Transaction with 'rest of the world' or foreign sector or external sector.

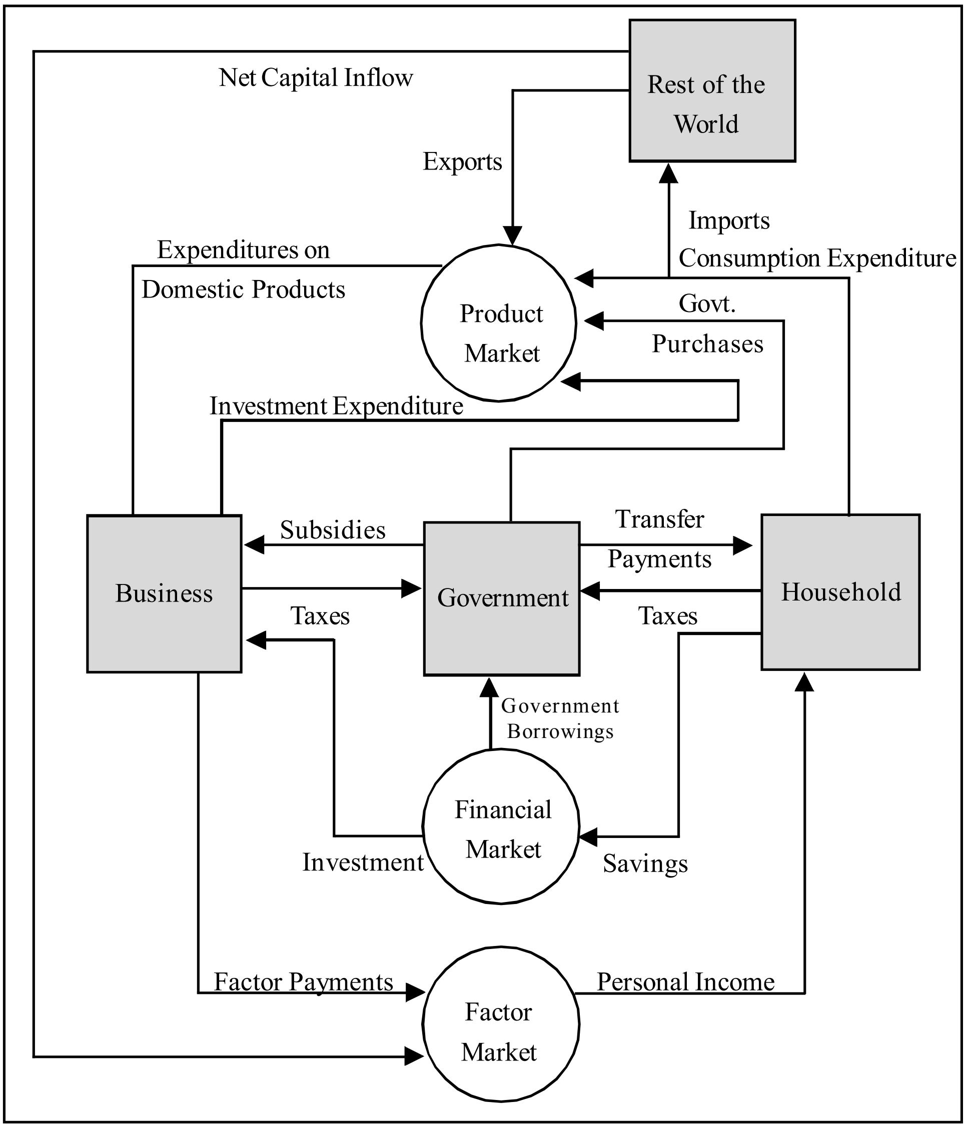

Fig. 8.5: Circular Flow of Income in a Four Sector Economy

The household sector, business sector and the government sector have already been defined in the previous sections. The foreign sector includes everyone and everything (households, businesses, and governments) beyond the boundaries of the domestic economy. It buys exports produced by the domestic economy and produces imports purchased by the domestic economy, which are commonly combined into net exports (exports minus imports). The inclusion of fourth sector, i.e., foreign sector or transaction with 'rest of the world' makes the national income accounting more purposeful and realistic. With the inclusion of this sector, the economy becomes an open economy. The transaction with 'rest of the world' involves import and export of goods and services, and new foreign investment. It is illustrated in the above figure.

In four-sector economy, goods and services available for the economy's purchase include those that are produced domestically (Y) and those that are imported (M). Thus, goods and services available for domestic purchase is Y+M. Expenditure for the entire economy include domestic expenditure (C+I+G) and foreign made goods (Export) = X. Thus:

$$\mathbf{Y + M = C + I + G + X}$$

$$\mathbf{Y = C + I + G + (X - M)}$$

Where,	C	=	Consumption expenditure
	I	=	Investment spending
	G	=	Government spending
	X	=	Total Exports
	M	=	Total Imports
	X – M	=	Net Exports

8.10 Summary

Money measures of the net aggregates of all commodities and services accruing to the inhabitants of a community during a specific period.

In national income accounting, thus, the concept of national income has been interpreted in three ways, as: (1) National Product, (2) National Dividend, (3) National Expenditure.

National Product consists of all the goods and services produced by the community and exchanged for money during a year. It does not include goods and services which are not paid for, such as hobbies, housewives' services, charitable work, etc.

National Dividend consists of all the incomes, in cash and kind, accruing to the factors of production in the course of generating the national product. It represents the total of income flow which will exactly equal the value of the national product turned out by the community during the year.

National Expenditure represents the total spending or outlay of the community on the goods and services produced during a given year. Since income is the source of expenditure, national expenditure constitutes the disposal of national income, which is evidently equal to it in value or in other words, National Expenditure equals National Income.

National Expenditure = National Product = National Income or Dividend.

GNP may be defined as the aggregate market value of all final goods and services produced during a given year. The concept of final goods and services stands for finished goods and services, ready for consumption of households and firms, and exclude raw materials, semi-finished goods and such other intermediary products.

Net National Product (NNP) refers to the value of the net output of the economy during one year. NNP is obtained by deducting the value of depreciation or replacement allowance of the capital assets from the GNP. To put it symbolically: NNP = GNP - D, where D = depreciation allowances. This value is measured at current prices, while GNP is expressed at current market prices. Net National Product, in fact, is the value of total consumption plus the value of net investment of the community.

Gross National Net Domestic Product at factor cost = Income earned by the factor of production –Depreciation + Taxes – Subsidy. National Income at market price + National Income at factor cost + Taxes – Subsidies – Depreciation

The flow is from production to income generation to expenditure, and from expenditure, to production. National income is, therefore, the total flow of wealth produced, distributed and consumed by the economy as a whole during the course of a year.

Personal income is the total money income received by individuals in the community. Personal income is the aggregate earned and unearned income. Undistributed profits of the corporations reduce the personal income of individuals to that extent.

Personal income (PI) = NI (Net Income) – undistributed profits. Again personal income includes transfer payments made by government as well as the private business sector to individuals.

Thus, Personal income (PI) = NNP + transfer payments (R) – undistributed profits

Personal savings refer to the difference between disposable personal income and personal consumption expenditure.

A simple circular flow model of the macro economics containing two sectors (business and household) and two markets (product and factor) that illustrates the continuous movement of the payments for goods and services between producers and consumers. The payment flow between the two sectors and two markets is conveniently divided into four segments representing consumption expenditures, gross domestic product, factor payments and national income.

The modern economy is a monetary economy. In the modern economy, money is used as a medium of exchange.

According to circular flow of income in a two-sector economy, there are only two sectors of the economy, i.e., household sector and business sector. Government does not exist at all, therefore, there is no public expenditure, no taxes, no subsidies, no social security contribution, etc. The economy is a closed one, having no international trade relations.

8.11 Key Words/Abbreviations

- **(NI) National Income:** National income is a money measure of value of net aggregate of goods and services becoming available annually to the nation as a result of the economic activities of the community at large, consisting of households or individuals, business firms, and social and political institutions.
- **(GNP) Gross National Product:** In calculating national income, we add up all the goods and services produced in a country.
- Personal Income (PI) = NNP + Transfer payments (R) – Undistributed profits
- Circular flow of economy sector models are two sectors (business and household) and two markets (product and factor)

8.12 Learning Activity

1. Students should collect the data about the Indian National Income 2010-2011 and prepare a report.

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2. Students are required to prepare a comparative study of circular flows in a Three sectors and Four-Sector Model.

8.13 Unit End Questions (MCQ and Descriptive)

A. Discriptive Type Questions

1. (a) Define National Income. Explain the triple identity between output, income and expenditure.
2. (a) What are the methods of estimating national income? What differences are encountered while estimating national income?
3. Distinguish between:

   (i) Gross National Product and Net National Product.

   (ii) National Income at Factor cost and National income at Market Price.
4. Define national income and discuss the methods of measurement.
5. What are the appropriate methods used to estimate the national income of a country? Explain each method by giving illustrations.
6. Explain the concept of national income. Point out the difficulties in its correct measurement.
7. What is circular flow in a Simple economic model? Discuss.
8. Explain the circular flows of Goods and money in a Three-Sector economy.
9. Explain the circular flows in a Four-Sector Model: A Model with Foreign Sector.
10. Explain the Income method of estimating National Income.

11. Elucidate three-dimensional model of circular flow.
12. Describe the procedure to calculate national income with expenditure method.

B. Multiple Choice Questions

1. Which is the correct form?

   (a) GNP = Gross Net Production. (b) NNP = Net National Product.

   (c) N.I. = German Democratic Production.

2. National income is:

   (a) a flow (b) a stock

   (c) a fund.

3. National income does not include:

   (a) Service of an actor (b) Profit of a firm

   (c) Export earnings (d) Transfer payments.

4. Total spending on goods and services is known as ____________.

   (a) Total Demand (b) Aggregate demand

   (c) Average demand (d) None of them.

5. The total market value of output produced and sold is also known as ____________.

   (a) Minimum supply (b) Total supply

   (c) Aggregate supply (d) None of the above.

Answers:

1. (b), 2. (a), 3. (a), 4. (b), 5. (c)

8.14 References

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3. Mankiw, Gregory (2006). Principles of Economics. Thomson Europe.

UNIT 9 CLASSICAL THEORY AND KEYNESIAN THEORY OF EMPLOYMENT

Structure:

CU
CHANDIGARH
UNIVERSITY

9.0 Learning Objectives

After studying this unit, you will be able to:

- Explain the Supply-oriented Classical Theory of Employment
- Discuss the various assumption of Full Employment
- Elaborate Say's Law of Markets
- Discuss Interest Rate Flexibility and Classical Model of Employment

9.1 Introduction

National income, employment and prices and the forces determining them are control to economic analysis and the questions that dominate the discussion are: what are, the factors that determine the level of GNP (or GNI) of a country in any given year? Why does GNP tend to change from time to time? Our queries will be satisfied by the theory of income determination, which seeks to explain how much the economy actually does produce out of its given resources and why its actual and potential output and income are not the same always.

The modern theory of income determination dates back to the publication of J.M. Keynes's General Theory of Employment and Interest and Money, in 1936. For brevity, this celebrated book of Keynes in economic literature, is usually referred to as the General Theory. In fact, Keynes's General Theory created the greatest stir in economic thinking of the present century. Today's modern economists, though they prefer to call themselves "post-Keynesians", in essence, are "pro-Keynesians" in the use of the tools of economic analysis. In this chapter, we shall, therefore, make a brief study of Keynes's analysis of income, determination, together with modern economists' refinements of the theory.

Keynesian economics is the outcome of Keynes's disagreement with the classical economists who avowed a strong belief in the operation of market forces resulting in automatic adjustment at full employment level. To quote Keynes, "I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case.... Moreover, the characteristics of the special case assumed by the classical theory happen not to be those of the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply to the facts of experience.”

In this chapter, we shall discuss the main strands of the Classical Theory of Employment and Keynes’s criticism of the same.

9.2 Supply-oriented Classical Theory of Employment

Apparently, the classical theory of employment refers to the theory and ideas about determinants of employment propounded by the classical writers like Adam Smith, Ricardo, Mill and others including Pigou, who is a noted classical thinker of the modern era. To Keynes, however, all his predecessors are classicists.

The classical theory of employment is essentially a supply-oriented theory. The economists were basically concerned with the long-run problem of growth of the economy’s productive capacity and the efficient allocation of the given resources at full employment. The classical economics has, therefore, focused its attention more on the supply side with a little emphasis on the demand side of the growth process.

To repeat, the mainstream of the long-run classical analysis was fundamentally supply-oriented. Adam Smith, Ricardo, Say, Mill and all other followers of the classical school of thought, except Malthus, had an avowed belief that there is no problem on demand side as the aggregate demand would always take care of itself. Hence, the main problem is of supply rather than demand.

Chart 9.1 gives an outline of the major postulates of the classical theory of employment.

We shall discuss below the main strands of the Classical Theory of Employment and Keynes’ criticisms of the same.

Chart 9.1

The Classical Theory of Employment
↓
Long-term Analysis
↓
Full Employment
↓
Say's Law of Markets
↓
Interest Rate Flexibility (Strategic Variable)
↓
Wage Rate Flexibility (Money Wage-Cut Policy)

9.3 Assumption of Full Employment

The entire economic premise of the classical economists was based on the assumption of full employment of labour and other economic resources. They believed in the prevalence of a stable equilibrium at full employment as a normal characteristic in the long-run. Any deviation, therefrom, was regarded by them as abnormal. They, therefore, concluded that under perfect competition in a free capitalist economy, forces operate in the economic system which tend to maintain full employment (without inflation). Consequently, the level of output is always at full employment with the optimum use of the resources in the long-run.

The concept of full employment does not rule out the possibility of frictional unemployment of a temporary nature. There must be temporary unemployment of some workers due to ignorance about the availability of job opportunities, machinery breakdown, etc. Similarly, somebody may not have a desire to work though the job is available. This is called voluntary unemployment. But, all such phenomena are conducive to full employment condition. Full employment condition implies the absence of any involuntary unemployment. A worker is said to be involuntarily unemployed when he cannot get a job inspite of his willingness to work at the prevailing wage rate. According to the classical economists, unusual disturbances in the economic system may create involuntary unemployment. However, natural economic forces tend to eliminate this involuntary unemployment to restore full employment again.

Hence, when the classical economists took full employment for granted, they never paid due attention to present a systematic theory of employment. Their major concern was, thus, to examine the forces which determined:

- The different types of goods and services that would be produced in the economy;
- The allocation of productive resources among the competing firms and industries. Basically, the classical theory studied the alternative uses of a given quantity of employed resources. The classicists tried to find out the conditions leading to the most efficient use and optimum allocation of the given resources;
- The relative price structure of different goods and factors; and
- The distribution of real income among the productive factors.

The classical belief in full employment as a normal economic condition was essentially based on the following assumptions:

- As supply creates its own demand (Say's Law), there can never be any deficiency in demand; and
- Any unemployment that might result in the process of a competitive system is automatically eliminated by the mechanism of the free market-price system.

9.4 Say's Law of Markets

Say's Law of markets was rooted in the mainstream of supply-oriented classical economics.

J.B. Say, a French economist of the 19th Century, asserted that: "supply creates its own demand." This appears to be a simple proposition, but has had many different meanings, and many sets of reasoning underlying each meaning — not all of these by J.B. Say.

Basically, Say's Law contends that the production of output in itself generates purchasing power, equal to the value of that output: supply creates its own demand. It is argued that, "Production

J.B. Say

increases not only the supply of goods but, by virtue of the requisite cost payments to the factors of production, also creates the demand to purchase these goods."

The core of Say's Law of markets is that the supply of a product through the process of production generates the necessary income (earned by the factors of production in the form of wages, interest, rent and profits) to demand the goods produced. By this method an equivalent demand is created in accordance with supply. According to Say, the main source of demand is the flow of factor incomes generated from the process of production itself. Any productive process has generally two effects: (1) Due to the employment of factors of production in the process, an income stream is generated in the economy on account of the payment of remuneration to the factors of production; and (2) a certain output results which is supplied to the market.

Thus, according to Say's Law, additional output creates additional incomes, which create an equal amount of extra expenditure. Therefore, every product produced generates an equivalent amount of purchasing power (income) in the economy which ultimately leads to its sale. In short, a new production process, by paying out income to its employed factors, generates demand at the same time as it adds to supply. Thus, every increase in production soon justifies itself by a matching increase in demand. Then, by doubling production, the producer would invariably double sales too.

Two Main Propositions of Say's Law

1. Production is the Sole Cause of Demand: Supply creates its own demand, because production has a dual effect on economy: (a) it creates supply, and (b) it generates factor incomes. Income generated in the production process enables the people to demand the goods so created. Their demand is expressed through their consumption outlay. In this way, 'consumption is co-extensive with production,' says J.S. Mill.

In his Principles of Political Economy, J. S. Mill provides his version of Say's Law as follows:

"What constitutes the means of payment for commodities is simply commodities. Each person's means of paying for the production of other people consists of those which he himself possesses. Should we suddenly double the productive powers of the country, we should double the supply of commodities in every market; but we should, by the same stroke, double the purchasing power. Everybody would bring a double demand as well as supply; everybody would be able to buy twice as much, because everyone would have twice as much to offer in exchange."

2. There can be no Overproduction of Goods any Time: According to Say's Law; as every additional supply creates an additional demand, there can be no general overproduction. It stresses that aggregate supply always equals aggregate demand. In other words, while individual goods can be overproduced, the supply need not equal demand in a single market. But it will be absorbed by the economy as a whole. At the same time, while general overproduction was considered impossible according to Say's Law, it also denied the possibility of a deficiency in aggregate demand. Similarly, it also denied the possibility of general unemployment. For, if resources are less than fully employed, there are incentives to expand production as entrepreneurs always strive for maximisation of profits.

To express this phenomenon differently, any expansion in the output would create an equivalent expansion in income and in spending. In symbolic terms:

$$\Delta O = \Delta Y = \Delta E$$

where, ΔO = increase in output,

ΔY = increase in income, and

ΔE = increase in intended expenditure.

Apparently, the additional income gives rise to an equal additional amount of intended expenditure. Hence, the circular flow of income expenditure is steadily maintained in the economy.

Assumptions Underlying Say's Law

As a matter of fact, Say's dictum that supply creates its own demand is based on the following assumptions:

1. Optimum Allocation of Resources: There is optimum allocation of resources as they are allocated to different channels of production in terms of proportionality and equality of marginal products.

2. Perfect Equilibrium: Commodity prices and factor prices are determined in perfect equilibrium of their demand and supply.

3. Perfect Competition: There is perfect competition prevailing in the commodity market as well as factor market. Thus, commodity prices are equal to average costs and factor prices are equal to marginal productivities.

4. Market Economy: There is free enterprise economy.

5. Laissez-Faire Policy of the Government: There is no government intervention in the economic field. The government follows a laissez-faire policy to facilitate automatic adjustment and smooth working of the market mechanism in the capitalist economic system.

6. Elastic Market: The size of the market has no limits. Thus, there is automatic expansion of the market with an increase in output offered for sale.

7. Market Automatism: The free market economy and its working of price mechanism provide due scope to labour supply and the rising population also stimulates capital formation. In an expanding economy, new workers and firms will be automatically absorbed into the productivity channels by their own products in exchange without displacing or supplanting the existing firms and workers.

8. Circular Flow: The circular flow of money is regular and continuous without any leakages. This implies that saving is nothing but another form of spending on capital goods. Savings are, thus, automatically invested. There is absence of hoarding. Hence, there is no break in the flow of income and expenditure. Income is automatically spent through consumption expenditure and investment expenditure.

9. Savings-Investment Equality: Since all savings are automatically invested, savings always equal investment. Savings-investment equality is the basic condition of equilibrium in the economy. It is maintained by interest flexibility.

10. Long-term: The economy's equilibrium process is perceived from the long-term point of view.

Implications of Say's Law

The Say's Law of Markets implies that:

1. *Automatic Attainment of Full Employment:* In the long-run, free economy automatically attains equilibrium at full employment level. Keynes held that Say's Law is 'equivalent to the proposition that there is no obstacle to full employment.'

2. *Self-adjusting Mechanism:* There is automatic adjustment when supply creates its own demand. Increase in supply will meet its own demand in the process of functioning of a free capitalist economy. Hence, there is no need for the government to intervene. On the contrary, any government interference in the economic field comes in direct conflict with the self-adjusting mechanism of the Say's Law of Markets.

3. *There can be no Deficiency of Aggregate Demand:* Since supply automatic-ally creates its own demand, there is no possibility of any general overproduction. Thus, Say's Law is a denial of the possibility of deficiency in aggregate demand.

4. *No Problem of General Unemployment:* When there is no general overprodu-ction, then there can be problem of general unemployment in the long-run, and the economy tends to remain at full employment equilibrium level.

5. *Automatic Resource Adjustment and Utilisation in an Expanding Capitalist Economy:* In an expanding free enterprise economy, when new workers and new firms are productively absorbed, they do not supplant the output, income and employment of the existing ones and as they release additional output and income, the community becomes automatically rich with the increasing size of national income. It also means that employment of new or unused resources in productive process tends to pay its own way and confer benefits to the society at large.

6. *Money has only a Passive Role:* Supply creates its own demand in real terms. Thus, money is just a veil. Behind the flow of money, there is real flow of goods and services which is important. Thus, changes in the supply of money have no impact on the real economy's process of equilibrium at full employment level.

7. Built-in-flexibility and Automatic Optimisation: A capitalist economy under the laissez-faire policy has built-in flexibility. It functions automatically to optimum adjustments through freely operating market mechanism and the price system.

8. Rate of Interest is a Strategic Variable — an Equilibrating Force in the Classical Model: Savings-investments equality is brought about by the flexibility of interest rates. Rate of interest is, thus, a strategic variable in the equilibrium process of the economy.

This point being the major classical postulate of the employment theory has been discussed further in the following section.

In short, Say's Law suggests that when savings would always be offset by an equivalent investment and as hoarding would always be zero, aggregate demand would always meet the aggregate supply, so there would be no general overproduction in the long-run and equilibrium will be maintained automatically at full employment level. By maintaining that, over-saving would be impossible. Say's Law implied denial of the possibility of underemployment equilibrium.

9.5 Interest Rate Flexibility

According to Say's Law, all income is spent by the community, though it admits that there is a "leakage" of saving in the circular flow of income expenditure. Yet it argues that such saving is not a real leakage, but a sort of channelisation in spending. According to the law, saving is another form of spending because, to save means is to intend to spend on the producer's good, i.e., investment. In other words, whatever is saved is automatically invested in production activities. In its view, saving and investment are balanced in the community through the flexibility of the rate of interest, for interest is a reward for saving. And if saving exceeds investment, the rate of interest will fall; hence investment will tend to rise and the level of saving will decline till both meet at an equilibrium point.

To illustrate it graphically, the two flows, investment (I) and saving (S), are brought into equilibrium by the rate of interest i. If the community as a whole decides to increase savings at all levels of the rate of interest, the S curve shifts to S'. Eventually, the rate of interest falls to i'. Investment being the inverse function of the rate of interest, it expands to OQ', hence, once again saving equals investment (see Fig. 9.1).

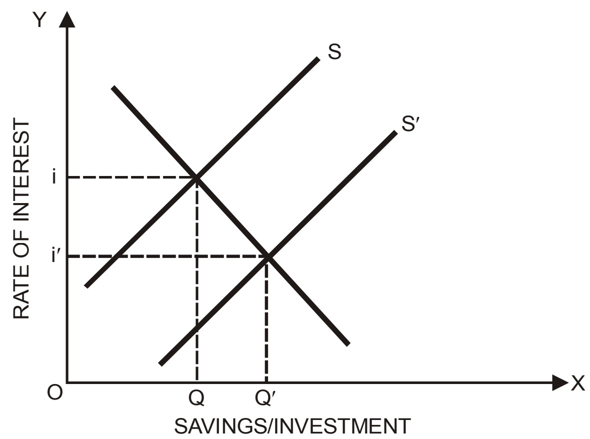

Fig. 9.1: Rate of Interest: The Strategic Variable

In essence, in the classical theory of employment, the rate of interest is regarded as a strategic variable which brings about equality between savings and investment. According to the classical economists, thus, the function of the rate of interest is to maintain savings and investment equilibrium. The flexibility of the rate of interest as such helps in maintaining the circular flow of income expenditure.

However, classical economists viewed that an increase in saving represented a decrease in the demand for consumption goods, which caused the prices to fall. Falling prices means falling profits, which cause resources to shift from consumer goods industries to investment goods industries where the demand has increased. Here the classicists presume that a decision to consume less today is linked directly with a decision to consume more in the future; therefore, the demand for investment goods increases. Thus, they do not agree that a fall in consumption instead of leading to an increase in investment may lead to a fall in aggregate demand, thereby to unemployment.

Thus, the classicists hold that the economy can always function at full employment level, in the long-run, irrespective of any level of saving and its increase because they assume that a fall in the rate of interest in a free capitalist economy provides ample opportunities for investment.

9.6 Classical Model of Employment

According to classical theory, in real terms, the aggregate production function and the demand and supply function of labour basically determine the equilibrium level of total output and employment at full employment level in the economy.

The classical aggregate production may be stated as under:

$Q = f$ (N.C.T.)

where,

Q = level of output,

f = functional relationship,

N = level of employment,

C = fixed stock of capital,

T = given stage of technology.

The above stated relation implies that under the given condition of technological and fixed stock of capital in the short-run, there exists a positive functional relationship between the level of output and employment. As the level of employment (N) increases, the level of ouput (Q) also increases and vice versa. Here, the proportionate relationship between the output and level of employment depends on the marginal productivity of labour. The marginal physical product of labour refers to the addition made to total product by the employing an additional worker, other things being equal.

The above-stated points can be clarified with an illustration as in Table 9.1.

Table 9.1: The Level of Output, Employment and the Marginal Physical Proudct of Labour (Imaginary Data)

Output (Q)	*Employment (N)*	*Marginal Physical Product of Labour (MPP_{Lt})*
500	100	—
1,200	200	8
1,800	300	7
2,200	400	6

2,500	500	5
2,700	600	4
2,800	700	3

It can be seen that with an increase in employment, total output increases, while marginal physical product of labour (MPP_L) diminishes.

The marginal physical product of labour curve reflects demand for labour. An entrepreneur employes labour, given a wage rate, till the wage rate is equal to the marginal physical product of labour, because this is his profit maximising condition.

In symbolic terms:

$$\frac{W}{P} = MPP_L$$

where,

$$\frac{W}{P} = \text{real wage } (W = \text{wage rate; } P = \text{price level}).$$

Again, by manipulation: $W = MPP_L \times P$, which means that money wage rate is equal to the marginal productivity of labour, i.e., the value of marginal physical product of labour, in the aggregate sense.

Since $MPP_L = \frac{dQ}{dN}$ (that is, ratio of small change in output to a small unit change in employment.)

$\therefore \frac{W}{P} = \frac{dQ}{dN}$ at equilibrium point.

Further, $DL = f\left(\frac{W}{P}\right)$ which suggests that the demand for labour is the inverse function of the real wage rate.

Similarly, the supply function of labour may be stated as: $SL = f\left(\frac{W}{P}\right)$ which implies that the supply of labour varies directly with the real wage rates. The classical economists stated supply function of labour with a positive slope on the assumption that the marginal utility of work increases as the number of man-hour worked per unit of time increases.

Given the demand and supply functions of labour, an equilibrium real wage rate is determined at the intersection point of the two functions (curves). In Fig. 9.2 *(a)* the equilibrium real wage is shown as (*W/P'*). The corresponding level of employment is *ON"*. If wage is (*W/P'*) which is a high rate, the supply of labour will exceed its demand. There will be thus, unemployment to the tune of MT. Labour market being competitive, the surplus of unemployment labour will cause the wage rate to fall. When it falls to *(W/P)' ON'* will be the supply as well as demand for labour. When the equilibrium wage rate is set in the economy, the labour market will reach a full employment situation. At the given full employment level, the total output in the economy depends on the aggregate production function. In Fig. 9.2 *(b)*, the curve *Q* represents the aggregate production function *Q* = *f* (N,C,T). With regard to the employment level ON', the corresponding level of output in the economy is, thus, measured as *OQ'*, which is the full employment output.

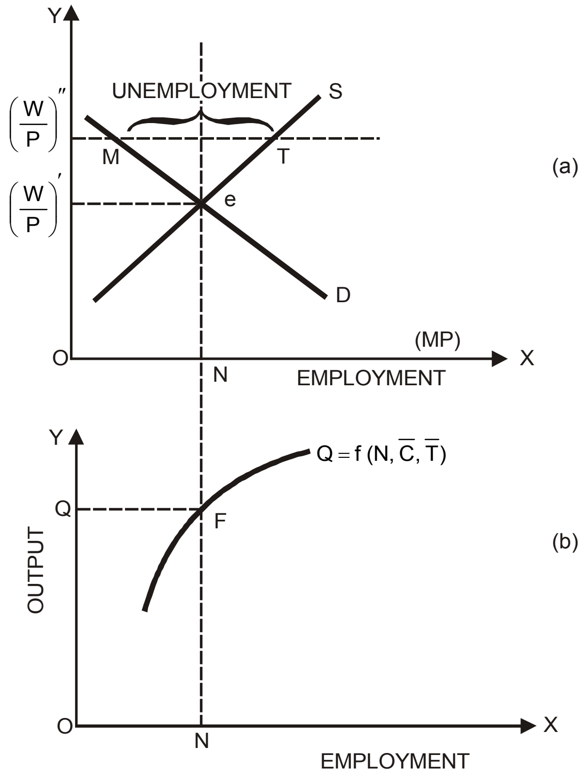

Fig. 9.2: The Classical Theory of Employment

It was the belief of the classical economists that there could be no involuntary unemployment in a labour market characterised by free and unhindered competition. They, in fact, could not believe that work is not available to the workers if they are willing to work at the prevailing wage rates.

9.7 Wage Rate Flexibility and Employment

The classicists have advocated "the money wage cut policy" to solve the problem of unemployment. The classical economists believed that involuntary unemployment, if it existed in an economy, was a consequence of the rigid wage structure. If wages are lowered sufficiently, all involuntary unemployment would disappear. They, thus, assumed that a self-adjusting system of wage rates would push the economy towards full employment stage.

They argued that involuntary unemployment comes into existence due to the interference of the free play of market mechanism in a capitalist economy. Such interference is the result of collective bargaining of trade unions to push up wages or governmental intervention through the passing of law of minimum wages. Such interferences disturb the smooth functioning of the market mechanism in determining the equilibrium wage rates which clears off the labour market. In this context, Dillard remarks: "Monopolistic behaviour on the part of labour and labour's friend is responsible for unemployment." If the economic system is allowed to function unhindered without such "interference" and the wages are allowed to find their own level in perfectly free competition, involuntary unemployment will cease to exist.

Thus, wage rates fall under the pressure of unemployment until all potential workers are employed. Pigou contends that the removal of "interference" and the existence of free competition would force wages down until it is profitable for the entrepreneur to employ everyone who wants to work. Thus, classical economists believed that involuntary unemployment is due to the rigidity of the wage structure. They, therefore advocated a wage cut policy for increasing employment. Since, in voluntary unemployment is caused by high wages, the cure is low wages. Prof. Pigou particularly held the view that unemployment would disappear from society by the device of money wage cuts during a depression.

Finally, the whole structure of the classical theory is based on the policy of *laissez faire,* i.e., government non-intervention in economic affairs. The classicists believed in governmental non-interference and a free economic system under perfect competition. They maintained that the government should not interfere with the economic forces but leave them free and unrestricted to attain equilibrium.

9.8 Keynes's Criticisms Against Classical Theory

Though logically the classical theory is sound and well-knit on the basis of its axioms, Keynes vehemently criticised and completely discarded it on the ground of false premises.

The following are the main points of Keynes' criticisms against the classical theory:

1. Unrealistic Assumption of Full Employment Condition: Keynes considered the fundamental classical assumption of full employment equilibrium condition as unrealistic. To him, there is the possibility of equilibrium condition of underemployment as a normal phenomenon. Keynes regarded it as a rare phenomenon. Keynes in fact considered the underemployment condition of equilibrium to be more realistic.

2. Undue Importance to the Long Period: Keynes opposed the classical insistence on long-term equilibrium; instead, he attached greater importance to short-term equilibrium. To him, "in the long-run, we are all dead." So, it is no use to say that in the long-run everything will be all right.

3. Keynes's Denial of Say's Law of Markets: Classical economists rest on Say's Law which blindly assumed that supply always creates its own demand and affirmed the impossibility of general overproduction and disequilibrium in the economy. Keynes totally disagreed with this view and stressed the possibility of supply exceeding demand, causing disequilibrium in the economy and pointed out that there is no automatic self-adjustment in the economy.

He further pointed out the weakness of Say's Law maintaining that all the income earned by the agents of production during the process of production would not necessarily be used to purchase the goods produced; hence there can be a deficiency of aggregate demand. Unemployment, according to him, is the result of deficiency of aggregate demand. He conceived that the entire part of money income which is not spent on consumption goods by individuals, need not necessarily be spent on the purchase of producers' goods or investment goods; money saved is often hoarded by individuals to increase their cash balances. Therefore, there can be shortage of aggregate demand. Evidently, additional supply does not necessarily mean additional demand.

Further, Say's Law laid down that supply and demand would always be in equilibrium and the process of equilibrium was automatic and self-balancing. Keynes refuted this too. He pointed out that the structure of modern society rests on two principal classes — the rich and the poor — and there is unequal distribution of wealth between them. The haves have too much of wealth all of which cannot be consumed by them and the have-nots too little even to meet their minimum consumption, which means a deficiency in aggregate demand in relation to additional supply, and this results in general overproduction and unemployment. Thus, Keynes pointed out the error of the classicists in denying general overproduction and unemployment. He also pointed out that the economic system in reality is never self-balancing in character. He, therefore, maintained that State intervention is necessary for adjustment between supply and demand in the economy.

4. Attack on Money Wage Cut Policy: Keynes objected to the classical formulation of employment theory, particularly, Pigou's notion that unemployment will disappear if the workers will just accept sufficiently low wage rates (*i.e.,* a voluntary cut in money wage). He rejected Pigou's plea for wage flexibility as a means of promoting employment at a time of depression. According to Pigou, employment in the society can be increased by a device of money wage cuts and noted that by following a policy of wage-cuts, costs would fall, resulting in the expansion of demand, greater production, and therefore, greater investments and employment. Keynes refuted Pigou's view that flexible wage rates will cure unemployment on two counts, practical and theoretical.

On the practical side, Keynes pointed out that trade unions are an integral part of the modern industrial system and they could certainly resist a wage-cut policy. Strikes and labour unrest are the bad consequences of such a policy. Similarly, there is welfare legislation regarding minimum wage and unemployment insurance in a Welfare State. Dillard remarks: "Therefore, it is bad politics even if it should be considered good economics to object to labour unions and to liberal labour legislation." Thus, in modern times, money wage cut is not a practical proposition.

On the theoretical ground, Keynes observed that a general wage cut would reduce the purchasing power in the hands of the workers which means a cut in their consumption, *i.e.,* effective demand for the products of industry. A decline in aggregate effective demand will obviously lead to a decrease in the level of employment. According to Keynes, thus, a general wage cut would reduce the volume of employment.

Keynes, thus, maintained that the volume of employment is determined by the effective aggregate demand and not by the wage bargain between workers and employers as the classicists had explained. The wage cut policy of the classicists appeared both immoral and unsound.

5. Keynes's Attack on Interest Rate to be Strategic Variable: Keynes also attacked the classical theory in regard to saving and investment. He objected to the classical idea of saving and investment equilibrium through flexible rates of interest. To him saving and investment equilibrium are obtained through changes in income rather than in the interest rate.

6. Keynes's Attack on Laissez-faire Policy: Keynes strongly attacked the classicists for their unrealistic approach to the problems of contemporary capitalist economic system. Pigou's plea for a return to free perfect competition to solve the problem of unemployment seemed 'obsolete' in the changed conditions of the modern world. Pigou grieved at the modern State's intervention with the free working of the economic system because it causes unemployment. He also condemned the activities of the trade unions which prevent the falling of wage level and thereby cause increase in unemployment. Keynes pointed out that the trade unions are an integral part of modern society and they will grow further. Besides, a progressive Welfare State will not refrain from accepting or adopting the principle of fixation of minimum wages. Keynes wanted governmental action to bring about adjustment in the economic system, because the modern economic system is not self-adjusting in character as assumed by the classicists.

In short, classical theory, in Keynes's view, is unrealistic and irrelevant to the present conditions and out of date, and, thus, cannot be a guide to the solution of modern economic problems. Thus, the basic need is for a theory which will diagnose the ills of the modern economic system and furnish a guide for the solution of problems like unemployment, business cycles, inflation and other economic ills.

Consumption expenditure is the major constituent of aggregate demand in an economy. The level of a community's expenditure on consumption is determined by a multitude of factors such as, household income, tastes and preferences, current and expected prices, expected future income, holding of liquid assets, interest rates, debts, real wealth, advertising and sales propaganda, taxation, inflation and the availability of goods. Keynes, however, assumed that in the short-run, real consumer spending is primarily determined by current real personal disposable income (that is, gross personal income minus personal tax liabilities). Prof. Hansen remarks that "income is singled out as the main determined of consumption just as in the case of the familiar demand wave, price is singled out as the primary determinant of the quantity taken."

In specific terms, Keynes held that current consumption depends upon current disposal income. A rise in income leads to a rise in consumption and vice versa. The empirical consumption income relationship is represented by the *consumption function.*

9.9 Summary

The classical theory of employment is essentially a supply-oriented theory. The economists were basically concerned with the long-run problem of growth of the economy's productive capacity and the efficient allocation of the given resources at full employment. The classical economics has, therefore, focused its attention more on the supply side with a little emphasis on the demand side of the growth process.

It gives an outline of the major postulates of the classical theory of employment.

The Classical Theory of Employment, Long-term Analysis, Full Employment, Say's Law of Markets Interest Rate Flexibility, Wage Rate Flexibility .

Their major concern of assumption of full employment was examine the forces which determined:, The different types of goods and services that would be produced in the economy; The allocation of productive resources among the competing firms and industries. Basically, the classical theory studied the alternative uses of a given quantity of employed resources. The classicists tried to find out the conditions leading to the most efficient use and optimum allocation of the given resources.

Basically, Say's Law contends that the production of output in itself generates purchasing power, equal to the value of that output: supply creates its own demand. It is argued that, "Production increases not only the supply of goods but, by virtue of the requisite cost payments to the factors of production, also creates the demand to purchase these goods.

Two Main Propositions of Say's Law such as: 1. Production is the Sole Cause of Demand and 2. There can be no Overproduction of Goods any Time.

Keynes' criticisms against the classical theory: 1. Unrealistic Assumption of Full Employment Condition, 2. Undue Importance to the Long Period, 3. Keynes's Denial of Say's Law of Markets, 4. Attack on Money Wage Cut Policy, 5. Keynes's Attack on Interest Rate to be Strategic Variable and 6. Keynes's Attack on Laissez-faire Policy.

Keynes' law is limited by the following assumptions: 1. Constancy of Psychological and Institutional Factors, 2. Normal Economic Conditions and 3. Laissez-faire Policy.

9.10 Key Words/Abbreviations

- **Classical theory of employment:** the classical theory of employment refers to the theory and ideas about determinants of employment propounded by the classical writers like Adam Smith, Ricardo, Mill and others.
- **Full employment:** Full employment condition implies the absence of any involuntary unemployment.
- **Say's law of market:** Say's Law of markets was rooted in the mainstream of supply-oriented classical economics. Say's Law contends that the production of output in itself generates purchasing power, equal to the value of that output: supply creates its own demand.
- **Interest rate flexibility:** saving and investment are balanced in the community through the flexibility of the rate of interest, for interest is a reward for saving.
- Supply function of law : SL = $f\,\dfrac{w}{p}$

9.11 Learning Activity

1. We have learnt Keynes thoery in this chatper. Students as asked to collect other economist theory and discuss aborted.

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2. Discuss in class about classical model of employment in todays IT company.

9.12 Unit End Questions (MCQ and Descriptive)

A. Discriptive Type Questions

1. Define the term 'Macro Economics'.
2. Explain Supply-oriented Classical Theory of Employment.
3. Discuss the various assumption of Full Employment.
4. Explain in details Say's Law of Markets.
5. Write note on: Interest Rate Flexibility.
6. Discuss Classical Model of Employment.
7. Explain Wage Rate Flexibility and Employment.
8. Explain in details Keynes's Criticisms against Classical Theory.
9. Comment on the Keynesian theory of Employment.
10. Throw some light on Classical Theory of Income and Employment?
11. Can the Keynesian theory of income and employment is determined through aggregate demand and aggregate supply? If Yes then Explain it through diagram.

B. Multiple Choice Questions

1. There could be no involuntary unemployment in a labour market characteristics by

   (a) Perfect competition (b) Free and unhindered competition

   (c) Hindered competition (d) None of these

2. Say's Law of ____________.

   (a) Demand (b) Supply

   (c) Income (d) Market

3. The classical theory of employment is essentially a

    (a) Market-oriented theory (b) Demand-oriented theory

    (c) Supply-oriented theory (d) All the above

4. ΔO means ____________.

    (a) Increase in intended expenditure (b) Increase in income

    (c) Increase in output (d) All the above

5. The equation of demand for labour is

    (a) DL = $f\frac{w}{p}$ (b) SL = $f\frac{w}{p}$

    (c) Wage rate = w/p (d) All the above

Answers:

1. (b), 2. (d), 3. (c), 4. (c), 5. (a)

9.13 References

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UNIT 10 KEYNESIAN TOOLS

Structure:

10.0 Learning Objectives

After studying this unit, you will be able to:

- Explain the fundamental Psychological Law of Consumption.
- Discuss the Consumption Function and Saving Function.
- Explain the Technical Attributes of Consumption Function.
- Elaborate the Factors Affecting the Consumption Function.
- Explain the Significance of the Concept of Consumption Function.

10.1 Introduction

Consumption expenditure is the major constituent of aggregate demand in an economy. The level of a community's expenditure on consumption is determined by a multitude of factors such as, household income, tastes and preferences, current and expected prices, expected future income, holding of liquid assets, interest rates, debts, real wealth, advertising and sales propaganda, taxation, inflation and the availability of goods. Keynes, however, assumed that in the short run, real consumer spending is primarily determined by current real personal disposable income (that is, gross personal income minus personal tax liabilities). Prof. Hansen remarks that "income is singled out as the main determinant of consumption just as in the case of the familiar demand wave, price is singled out as the primary determinant of the quantity taken."

In specific terms, Keynes held that current consumption depends upon current disposal income. A rise in income leads to a rise in consumption and *vice versa*. The empirical consumption income relationship is represented by the *consumption function.*

10.2 Fundamental Psychological Law of Consumption

The Keynesian concept of consumption function stems from the fundamental psychological law of consumption which states that there is a common tendency for people to spend more on consumption when income increases, but not to the same extent as the rise in income because a part of the income is also saved. The community, as a rule, consumes as well as saves a larger amount with a rise in income.

Thus, Keynes' psychological law of consumption is based on the following propositions:

- When the total income of a community increases, the consumption expenditure of the community will also increase, but less proportionately.
- It follows from this that an increase in income is always bifurcated into spending and saving.
- An increase in income will, thus, lead to an increase in both consumption and savings. This means that with an increase in income in the community, we cannot normally expect a reduction in total consumption or a reduction in total savings. A rising income will often be accompanied by increased savings, and a falling income by decreased savings. The rate of increase or decrease in savings will be greater in the initial stages of increase or decrease of income than in the later stages.

The gist of Keynes' law is that consumption mainly depends on income and that income recipients always do not tend to spend all of the increased income on consumption. This is the fundamental maxim upon which Keynes' concept of consumption function is based.

Keynes' law is limited by the following assumptions:

1. **Constancy of Psychological and Institutional Factors.** Propensity to consume will remain stable owing to the constancy of the existing psychological and institutional complexities influencing consumption expenditure.
2. **Normal Economic Conditions.** General economic conditions are normal and there are no abnormal and extraordinary circumstances such as war, revolution, inflation, etc.

3. **Laissez-faire Policy.** It is assumed that there exists a free capitalist economy, in which there is no government restriction on consumption when income increases.

Implications of the Psychological Law of Consumption

A more detailed analysis of Keynes' law shows that it has the following important implications:

1. Highlighting the crucial importance of investment in an economy. A vital point in the law is the tendency of people not to spend on consumption the full amount of an increase in their income. There is thus a "gap" between aggregate income and aggregate consumption. Assuming the consumption function to be stable during a short-run period, the "gap" will widen with an increase in income. This gives rise to the problem of investment. Investment should be increased to fill the gap between income and consumption. Keynes, therefore, stresses that investment is the crucial and initiating determinant of levels of income and employment.

2. Refuting Say's Law. It refutes Say's Law of market by indicating the demand deficiency and possibility of over-production.

3. Explanation to the Business Cycle. An explanation of the turning points of a business cycle is also provided by this law. The upper turning point from a boom is caused by a collapse of the marginal efficiency of capital owing to the fact that consumption expenditure does not keep pace with increase in income during the prosperity phase. Similarly, the law explains the revival of the marginal efficiency of capital and the turning point of recovery from a depression, on the basis of the fact that when income is reduced consumption expenditure does not decrease in the same proportion.

10.3 The Consumption Function

The consumption function or the propensity to consume is nothing but an expression of an empirical income-consumption relationship. In technical terms, Keynes postulates that *ceteris paribus* consumption is a function of income.

Algebraically, the relationship between consumption as a dependent variable and total real income as the independent variable is expressed as:

$C = f(Y)\ ;\ f > 0$

where, C = real aggregate consumption expenditure,

Y = total real income and

f = functional relationship.

f = > 0 implies positive or direct relationship.

The propensity to consume or the consumption function shows the relationship between aggregate real consumption and aggregate real income. To put it more simply, the propensity to consume refers to the actual or intended consumption expenditure undertaken out of varying levels of income. Other things being equal, the consumption function shows that changes can be expected in consumption from the given changes in income.

Schedule of the Propensity to Consume

The propensity to consume does not mean a mere desire to consume, but the actual amount of real consumption that takes place or that is expected to take place at various income levels. In this respect, it is similar to a demand schedule, which refers not mere desire to buy but an effective desire of demand, backed by an ability and willingness to pay for the goods. Similarly, the propensity to consume also refers to effective consumption and not to a mere desire to consume.

We can tabulate various amounts of consumption expenditure which people are prepared to make at various corresponding levels of income. Such a list is called a schedule of the propensity to consume or is sometimes also referred to as the schedule of intended consumption. A schedule of the propensity to consume is a statement showing the functional relationship between the level of consumption at each level of income. Such a schedule is illustrated in Table 10.1.

Table 10.1: Consumption Function

Income (Y)	Consumption (C) (In crores of rupees)
200	220
300	300
400	380
500	460
600	540
700	620

In Table 10.1, the first column indicates the various levels of income. The second column shows the amounts of real consumption expenditure at each level of income. It is the whole schedule relating to the various amounts of consumption at various levels of income, and is called "the propensity to consume" or "the consumption function."

Table 10.1 shows that consumption is an increasing function of income as both variables, *Y* and *C,* moves in the same direction. Consumption and income are positively correlated. It may further be noticed that consumption is shown to change by ₹ 80 crores for each ₹ 100 crores change in income. This is on the assumption that in the short run at any rate, the propensity to consume will remain stable.

We may represent the consumption function diagrammatically as in Fig. 10.1. As a matter of fact, the consumption function may be linear as in Fig. 10.1 or non-linear as shown in Fig. 10.2.

In both the diagrams, the Y-axis measures consumption and X-axis real income. The *C* curve represents the consumption function or the propensity to consume. It moves upward to the right, indicating that consumption increases as income increases. But in Fig. 10.1, it should be noticed that the *C* curve rises less steeply than the unity line[1] after the intersection, or break-even point *B* (the break-even point is the position where consumption is the same as income). This shows that the increase in consumption is smaller than the increase in income. In Fig. 10.1, increase in consumption C_1C_2 is less than the increase in income Y_1Y_2.

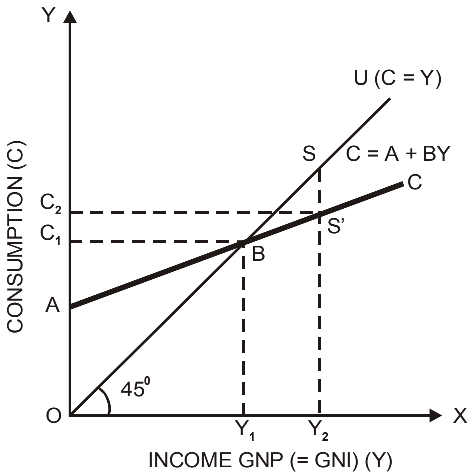

Fig. 10.1: Linear Consumption Function

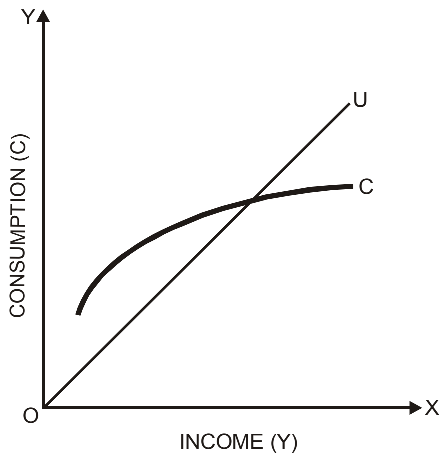

Fig. 10.2: Non-Linear Consumption Function

Now, since that part of income that is not consumed is saved, diagrammatically *SS'* is the saving — the gap between *OU*, the unity curve and the *C* curve. Thus, the consumption function measures not only the amount spent on consumption but the amount saved. The unity curve (45° line) may thus be regarded as the zero-saving line, while the shape and position of the *C* curve indicate the division of income between consumption and saving.

It is interesting to note that at point A interception of curve *C* at *Y*, income is zero, though there is consumption. But this is not an unrealistic phenomenon. Perhaps, this refers to the case of traditional primitive society, where people do not produce any real output but consume fruits, leaves, etc. as available in nature. Further, in a traditional society, people consume more than what they produce. As such, up to *CB* on *C* curve, we find that consumption exceeds income. In a modern economy, this may be met by dissaving — consuming capital or relying on foreign aid for consumption. Economic development in a real sense (when capital formation emerges from domestic saving which is invested) starts at a point of "break-even." Break-even point is a theoretical possibility which, however, cannot be proved empirically due to non-homogeneity in macro entities, but its existence cannot be denied.

Usually, as we have seen, the shape of propensity to consume curve, *i.e.,* the *C* curve, is such that it moves upward to the right, but less steeply than the unity curve. This normal shape of the consumption function is explained by Keynes in terms of the fundamental psychological law of consumption when he states "that men are disposed as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their incomes."

10.4 Saving Function

Saving function (S) is the counterpart of the consumption function, because:

$$S = Y - C$$

$$\therefore S = f(Y).$$

A saving function can, thus, graphically be derived from $C + I$ curve by plotting saving as a function of income (Y); the equilibrium level of income being the one at which saving is equal to the given level of investment.

Thus, from a given consumption curve (C), saving curve can be derived as in Fig. 10.3.

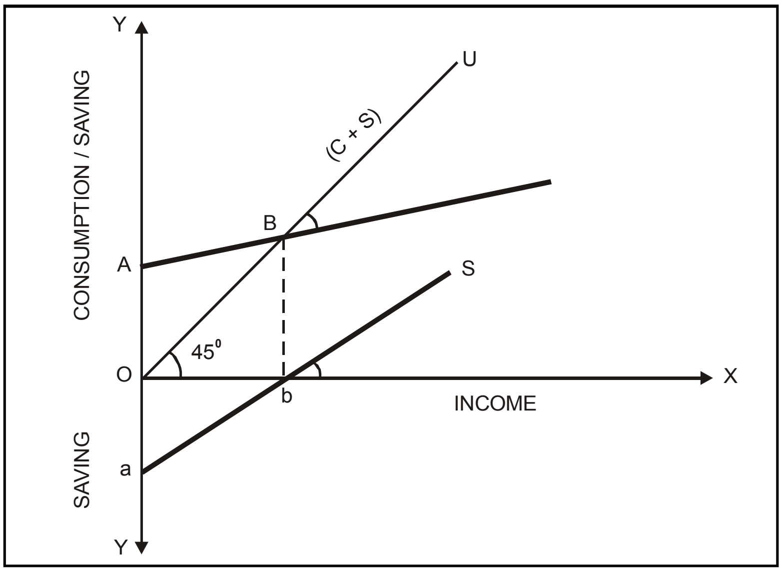

Fig. 10.3: Derivation of Saving Function

Measure *OA* = *Oa*. At B point on the *C* curve, draw a perpendicular *Bb* and along *ab* draw *S* curve by extending the line.

10.5 Technical Attributes of Consumption Function

In dealing with the consumption function or the propensity to consume, Keynes considered its two technical attributes: (*i*) the propensity to consume and (*ii*) the marginal propensity to consume, both having substantial economic significance.

Average Propensity to Consume (APC)

The average propensity to consume (APC) is defined as the ratio of aggregate or total consumption to aggregate income in a given period of time. Thus, the value of average propensity to consume, for any income level, may be found by dividing consumption by income. Symbolically,

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

where, C stands for consumption and

Y stands for income.

Table 10.2: Schedule of Propensity to Consume

Income	Consumption	Average Propensity to Consume	Marginal Propensity to Consume
(Y)	*(C)*	$APC = \frac{C}{Y}$	$MPC = \frac{\Delta C}{\Delta Y}$
300	300	$\frac{300}{300} = 1$ or 100%	
400	380	$\frac{380}{400} = 0.95$ or 95%	$\frac{80}{100} = 0.8$ or 80%
500	460	$\frac{460}{500} = 0.92$ or 92%	$\frac{80}{100} = 0.8$ or 80%
600	540	$\frac{540}{600} = 0.90$ or 90%	$\frac{80}{100} = 0.8$ or 80%
700	620	$\frac{620}{700} = 0.88$ or 88%	$\frac{80}{100} = 0.8$ or 80%

In Table 10.2, the *APC* is calculated at various income levels. It is obvious that the proportion of income spent on consumption decreases as income increases. Since the average propensity to consume is 100%, 95%, 92% and 88%. It follows that the average propensity to save $\left(\frac{S}{Y}\right)$ is respectively, 0.5%, 8%, 10% and 12%,

$$\therefore APS = \frac{S}{Y} = 1 - \frac{C}{y}$$

Thus, the proportion of income saved increases as income increases.

The economic significance of the *APC* is that it tells us what proportion of the total cost of a given output from planned employment may be expected to be recovered by selling consumer goods alone. It tells us what proportion of the total amount of goods and services demanded by the community originates in the demand for consumers goods. The average propensity to save tells what proportion of the total cost of a given output will have to be recovered by the sale of capital goods. Other things remaining equal, the relative development of consumer goods and capital goods industries in an economy depends on the *APC* and the *APS*. This suggests that in highly industrialised economies, the *APC* is persistently low and the *APS* is persistently high.

Marginal Propensity to Consume

The marginal propensity to consume (*MPC*) is the ratio of the change in the level of aggregate consumption to a change in the level of aggregate income. The *MPC,* thus, refers to the effect of additional income on consumption.

MPC can be found by dividing a change (increase or decrease) in consumption by a change (increase or decrease) in income. Symbolically,

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

where, D (delta) indicates the change (increase or decrease), and

C denote consumption and

Y denote income.

In Table 2 above, the *MPC* is calculated at various income levels. It is obvious that the *MPC* is 0.8 or 80% at all levels. Thus, the *MPC* is constant here because the linear consumption function is non-linear, *MPC* will not be constant.

Again, the marginal propensity to consume (*MPC*) is always positive but less than one. This behavioural characteristic of the *MPC* is attributed by Keynes to the fundamental psychological law of consumption that consumption increases less proportionately than income when income increases.

People's main motivation for not spending the entire increase in income is to save and to create a hedge against special risks and unforeseen contingencies. Thus, D*C* < D*Y* always. This means that

$$MPC = \frac{\Delta C}{\Delta Y} < 1.$$

Keynes' hypothesis that the marginal propensity to consume is positive but less than unity $0 < \frac{\Delta C}{\Delta Y} < 1$ has great analytical and practical significance. It tells us not only that consumption is an increasing function of income but also that it usually increases by less than 100% of any increase in income. K.K.Kurihara observes that this hypothesis will be found helpful in explaining: (1) the theoretical possibility of "underemployment equilibrium," and (2) the relative ability of a highly developed industrial economy. For the hypothesis implies that the gap between income and consumption at all high levels of income is too wide to be easily filled by investment, with a possible consequence that the economy may fluctuate around an unemployment equilibrium.[1]

From the marginal propensity to consume (*MPC*), we can derive the marginal propensity to save (*MPS*) by the following fomula:

$$MPS = 1 - MPC \text{ or } \left(1 - \frac{\Delta C}{\Delta Y}\right).$$

Thus, if the marginal propensity to consume is 0.8, the marginal propensity to save, according to this formula, must be 0.2, as *MPC* + *MPS* = 1. Again, as MPC is always less than unity, *MPS* tends to be always positive.

According to Keynes, the propensity to consume is a fairly stable function of income with the marginal propensity to consume being positive but less than unity. Keynes, however, did not state what would be the exact nature of the *MPC* within the limits laid down. The *MPC* may rise, fall or remain constant between the limits set. However, Keynes implicitly stated that the *MPC* will not be constant when cyclical fluctuations cause change in objectives factors determining the propensity to consume. Thus, it may be inferred that during the cyclical upswing, the *MPC* will fall while during the downswing, it will rise. Keynes, however, opines that the long-run MPC has tended to decline as nations have become richer.

The economic significance of the concept of marginal propensity to consume (*MPC*) is that it throws light on the possible division of any extra income consumption and investment, thus, facilitating the planning of investment to maintain the desired level of income. It has further significance in the multiplier theory.

It has been observed that the *MPC* is higher in the case of poor than rich people. Therefore, in underdeveloped countries, the *MPC* tends to be high, whereas in advanced countries it tends to be low. Consequently, the *MPC* is high in rich sections and is low in poor sections of the community. The same is true of rich nations and poor nations.

Graphical Measurement of APC and MPC

Diagrammatically, the average propensity to consume is measured at a single point on the *C* curve. In Fig.10. 4, it is determined at Point *A* (where $\frac{C}{Y}$ gives *APC*). The marginal propensity to consume, on the other hand, is measured by the slope or gradient of the *C* curve, *i.e.,* the consumption function schedule or curve. To ascertain the slope of the *C* curve, we draw a horizontal line through *A,* the previous consumption income point, and then measure vertically to the tangent *P*, the changed consumption-income point. We shall find that the ratio of the vertical length *PM* to the horizontal length *AM* is 0.8.

Empirical relationship between APC and MPC

The two consumption propensities are closely interrelated.

- When the *MPC* is constant, the consumption function is linear, *i.e.,* a straight line curve. The *APC* will also be constant only if the consumption function passes, through the origin. When it does not pass through the origin, the *APC* will not be constant.
- As income rises, the *MPC* also falls, but it falls to a greater extent than the *APC.*
- As income falls, the *MPC* rises. The *APC* will also rise but at a slower rate.

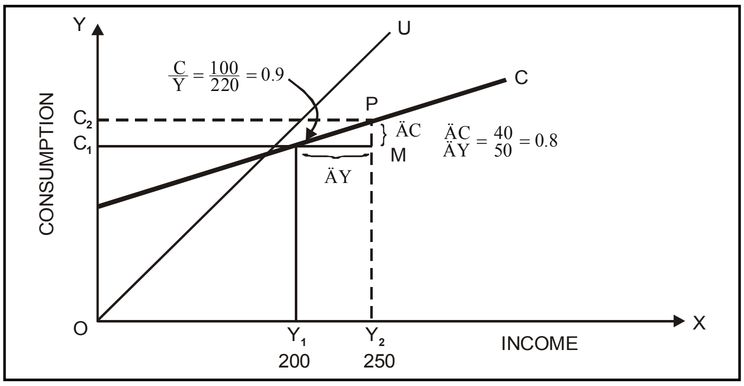

Fig. 10.4: Measurement of *APC* and *MPC*

10.6 Investment Demand Schedule (Function)

The equilibrium volume of investment can be found out by relating the rate of interest to a given schedule of marginal efficiency of capital. On the basis of the schedule of the marginal efficiency of capital, we can prepare a schedule showing the various amounts of investment demand, at varying rates of interest. In fact, such a schedule is called the investment-demand schedule, as illustrated in Table 10.3.

Table 10.3: Investment Demand Schedule

The rate of interest (Ri) (in % p.a.)	Volume of Investment Demand (in crores of rupees)	Marginal Efficiency of Capital (in % p.a.) MEC
10	10	10
9	20	9
8	30	8
7	40	7
6	50	6
5	60	5

It will be observed from the table that when the rate of interest falls, investment demand rises. When the rate of interest is 10 per cent, the volume of investment that would be undertaken is only ₹ 10 crores. Here the rate of interest which is 10% is equal to the *MEC,* which is also 10%.

If the rate of interest falls to 6 per cent, the investment demand of the entrepreneurs would be ₹ 50 crores, because at this investment, the *MEC* is also 6 per cent *i.e., MEC = Ri*. In this way, *MEC* and interest rate are closely related to each other. But the rate of interest is assumed to be independent of the volume of investment, while the marginal efficiency of capital is regarded as a function of the volume of investment.

Diagrammatic Representation

When the investment demand schedule is represented graphically, it gives a curve called the *investment demand function.* This we illustrate in Fig. 1 where the X-axis represents the volume of investment which entrepreneurs would be ready to undertake (*i.e.,* investment demand) and the Y-axis denotes the *MEC* and the rate of interest, curve *ID* (the investment-demand curve) shows the behaviour of investment demand, based on the MEC in relation to a given a rate of investment. In fact, the curve *ID* also represents the marginal efficiency of capital (*MEC*).

Usually, the investment demand curve, or the *MEC* curve, generally takes the shape of an ordinary demand curve, sloping downward from left to right. The position and shape of the general *MEC* curve, *i.e.,* the investment-demand curve *i.e.,* the investment-demand function, is of major significance in determining the volume of employment, because it will indicate the extent to which the amount of investment will change in response to a change in the rate of interest. In this context, the concept of elasticity should be taken into consideration. The more elastic investment-demand schedule (or the schedule of the marginal efficiency of capital, in general), the greater will be the increase in investment in response to a given fall in the rate of interest. Evidently, the more inelastic the investment-demand schedule, the less will be the rate of interest. In Fig. 10.5 (A) the investment-demand schedule is relatively elastic, so that a fall of one per cent in the rate of interest will result in a relatively large increase in the volume of investment, whereas in Fig. 10.5 (B) a similar change in the rate of interest has a smaller increase in the volume of investment.

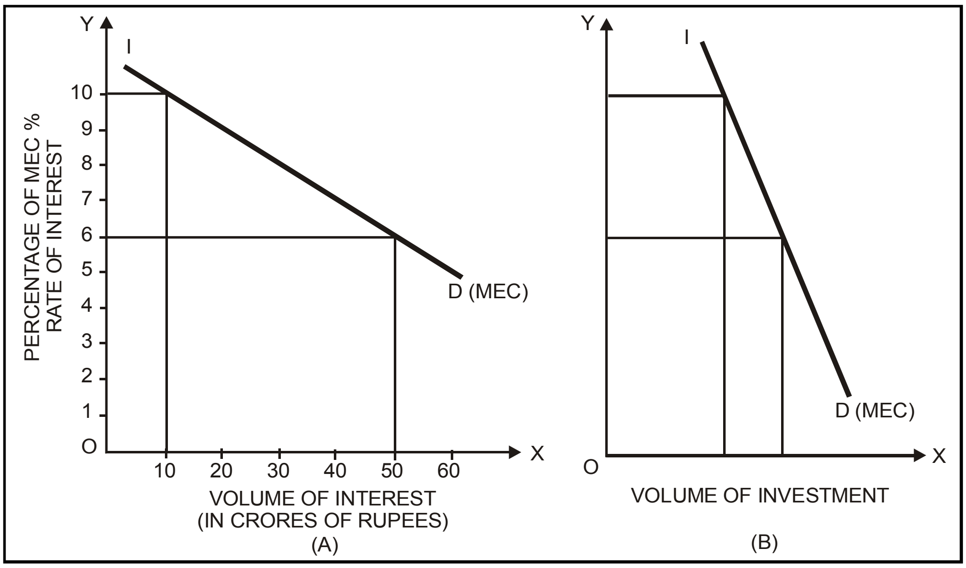

Fig. 10.5: Investment Demand Function

However, on an average, empirical evidence suggests that the schedule of the marginal efficiency of capital and thus, the investment-demand function, tends to be inelastic. Therefore, changes in the rate of interest only slightly influence the flow of new investment in the economy. Thus, what is more important for increase in investment and employment is not changes in the rate of interest, but the shift (an upward shift) in the schedule of the marginal efficiency of capital or the investment-demand function.

It must be remembered that $I = f(MEC, i)$ where, I stands for investment demand, *MEC* refers to the marginal efficiency of capital and i stands for the rate of interest.

Keynes, however, states that the *MEC* is highly fluctuating phenomenon, while the rate of interest remains more or less stable in the short run. Thus, he concludes that the investment-demand function and accordingly, the volume of investment moves along with a rise or fall in the *MEC*.

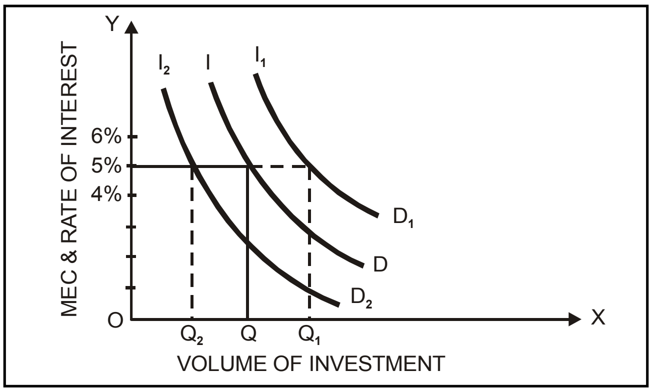

Fig. 10.6: Shifts in Investment-Demand Function

In Fig. 10.6, an upward shift in the investment-demand schedule, indicated by the I_1D_2 curve, shows that though the rate of interest is unchanged at 5 per cent, the volume of investment rises to the QQ_1 level. Similarly, the downward shift in the investment demand schedule, as indicated by the I_1 D_2 curve, shows that the volume of investment is reduced to QQ_2, though the rate of interest is unchanged (*i.e.,* increased).

A shift in the investment-demand function is caused by a change in the marginal efficiency of capital due to changes in dynamic factors like technological progress, business expectation, etc. Technological progress creates investment opportunities and thereby raises the investment-demand schedule. Similarly, the discovery of new resources or territorial expansion, or population growth would also create new investment opportunities and shift the curve of investment-demand upwards.

In the short run, however, changes in business expectations of entrepreneurs largely influence the investment-demand function.

10.7 Factors Affecting MEC

There are many short-run and long-run factors which affect the marginal efficiency of capital in a free enterprise economy.

The following are the important short-run factors which affect the *MEC*:

1. Expectations about the course of demand, price and cost of production. If the business community expects demand for products to rise and their prices to rise more than their cost, a high *MEC* which would stimulate investment activity is estimated. If, however, entrepreneurs anticipate the demand to decline and prices to fall against a steady cost of production, a declining *MEC* will be estimated.

2. Business optimism and pessimism. Business psychology plays an important part in determining the *MEC*. If there is an atmosphere of business optimism a majority of entrepreneurs would estimate a high or improved *MEC*. Under business pessimism, a low *MEC* is estimated.

3. Change in income. Any windfall gain, tax reduction or such other factors may suddenly raise the level of income. This would encourage demand and consumer's outlay, so the *MEC* will tend to rise.

4. Propensity to consume. When there is a shift in the consumption function, the increased demand for consumption goods will increase the derived demand for capital goods. This obviously causes a high *MEC* anticipation.

5. Changes in liquid assets. If entrepreneurs hold a large volume of liquid assets of various kinds, they can take advantage of forthcoming investment opportunities very easily, hence the *MEC* will be relatively high.

Further, *MEC* is also affected by the following long-term factors which are dynamic in nature.

1. Population growth. A growth of population causes demand, in general, to rise, so that *MEC* may be expected to rise with it. This is specially true for an under-populated country. But for an over populated country, a rise in population implies widespread poverty, which creates an adverse effect on the *MEC*. Thus, to stimulate investment in an over-populated country like India, population control becomes a pre-requisite.

2. Technological advancement. With the growth of scientific inventions and technological change, new products, new methods of production, new markets, etc. may be developed, which have a favourable impact on the *MEC* in the long run.

3. Creation of an infrastructure. Development of an industrial base and transport facilities, construction of social overhead capital, etc. in the long run, tend to create a favourable impact on the *MEC*.

10.8 Measures to Stimulate Investment

Since consumption tends to remain stable in the short period, it is changes in investment which determine aggregate demand and the resulting income and employment in the economy. Thus, by increasing the level of investment, the level of employment and income can be increased. Various fiscal, monetary and other measures have been suggested to stimulate investment in an economy. These are:

1. Lowering the Rate of Interest. Since inducement to invest depends on a comparison between MEC and the rate of interest, it is obvious that under the given state of MEC, a lowering of the rate of interest would enhance the probability of investment so that the investment in the private sector would be encouraged. Monetary authorities — the central bank — should accept a cheap money policy by lowering the bank rate. Availability of easy and cheap credit has a favourable impact in the construction industries, transport and co-operative sectors.

2. Tax Reduction. Direct personal and corporate taxes should be lowered so that the disposable income of the community increases. Again, a reduction in profit tax would increase corporate saving which may induce more investment. Indeed, heavy taxes have proved to be an obstacle to new investment in a country like India.

3. Public Expenditure. Public spending may be of two types: (*i*) pump-priming and (*ii*) compensatory spending, which may affect investment in the economy.

Deliberate public expenditure undertaken by the Government with a view to initiating recovery by injecting the circulation of new money into depressed economy is called pump-priming. Pump-priming is not intended to replace private investment. Its object is only to stimulate private investment and not to supplement it.

Public expenditure designed to compensate the deficiency in private investment is referred to as compensatory spending. It implies public expenditure incurred to fill up the gap of private investment in the economy. During, a depression, on account of the very low marginal efficiency of capital, the investment-demand function in the private sector is at a very low level, where automatic revival cannot take place. In such a situation, Keynes suggested that the government should resort to adequate public investment in order to compensate for the deficiency of aggregate demand. Compensatory spending by the government should be on a very large scale and has to be continued till private investment becomes normal.

Incidentally, it may be noted that Keynes relates his multiplier theory to the compensatory spending and not to the pump-priming programmes adopted by the government.

4. Price Policy. Instability in private sector investment is caused by price fluctuations which cause variations in the expected rate of profitability, *i.e.,* marginal efficiency of capital. Thus, price stability is an essential condition for stimulating investment in the economy. Price stability does not imply price rigidity. It means relative price stability. A price policy must be set forth by the government in this direction. A host of Keynesian and post-Keynesian economists believe that a rising price policy (the policy of mild inflation) has a favourable impact on investment and growth.

5. Technological Change and Innovation. When technological improvement takes place and the capital-output ratio tends to rise, the demand for capital increases which induces more investment in the capital goods sector. Again, there may be innovations like the introduction of the new products, new methods of production, new markets, etc., on account of which investment is likely to increase in the economy.

6. Abolition of Monopoly Privileges and Encouragement of Competition. Prof. Klein suggests that the abolition of certain monopoly privileges can serve as a stimulus to investment. He writes, "It is said that the patent system which grants at least 17-year monopolies on new inventions serves to decrease the volume of investment by holding innovations which would otherwise call for increased investment. The innovations are suppressed because they conflict with certain vested interests.”

Similarly, when conditions are developed to encourage competition in the market by permitting easy entry of new firms, the volume of investment in the economy would definitely rise. In a country like India, relaxing the licensing system, development related to new firms, special priorities to the new sector, etc., can help in stimulating the rate of investment.

7. Economic Planning. By an appropriate economic planning, creation of a suitable industrial base and the construction of social overhead capital, the volume of investment can be increased in an economy. In India, the volume of investment has increased considerably over a period of time due to the planning efforts.

10.9 The Concept of Multiplier

Conceptually, the multiplier refers to the effects of changes in investment outlays on aggregate income through induced consumption expenditures. Thus, the multiplier expresses a relationship between an initial increment of investment and the resulting increase in aggregate income. In fact, the multiplier is the name given to the numerical coefficient which indicates the increase in incomes which will result in response to an increase in investment. For instance, if investment increases by one crore of rupees and the aggregate income (or the national income) rises by four crore of rupees, then the multiplier is 4 (increase in income of ₹ 4 crores/increase in investment of ₹ 1 crore = 4). The multiplier may be defined as the ratio of the realised change in aggregate income to the given change in investment.

Symbolically,

$$K = \frac{\Delta Y}{\Delta I}$$

where, K stands for the investment multiplier,

DY represents change in income, and

DI refers to a given change in investment.

It follows that, given the multiplier coefficient *K*, we can measure the resulting change in the level of income caused by an intended change in investment:

$$DY = K.D\,I$$

Samuelson, therefore, defines the multiplier as "the number by which the change in investment must be multiplied in order to present us with the resulting change in income."[1]

The propelling force behind the multiplier effect is the consumption function. As a result of an increase in investment outlay, income initially increases in the same magnitude, but as income increases, consumption also increases. Consumption expenditures, in turn, become additional income to factors of production engaged in the production of consumers' goods. Thus, there is a further increase in income due to induced consumption and so on. The process, however, is not endless as the whole of the increase in income is not consumed. The process continues till the increasing ratio of income to expenditure gradually works itself out, because the marginal propensity to consume is less than unity.

Keynes assumes that when the real income of the community increases or decreases, its consumption will increase or decrease, but not in the same proportion. Hence, the marginal propensity to consume is always less than one. This conception of the marginal propensity to consume is at the heart of the multiplier principle. The value of the multiplier is in fact determined by the marginal propensity to consume. The larger its value, the greater is the value of the multiplier and vice versa. Thus, the investment multiplier is a direct function of the marginal propensity to consume (MPC). On this basis, Keynes sets a general formula for the multiplier as follows:

$$K = \frac{1}{1-\left(\frac{\Delta C}{\Delta Y}\right)} \text{ or } K = \frac{1}{1-MPC}$$

where, *K* stands for the multiplier coefficient and $\frac{\Delta C}{\Delta Y}$ refers to the marginal propensity to consume (*MPC*).

Alternatively, since *1 - MPC = MPS,* we can also say $K = \frac{1}{MPS}$

(where *MPS* refers to the marginal propensity to save).

This means that the multiplier coefficient is measured as the reciprocal of the marginal propensity to save.

10.10 Working of the Multiplier (The Process of Income Propagation)

The process of the working of the multiplier can be briefly illustrated by a "sequence analysis," which is discussed here.

Suppose, in any given period, investment increases by ₹ 10 crores. It will first increase income by ₹ 10 crores for those engaged in producing investment goods. Assuming the marginal propensity to consume to be 0.5 or 50 per cent in the first round, ₹ 5 crores will be spent on consumption goods by these income recipients. Thus, ₹ 5 crores, in turn, are received as income by those engaged in consumer goods industries. This logic is based on the fundamental proposition that one person's consumption expenditure is other person's income, so that an amount spent on consumption means a further amount of income received within the economy. The recipients of the ₹ 5 crores income will, by hypothesis, in turn, spend 50 per cent of that income on consumption, *i.e.,* ₹ 2.5 crores in the second round. Similarly, ₹ 1.25 crores of income will be generated in the third round, and so on. Economists estimate that each round of expenditure takes about two to three months to materialise. This interval of time between consumption responses is the multiplier period or propagation period. Professor Halm defines the multiplier period as the average period of time taken before money received as income and spent on consumption becomes income again. As we move from one multiplier period or round to another, the initial expenditures give rise to a gradually diminishing series of successive additions to income (when *MPC* is > 0 but < 1). This process will continue till the total increment in income becomes so large that it generates additional saving which is equal to the increase in investment. The process may be demonstrated mathematically by the use of the formula for the sum of an infinite geometric series.

$$DY = D\,l\,(1 + c + c^2 + c^3 + ... + c^n)$$

where, DY represents the increase in income.

DI is the initial increase in investment, and

c the marginal propensity to consume.

Since the absolute value of c is less than 1, the sum of an infinite geometrical progression is

$$1 + c + c^2 + c^3 + ... + c^n = \frac{1}{1-c}$$

or

$$DY = DI \frac{1}{1-c}$$

Hence, substituting the value of the above example in the formula,

$$Y = 10 + 5\frac{1}{1-0.5} = 10 + 5\frac{1}{\frac{1}{2}} = 10 + 5 + 2 = ₹\ 20 \text{ crores}$$

In other words, with a marginal propensity to consume 0.5, an initial investment of ₹ 10 crores will give rise to an aggregate income amounting to ₹ 20 crores.

Table 10.4 shows the process of income propagation in its simplest form.

Table 10.4: Process of Income Propagation

(MPC = 0.5)

Periodic Rounds of New Consumption	New Income (₹ Crores)	New Savings (₹ Crores)
Initial investment	10.00	Nil
First round of new consumption	5.00	5.00
Second round of new consumption	2.50	2.50
Third round of new consumption	1.25	1.25
Fourth round of new consumption	0.65	0.65
Fifth round of new consumption	0.31	0.31
Remaining round of new consumption	0.31	0.31
Total	20.00	10.00

Table 10.6 show that ₹ 10 crores of initial investment generate, over a period of time, an aggregate income of ₹ 20 crores. At this stage, savings (₹ 10 crores) equal investment (₹ 10 crores), and the process of income propagation comes to an end.

Keynes, however, assumes that the multiplier process does not take time to work itself out, so that any increase in investment outlay generates income by the multiple amount immediately. In other words, he ignores time lags by assuming instantaneous adjustments. Modern economists, on the other hand, point out that it takes time for the impact of the initial investment to make itself felt throughout the entire economy. They recognise the existence of time lags and consider the multiplier effect over time.

In demonstrating the sequence analysis of income propagation, we have, in Table 1, assumed a single injection of initial investment which is not repeated in subsequent rounds or multiplier periods. Increments in investment have to be repeated at regular time intervals if the aggregate income is to be raised to the multiplier level and kept intact. One injection of new investment will raise the multiplier value, but as soon as the multiplier effect has worked itself out, other things being equal, the aggregate income will fall to its original level. A steady or continuous injection of new investment is, thus, necessary in order to raise the aggregate income to the multiplier level and to keep it steady. Thus, it goes without saying that, in our illustration, in order to maintain the new level of income, that is, ₹ 10 crores plus income for the previous period, investment must be increased steadily at the rate of ₹ 10 crores per round or multiplier period. Otherwise, the income will return to its original level.

The multiplier process, with continuous investment at the rate of ₹ 10 crores, when the marginal propensity to consume is ₹ 0.5, is illustrated in Table 10.5. It shows that the steady injection of ₹ 10 crores of new investment in each round enables the aggregate income to rise to an amount equal to the multiplier value, and stay there.

Table 10.5: The Multiplier Effects of a Steady Injection of New Investment

Multiplier period	**Initial investment (I) ₹ crores**	$\left(MPC = \frac{1}{2}\right)$ **Increase in consumption*(DC)**	**Total increase in income DY = I +DC**
0	10		10
1	10	5	15
2	10	$5 + 2.5$	17.5
3	10	$5 + 2.5 + 1.25$	18.75
4	10	$5 + 2.5 + 1.25 + 0.625$	19.375
5	10	$5 + 2.5 + 1.25 + 0.625 + 0.312$	19.687
..	..	... ...	
..	10	... ...	20.00

* Successive figures trace these increments of consumption in successive periods, which are attributable to increment of investment in each period.

10.11 Graphical Representation of the Multiplier Effect

The effect of investment multiplier, in generating income, can also be expressed diagrammatically as in Fig. 10.7.

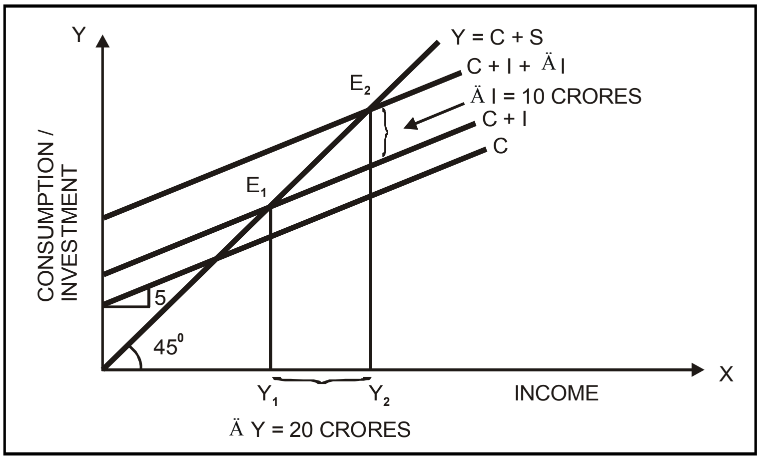

Fig. 10.7: Multiplier

In Fig. 10.7, curve C refers to a linear consumption function, with a constant *MPC* of 0.5. The level of effective demand is determined by consumption and investment outlays, as represented by the curve $C + I$, which is merely superimposed on the C curve. The 45° line, OY, shows that Income = Consumption + Saving. The $C + I$ curve intersects the 45° line at E_1; the original equilibrium level of income OY_1.

An increase in investment is shown by a shift of the $C + I$ curve to the $C + l +$ D I curve. The difference between the two curves is the value of the new investment. In our example, it is ₹ 10 crores. Now, this new $C + I + D\ I$ curve intersects the 45° line at E_2, which gives a new equilibrium level of income OY_2, which is greater than the initial income by Y_1Y_2. The additional income Y_1Y_2 (that is, ₹ 20 crores in our example) is, in fact, twice the initial outlay (₹ 10 crores), implying that the multiplier coefficient is ₹ 2.

In the aforementioned example, the change in income is Y_1Y_2 = ₹ 20 crores, which is k times $D\ I\ (k = 2\ D\ I = 10\ DY_1 = 20)$.

10.12 Assumptions of the Multiplier Theory

The assumptions which are implicit in the Keynesian theory of the multiplier may be stated as under:

1. Constant Marginal Propensity to Consume. The marginal propensity to consume remains constant during the process of income propagation.

2. Stable Monetary and Fiscal Policies. Fiscal and monetary policies remain stable, so that they do not affect the propensity to consume.

3. Excess Capacity. Excess capacity exists in the economic system. The assumption is that the economy operates at less than full employment level, so that the multiplier effect is realised in real terms in that it raises the level of output and employment.

4. Closed Economy. A closed economy model is assumed. That is, the country has no foreign trade activity. With this assumption, the impact of international economic transactions and consequent position of the balance of payments on the domestic level of income and consumption is ruled out.

5. No Dynamic Changes. A static economy model is assumed. That is, there is absence of dynamic changes in the economy. The state of technology, capital formation and accumulation, labour supply, stock of raw materials, power resources and other input variables are assumed to be given.

6. No Timelag. There is no significant time lag involved between the receipt of income and its expenditure. Thus, the process of income propagation in each round is assumed to be instantaneous.

10.13 Summary

Consumption expenditure is the major constituent of aggregate demand in an economy. The level of a community's expenditure on consumption is determined by a multitude of factors such as, household income, tastes and preferences, current and expected prices, expected future income, holding of liquid assets, interest rates, debts, real wealth, advertising and sales propaganda, taxation, inflation and the availability of goods.

The Keynesian concept of consumption function stems from the fundamental psychological law of consumption which states that there is a common tendency for people to spend more on consumption when income increases, but not to the same extent as the rise in income because a part of the income is also saved. The community, as a rule, consumes as well as saves a larger amount with a rise in income.

An explanation of the turning points of a business cycle is also provided by this law. The upper turning point from a boom is caused by a collapse of the marginal efficiency of capital owing to the fact that consumption expenditure does not keep pace with increase in income during the prosperity phase. Similarly, the law explains the revival of the marginal efficiency of capital and the turning point of recovery from a depression, on the basis of the fact that when income is reduced consumption expenditure does not decrease in the same proportion.

Investment function refers to inducement to invest or investment demand. Classical economists considered investment demand simply as a decreasing function of the interest rate, that is, $I = f(i)$; $f < 0$ implies inverse relationship, (where I stand for investment demand and i stands for the rate of interest).

Marginal efficiency of capital in ordinary parlance means the expected rate of profit. It is the expected rate of return over cost or the expected profitability of a capital asset. Marginal efficiency of a given capital asset is the highest rate of return over the cost expected from an additional or marginal unit of that capital asset.

According to Keynes, in the functional or scheduled sense, there is saving schedule and investment schedule and the equality between investment and savings is a consequence of changes in the level of income.

The classical economists held that saving being a function of the rate of interest; it automatically flows into an equal amount of investment, led by changes in the rate of interest which tend to generate a full employment level of income in the economy.

Keynesian economics deals primarily with the problem of unemployment in a developed capitalist economy.

10.14 Key Words/Abbreviations

- Consumption function $c = f(y) : f > 0$
- Average propensity of consume $APC = \frac{C}{y}$
- Investment function: $I = f(i); f < 0$
- MEC = Marginal efficiency of capital $e = \frac{Q}{P}$

10.15 Learning Activity

1. Students should prepare a comparative study of Keynes' consumption function.

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2. Trace out a list of measure to increase investment in an economy.

10.16 Unit End Questions (MCQ and Descriptive)

A. Discriptive Type Questions

1. Explain the main characteristics of Keynes' consumption function. What are the objective and subjective factors on which the consumption curve depends?
2. What is propensity to consume? Discuss the factors on which the consumption curve depends.
3. (a) Explain the significance of the consumption function in Keynesian theory of employment.

   (b) Distinguish between average propensity to consume and marginal propensity to consume.

4. What kind of relationship Keynes postulates between aggregate income and aggregate consumption expenditure?
5. Explain the method of consumption and significance of the consumption function in the Keynesian theory of employment. On what factors does the consumption function depend?
6. (a) What is an investment function?

   (b) What are the measures to increase investment in an economy?
7. What is meant by marginal efficiency of capital? Examine its role in the Keynesian theory of employment.
8. Comment on the determinants of Investment.
9. Briefly explain the concept of Keynes Multiplier.
10. Highlight the theory of Effective Demand.

B. Multiple Choice Questions

1. According to Keynes, the level of consumption is determined by:

   (a) effective demand. (b) level of increase.

   (c) rate of interest. (d) level of savings.
2. APC stands for __________.

   (a) Average Propensity to Consume (b) Aggregate Propensity to Consume

   (c) Actual Propensity to Consume (d) None of them.
3. Consumption function is a

   (a) Stable phenomenon in short run (b) Stable phenomenon in long run

   (c) Is not stable in long run (d) Is not stable in long run

4. Keynes consumption function is a major landmark in the

   (a) Science of economic (b) History of economic literature

   (c) Economical study (d) All the above

5. MEC is full form of __________.

   (a) Marshall elasticity curve (b) Marginal economic cost

   (c) Marginal efficiency of capital (d) None of these

Answers:

1. (a), 2. (a), 3. (a), 4. (b), 5. (c)

10.17 References

1. Money, Banking, International Trade and Public Finance, Dr. D.M. Mithani,
2. Managerial Economics, Dr. D.M. Mithani
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UNIT 11 INFLATION

Structure:

11.0 Learning Objectives

After studying this unit, you will be able to:

- Explain the phenomenon of inflation.
- Analyse the characteristics of inflationary economy.
- Discuss the factors causing inflation.
- Examine the effects of inflation.

11.1 Introduction

Modern economy is a money-based economy. Success of modern business is determined by money making. In the set of productive business resources described as five Ms: Manpower, Materials, Machine-power, Management and Money; Money-power is regarded more important for the business adventure. Finance matters the most. A micro-macro understanding of money and its business/ economic effects is necessary for a manager.

If money is to serve its good purpose, its value must remain stable. Changes in value of money lead to harmful consequences in the economy at large.

Some broad effects of changes in value of money are traced below:

1. Price fluctuations imply that the value of money is unstable. This adversely affect the confidence in money as money fails to serve as a good store of value.
2. Even as a means of payments it loses its growth. It may also become a source of peril and confusion. Since prices of all goods do not change in the same order, the relative price structure is distorted. When prices of necessaries tend to rise while those of luxuries may be falling, there is regressive effect, as the poor consumers suffer, while the rich are benefited while spending their money.
3. Price variations in product and factor markets are not uniform. Thus, the cost functions and revenues in different categories of production differ. As a result, profitability of firms and industry tend to differ. Marginal productivity of different factors in different uses never

tend to be identical when the value of money fluctuates in a segregated manner. This obstructs the optimal utilisation of resources. This may also cause maladjustment and wastefulness in the exploitation of country's productive resources.

4. When value of money changes incoherently in different types of real and financial assets, assets portfolio management becomes a difficult task. It also distorts the pattern of wealth distribution and position of the wealth holders. Say, for instance, when share prices fall but real estate prices rises, then person who has invested in shares is a loser while person occupying a real estate of the same value is a gainer.

   Such changes in different values of wealth due to unstable value of money distorts the pattern of income distribution. Consequently, savings and investment may be adversely affected. It also disturb business expectations and business planning. Business risks would be high when value of money is not stable.

5. Effects of rising prices in general — inflation effects — are also different from the effects of falling prices in general — the deflation effects. Especially, tempo of growth process and economic development are disturbed due to instability in the value of money. It also adversely affects the course of economic planning and programming both at macro and micro levels.

In short, most of such harmful effects are indicated as the menace of 'inflation' and 'deflation.' Inflation implies declining value of money. Deflation implies rising value of money. We shall, therefore, discuss these topics in detail in this chapter.

11.2 Meaning of Inflation

Term inflation refers to the continuously rising price level in the economy over a period of time. Usually, income is measured as annual general price rise. It is also measured on quarterly basis.

Inflation is commonly understood as a situation of substantial and rapid general increase in the level of prices and consequent deterioration in the value of money over a period of time.

The behaviour of general prices is measured through price indices. The trend of price indices reveals the course of inflation or deflation in the economy. As Lerner says, a price rise which is unforeseen and uncorrected is inflationary.

Thus, inflation is statistically measured in terms of percentage increase in the price index, as a rate per cent per unit of time — usually a year or a month.

Usually, the wholesale price index (WPI) numbers are used to measure inflation. Alternatively, the consumer price index (CPI) or the cost of living index number can be adopted in measuring the rate of inflation.

Inflation Rate

According to Prof. Rowan, inflation is the process of price increase.[1]

Rowan suggests the following formula to measure the percentage rate of inflation:

$$P(t) = \frac{\Delta P(t)}{P(t-1)} \times 100$$

(where, $\Delta P(t) = P(t) - P(t-1)$, P = the price level, and (t), $(t-1)$ are the periods of calendar time to which the observations are made).

The application of the formula is illustrated in the Table 11.1.

A Few Definitions

Inflation is like an elephant to the blind men. Different economists have defined inflation differently. We may, thus, enlist a few important definitions of inflation as under, which would give us a comprehensive idea about this intricate problem.

Harry Johnson defines inflation as a sustained rise in prices.

Crowther (1970, p. 107), similarly defines inflation as "a state in which the value of money is falling, *i.e.,* prices are rising."

The common feature of inflation is a price rise, the degree of which may be measured by price indices. Edward Shapiro (1970, p. 235), puts it thus: "Recognising the ambiguities our words contain, we will define inflation simply as a persistent and appreciable rise in the general level of prices."

1. Rowan D.C.: Output, *Inflation and Growth* (3rd Ed.) ELBS, p. 383.

Table 11.1: Inflation Rate in India (1980-81 - 1983-84)

Year	*WPI*	$\frac{\Delta P(t)}{P(t-1)} \times 100$	*Inflation Rate (%)*
1980-81	257		—
1981-82	281	$\frac{281-257}{257} \times 100 = \frac{2400}{257} =$	9.3
1982-83	289	$\frac{289-281}{281} \times 100 = \frac{800}{281} =$	2.9
1983-84	316	$\frac{316-289}{289} \times 100 = \frac{2700}{289} =$	9.3

Prof. Samuelson puts it thus: "Inflation occurs when the general level of prices and costs are rising."

Authors like Throp and Quandt, however, opine that it is of great help to define inflation in terms of observable phenomenon and for this reason the process of rising prices should be considered as inflation.

There are at least two distinct views on the concept of inflation. To some economists, inflation is a pure monetary phenomenon, while to others, it is a post-full employment phenomenon.

11.3 Types of Inflation

On different grounds, economists have classified inflation into various types. A few important categories are discussed below.

Chart 11.1 pinpoints the classification of inflation.

Chart 11.1

Classification or Types of Inflation

(1)	(2)	(3)	(4)	(5)
According to the Rate of Inflation:	**According to the nature of time-period of occurrence:**	**According to the scope or coverage:**	**According to the Govern-ment's reaction:**	**According to the causes:**
1. Moderate Inflation *(a)* Creeping *(b)* Walking	1. War-time Inflation	1. Comprehensive Inflation	1. Open inflation	1. Credit Inflation
2. Running Inflation	2. Post-war Inflation	2. Sporadic Inflation	2. Repressed Inflation	2. Deficit Inflation
3. Galloping Inflation	3. Peace-time Inflation			3. Scarcity Inflation
4. Hyper-inflation				4. Profit Inflation
				5. Foreign Trade Inflation
				6. Tax Inflation
				7. Cost or Wage Inflation
				8. Demand Inflation

Moderate, Galloping and Hyper-inflation

The severity of inflation is often measured in terms of the rapidity of price rise, *i.e.,* the rate of inflation. On the basis, a quantitative distinction of inflation may be made into three categories, *viz:*

- Moderate inflation;
- Running and galloping inflation; and
- Hyper-inflation.

(a) Moderate Inflation

It is a mild and tolerable form of inflation. It occurs when prices are rising slowly. When the rate of inflation is less than 10 per cent annually, or it is a single digit annual inflation rate, it is considered to be a moderate inflation in the present-day economy.

Prof. Samuelson observes that moderate inflation has been typical in most industrialised countries during the seventies.

The following are the major characteristics of moderate inflation:

(*i*) There is a *single digit* inflation rate (less than 10 per cent) annually.

(*ii*) It does not *disrupt* the economic balance.

(*iii*) It is regarded as stable *inflation* in which the relative prices do not get far out of line.

(*iv*) People's expectations remain more or less *stable* under moderate inflation.

(*v*) Under a low inflation rate, the real interest rate is not too low or negative, so money can serve its role as a store of value without difficulty.

(*vi*) There are modest inefficiencies associated with moderate inflation.

Economists have arbitrarily laid down that a 3-4 per cent price rise per annum is a tolerable rate of inflation in modern economies. Even the Chakravarty Report (1985) of the Reserve Bank of India has accepted 4 per cent rate of inflation annually to be an efficient and tolerable norm for the Indian economy.

Incidentally, some economists have described up to 3 per cent annual rate of inflation as 'creeping inflation' and if it exceeds 10 per cent, it is called 'walking inflation.' This means, Samuelson has clubbed 'creeping' and 'walking' inflation into 'moderate' inflation.

In Samuelson's opinion, moderate inflation is not a serious problem. While some economists feel that even a walking inflation should make us more cautious, as it represents a warning signal for the occurrence of running or double digit and eventually a galloping inflation, if it is not checked in time.

(b) Running and Galloping Inflation

When the movement of price accelerates rapidly, running inflation emerges. Running inflation may record more than 100 per cent rise in prices over a decade. Thus, when prices rise by more than 10 per cent a year, running inflation occurs.

Economists have not described the range of running inflation. But, we may say that a double digit inflation of 10-20 per cent per annum is a running inflation. If it exceeds that figure, it may be called 'galloping' inflation.

According to Samuelson, when prices are rising at double or triple digit rates of 20, 100 or 200 per cent a year, the situation may be described as 'galloping' inflation.

Indian economy has witnessed a sort of 'running' and 'galloping' inflation to some extent (not exceeding 25 per cent per annum) during the planning era, since the Second Plan period. Argentina, Brazil and Israel, for instance, have experienced inflation rates over 100 per cent in the eighties of the 20th century.

Galloping inflation is really a serious problem. It causes economic distortions and disturbances.

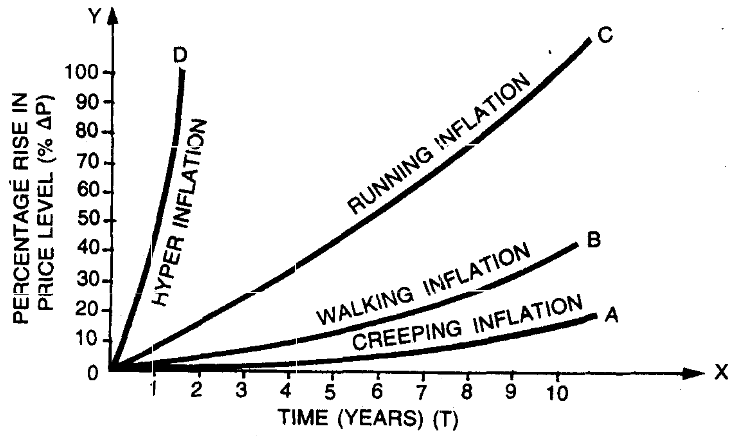

Fig. 11.1: Speed Categories of Inflation

(c) Hyper-inflation

In the case of hyper-inflation, prices rise every moment, and there is no limit to the height to which prices might rise. Therefore, it is difficult to measure its magnitude, as prices rise by fits and starts.

In quantitative terms, when prices rise over 1000 per cent in a year, it is called a hyper-inflation.

Austria, Hungary, Germany, Poland and Russia witnessed hyper-inflation in the wake of World War I.

Hyper-inflation notably took place in Germany in 1920-1923. The German price index rose from 1 to 10,00,000,000 during January 1922 to November 1923. Believe it or not, it is a fact!

The main features of hyperinflation are:

(*i*) During hyperinflation, the price rise is severe. The price index moves up by leaps and bounds. It is over 1000 per cent per year. There is at least a 50 per cent price rise in a month, so that in a year it rises to about 130 times.

(*ii*) It represents the most pathetic deterioration in people's purchasing power.

(*iii*) It is apparently generated by a massive fiscal dislocation.

(*iv*) It is amplified by wage-price spiral.

(*v*) Hyperinflation is a monetary disease.

(*vi*) The velocity of circulation of money increases very fast.

(vii) The structure of the relative prices of goods become highly unstable.

(viii) The real wages tend to decline fast.

(ix) Inequalities increase.

(x) Overall economic distortions take place.

These speed categories of inflation are graphically depicted as in Figure 11.2.

It must be remembered that the difference between all these four types of inflation is one of degree than of kind.

War, Post-war and Peace-time Inflation

On the basis of the nature of time-period of occurrence, we have:

- war-time inflation;
- post-war inflation; and
- peace-time inflation.

(a) War-time inflation: It is the outcome of certain exigencies of war, on account of increased government expenditure on defence which is of an unproductive nature. By such public expenditure, the government apportions a substantial production of goods and services out of total availability for war which causes a downward shift in the supply; as a result, an inflationary gap may develop.

(b) Post-war inflation: It is a legacy of war. In the immediate post-war period, it is usually experienced. This may happen when the disposable income of the community increases, when war-time taxation is withdrawn, or public debt is repaid in the post-war period.

(c) Peace-time inflation: By this is meant the rise in prices during the normal period of peace. Peace-time inflation is often a result of increased government outlays on capital projects having a long gestation period; so a gap between money income and real wage goods develops. In a planning era, thus, when government's expenditure increases, prices may rise.

Comprehensive and Sporadic Inflation

From the coverage or scope point of view, we have:

- comprehensive or economy-wide inflation, and
- sporadic inflation.

(a) Comprehensive inflation: When prices of every commodity throughout the economy rise, it is called economy-wide or comprehensive inflation. It is a normal inflationary phenomenon and refers to a rise in the general price level.

(b) Sporadic inflation: This is a kind of sectional inflation. It consists of cases in which the averages of a group of prices rise because of increases in individual prices due to abnormal shortage of specific goods. When the supply of some goods become inelastic, at least temporarily, due to physical or structural constraints, sporadic inflation has its sway. For instance, during drought conditions when there is a failure of crops, foodgrain prices shoot up.

Sporadic inflation is a situation in which direct price control, if skilfully used, is most likely to be beneficial to the community at large.

Open and Repressed Inflation

An inflation is open or repressed according to the government's reaction to the prevalence of inflationary forces in the economy.

(a) Open inflation: When the government does not attempt to prevent a price rise, inflation is said to be open. Thus, inflation is open when prices rise without any interruption. In open inflation, the free market mechanism is permitted to fulfil its historic function of rationing the short supply of goods and distribute them according to consumer's ability to pay. Therefore, the essential characteristics of an open inflation lie in the operation of the price mechanism as the sole distributing agent. The post-war hyper-inflation during the twenties in Germany is a living example of open inflation.

(b) Repressed inflation: When the government interrupts a price rise, there is a repressed or suppressed inflation. Thus, suppressed inflation refers to those conditions in which price increases are prevented at the present time through an adoption of certain measures like price controls and rationing by the government, but they rise on the removal of such controls and rationing. The essential characteristic of repressed inflation, in contrast to open inflation, is that the former seeks to prevent distribution through price rise under free market mechanism and substitutes instead a distribution system based on controls. Thus, the administration of controls is an important feature of suppressed inflation.

However, many economists like Milton Friedman and G.N. Halm opine that if there has to be any inflation, it is better open than suppressed. Suppressed inflation is condemned as it breeds a number of evils like black market, hierarchy of price controllers and rationing officers, and uneconomic diversion of productive resources from essential industries to non-essential or less essential goods industries since there is a free price movement in the latter and hence are more profitable to investors.

Types of Inflation based on the Causes Inducing Inflation

According to the cause of rising prices, one can consider several types of inflation as follows:

(a) Credit inflation: Inflation which is caused by excessive expansion of bank credit or money supply is referred to as credit or money inflation.

(b) Deficit inflation: It is the inflation caused by deficit financing.

When the government budgets contain heavy deficits and that are financial, through creating new money (net credit of the Central Banks to the government), the purchasing power in the community increases and prices rise. This may be referred as to as deficit-induced inflation. An inflationary spiral develops due to deficit financing, when the production of consumption goods fails to keep pace with the increased money expenditure.

(c) Scarcity inflation: Whenever scarcity of real goods occurs and this may be artificially created by the hoarding activities of unscrupulous traders and speculators involving blackmarketing, causing prices to go up, such type of inflation may be described as scarcity inflation.

(d) Profit inflation: In his recent book, *Growthless Inflation by Means of Stockless Money,* Prof. Brahmananda mentions profit inflation as a unique category of inflation. The concept of profit inflation was originated by Keynes in his *Treatise on Money*. According to Keynes, the price level of consumption goods is a function of the investment exceeding savings. He considered the investment boom as a reflection of profit boom. Inflation is unjust in its distribution effect. It redistributes income in favour of profiteers and against the wage-earning class. During inflation, thus, the entrepreneur class may tend to expect an upward shifting of the marginal efficiency of capital (*MEC*); hence, entrepreneurs are induced to invest more even by borrowing at higher interest rates. Eventually, investment exceeds savings and the economy tends to reach a higher level of money income equilibrium. If the economy is operating at full employment level or if there are bottlenecks of market imperfections, real output will not rise proportionately, so the imbalance between money income and real income is corrected through rising prices.

(e) Foreign trade induced inflation: For an international economy, we may categorise the following two types of inflation as being caused by factors pertaining to the balance of payments:

(i) Export-boom Inflation; and

(ii) Import price-hike Inflation.

(i) Export-boom inflation. When a country having a sizeable export component in its foreign trade experiences a sudden rise in the demand for its exportables against the inelastic supply of exportables in the domestic market, it obviously implies an excessive pressure of demand which is revealed in terms of persistent inflation at home.

Again, trade gains and sudden influx of exchange remittances may lead to an increase in monetary liabilities which is further reflected in the rising pressure of demand for domestic output causing an inflationary spiral to get further momentum. Such a permanent case for an export-boom inflation is, however, ruled out in the Indian economy, because neither export trade is a significant portion of Domestic National Product nor is there a continuous boom of export-demand, causing terms of trade to move up favourably all the time.

(ii) Import price-hike inflation: When prices of import components rise due to inflation abroad, the domestic costs and prices of goods using these imported parts will tend to rise. Such an inflation is referred to as imported inflation. For instance, hike in oil prices by the Arab countries was responsible for accelerating inflationary price rise in many oil-importing countries, including India to some extent.

(f) Tax inflation: Year-to-year increase in commodity taxation such as excise duties and sales tax may lead to rise in prices of taxed goods. Such an inflation is termed as tax inflation or tax-induced inflation.

(g) Cost inflation: When inflation emerges on account of a rise in cost factor, it is called cost inflation. It occurs when money incomes (wage rate, particularly) expand more than real productivity. Cost inflation has its course through the level of money costs of the factors of production and in particular through the level of wage rates. Due to a rising cost of living index, workers demand higher wages, and higher wages in their turn increase the cost of production, which a producer generally meets by raising prices. This process of spiralling may reach higher and higher levels. In this case, however, cyclical anti-inflation remedies of monetary controls are not relatively effective.

Wage inflation is an important variant of cost inflation. Wage-push inflation occurs when money wages are raised without corresponding improvement in the productivity of the workers.

(h) Demand inflation: When there is an excess of aggregate demand against the available aggregate supply of goods and services, prices tend to rise. It is called demand-induced inflation. Population growth, rising money income, etc. forces play a significant role in generating demand inflation.

11.4 Demand-pull *versus* Cost-push Inflation

Broadly speaking, there are two schools of thought regarding the possible causes of inflation. One school views the demand-pull element as an important cause of inflation, while the other group of economists holds that inflation is mainly caused by the cost-push element.

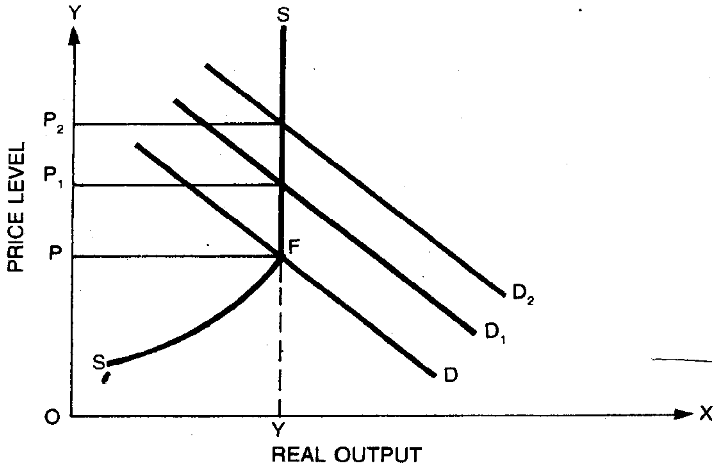

Fig. 11.2: Demand-pull Inflation

Demand-pull Inflation

According to the demand-pull theory, prices rise in response to an excess of aggregate demand over existing supply of goods and services. The demand-pull theorists point out that inflation (demand-pull) might be caused, in the first place, by an increase in the quantity of money, when the economy is operating at full employment level. As the quantity of money increases, the rate of interest will fall and, consequently, investment will increase. This increased investment expenditure will soon increase the income of the various factors of production. As a result, aggregate consumption expenditure will increase leading to an effective increase in the effective demand. With the economy already operating at the level of full employment, this will immediately raise prices, and inflationary forces may emerge. Thus, when the general monetary demand rises faster than the general supply, it *pulls up* prices (commodity prices as well as factor prices, in general). Demand-pull inflation, therefore, manifests itself when there is active co-operation, or passive collusion, or a failure to take counteracting measures by monetary authorities.

Demand-pull or just demand inflation may be defined as a situation where the total monetary demand persistently exceeds total supply of real goods and services at current prices, so that prices are pulled upwards by the continuous upward shift of the aggregate demand function. By using the aggregate demand and supply curves, in Fig. 11.2, the demand-pull process can be graphically illustrated.

In Fig. 11.2, the X-axis measures real output, and the Y-axis measures the price level. Curves D, D_1 and D_2 represent the aggregate demand curves. The S curve represents the aggregate supply function, which slopes upward from left to right and, at point F it becomes a vertical straight line. The point F suggests that the economy has reached a level of full employment. Hence, the real output tends to be fixed or inelastic at this point. Assuming that the D curve intersects the S curve at point F, the real output or income is at full employment and the price level is OP. When there is an increase in the aggregate demand function beyond D, either due to an increase in autonomous investment (I), or because of an increase in the propensity to consume (C), or government spending increase in the propensity to consume (C), or government spending (G), represented by a shift in the aggregate demand curve, such as D_1, D_2, the supply of total real output being inelastic, the price level tends to rise from P to P_1 and then to P_2.

However, demand-pull inflation can also occur without an increase in the money supply. This can happen when either the marginal efficiency of capital increases or the marginal propensity to consume rises, so that investment expenditures may rise, thereby leading to rise in the aggregate demand which will exert its influence in raising prices beyond the level of full employment already attained in the economy.

According to the demand-pull theorists, during the process of demand inflation, rise in wages accompanies or follows the price rise as a natural consequence. Under the condition of rising prices, when the rate of profit is increasing, producers are inclined in general to increase investment and employment, in that they bid against each other for labour, so that labour prices (*i.e.,* wages) may rise.

In short, the inflationary process, described by the demand inflation theory, implies the following sequences: Increasing demand — increasing prices — increasing costs — increasing income — increasing demand — increasing prices — and so on.

Causes of Demand-pull Inflation

It should be noted that the concept of demand-pull inflation is associated with a situation of full employment where increase in aggregate demand cannot be met by a corresponding expansion in the supply of real output. There can be many reasons for such excess monetary demand:

1. Increase in public expenditure. There may be an increase in the public expenditure (*G*) in excess of public revenue. This might have been made possible (or rendered necessary) through public borrowings from banks or through deficit financing, which implies an increase in the money supply.

2. Increase in investment. There may be an increase in the autonomous investment (*I*) in firms, which is in excess of the current savings in the economy. Hence, the flow of total expenditure tends to rise, causing an excess monetary demand, leading to an upward pressure on prices.

3. Increase in MPC. There may be an increase in the marginal propensity to consume (*MPC*), causing an excess monetary demand. This could be due to the operation of demonstration effect and such other reasons.

4. Increasing exports and surplus balance of payments. In an open economy, an increasing surplus in the balance of payments also leads to an excess demand. Increasing exports also have an inflationary impact because there is generation of money income in the home economy due to export earnings but, simultaneously, there is reduction in the domestic supply of goods because products are exported. If an export surplus is not balanced by increased savings, or through taxation, domestic spending will be in excess of the value of domestic output, marketed at current prices.

5. Diversification resources. A diversion of resources from the consumption goods sector either to the capital good sector or the military sector (for producing war goods) will lead to an inflationary pressure because while the generation of income and expenditure continues, the current flow of real output decreases on account of high gestation period involved in these sectors. Again, the opportunity cost of war goods is quite high in terms of consumption goods meant for the civilian sector. This leads to an excessive monetary demand for the goods and services against their real supply, causing the prices to move up.

In short, it is said that the demand-pull inflation could be averted through deflationary measures adopted by the monetary and fiscal authorities. Thus, passive policies are responsible for demand-pull inflation.

Cost-push Inflation

A group of economists holds the opposite view that the process of inflation is initiated not by an excess of general demand but by an increase in costs, as factors of production try to increase their share of the total product by raising their prices. Thus, it has been viewed that a rise in prices is initiated by growing factor costs. Therefore, such a price rise is termed as "cost-push" inflation as prices are being pushed up by the rising factor costs.

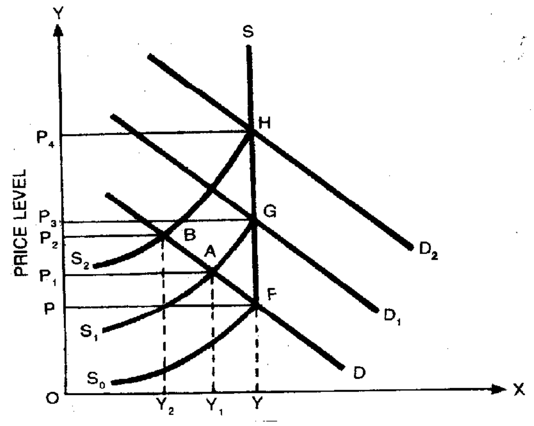

Fig. 11.4: Cost-push Inflation

Cost-push inflation, or cost inflation, as it is sometimes called, is induced by the wage inflation process. It is believed that wages constitute nearly seventy per cent of the total cost of production. This is specially true for a country like India, where labour-intensive techniques are commonly used. Thus, a rise in wages leads to a rise in the total cost of production and a consequent rise in the price level, because fundamentally, prices are based on costs. It has been said that a rise in wages causing a rise in prices may, in turn, generate an inflationary spiral because an increase would motivate the workers to demand higher wages. Indeed, any autonomous increase in costs, such as a rise in the prices of imported components or an increase in indirect taxes (excise duties, etc.) may initiate a cost-push inflation. Basically, however, it is wage-push pressures which tend to accelerate the rising price spiral.

The phenomenon of cost-push inflation is graphically illustrated in Fig. 11.4. In the figure, the *D* curves represent the aggregate demand function, and the SS_1 curve, the aggregate supply function.

The full-employment level of income is *OY*, which can be maintained only at rising price levels, *P*, P_1 and P_2.

Now, if we begin with price level *P*, *F* is the point of intersection of the aggregate supply curve *D* and SS_1. Let us assume that the aggregate supply function shifts upward as S_1, which becomes a vertical straight line at point *F*, and merges with the *SF* line (the previous supply curve at full employment level). The cost-push inflation may be attributed to either an increase in money wages due to trade unions' successful collective bargaining, or to the profit-motivated monopolists or oligopolists, who might have raised the prices of goods. Anyway, as the aggregate supply curve shifts to S_1, the new equilibrium point *A* is determined at OY_1 level of real output, which is less than full employment level, at P_1 level of prices. This means that with a rise in the price level, unemployment increases. It is regarded as the cost of holding the price level close to *P*. Similarly, a further shift in the aggregate supply curve to S_2 on account of a further wage-push, implies a new equilibrium point *B*. This causes the income level to fall further to Y_2, and prices to rise to P_2. If, however, the government or monetary authority is committed to maintain full employment, there will be more public spending or more credit expansion, causing the price level to rise to much more — such as from *P* to P_3 and P_4. In this case, the sequence of equilibrium points become *A-B-G-H.*

Cost-push inflation may occur either due to wage-push or profit-push. Cost-push analysis assumes monopoly elements either in the labour market or in the product market. When there are monopolistic labour organisations, prices may rise due to wage-push. And, when there are monopolies in the product market, the monopolists may be induced to raise the prices in order to fetch high profits. Then, there is profit-push in raising the prices.

However, the cost-push hypothesis rarely considers autonomous attempts to increase profits as an important inflationary element. Firstly, because profits are generally a small fraction of the total price, a rise in profits would have only a slight impact on prices. Secondly, the monopolists generally hesitate to raise prices in absence of obvious demand-pull elements. Finally, the motivation for profit-push is weak since, at least in corporations, those who make the decision to raise prices are not the direct beneficiaries of the price increase.

Hence, cost-push is generally conceived as a synonymous with wage-push. When wages are pushed up, cost of production increases to a considerable extent so that prices may rise. Since wages are pushed up by the demand for high wages by the labour unions, wage-push may be equated with union-push.

According to one variant of the cost-push theory, sectoral shifts in demand are prime-movers in the inflationary process. Starting with an autonomous shift in demand, a rise in wages and prices could result in one sector and this rise could elicit further shifts of demand. This happens because there is a close link between different goods through inputs. One good serves as an input in the production of the other goods, and consequently, when the price of the input rises, the prices of output will also rise. For instance, when due to a rise in wages in the steel industry, price of steel may rise, and this will raise the prices of vehicles, machines, etc., using steel as input. The rise in the prices of vehicles may in turn raise the cost of transport and manufactured goods. Similarly, prices of tractors, etc. may increase due to high prices of steel so that costs of agriculture may rise, hence food and raw material prices will also rise. All these ultimately raise the cost of living, leading to increase in wage rates. Thus, inflation once sets in motion due to the phenomenon of cost-push in one industry or sector spreads throughout the economy.

11.5 Causes of Inflation

Inflation is a complex phenomenon which cannot be attributed to a single factor. We may summarise the major causes of inflation thus:

Overexpansion of Money Supply

Many a times, a remarkable degree of correlation between the increase in money supply and the rise in the price level may be observed.

Expansion of Bank Credit

Rapid expansion of bank credit is also responsible for the inflationary trend in a country.

Deficit Financing

The high doses of deficit financing which may cause reckless spending, may also contribute to the growth of the inflationary spiral in a country.

Ordinary Monetary Factors

Among other monetary factors influencing the price trend in an economy, the major ones are listed here:

(a) High non-development expenditure. The continuous increase in public expenditure, and especially the growth of defence and non-development expenditure.

(b) Huge plan investment. The huge planned investment and its high rate of growth in every plan may lead to an excess demand in the capital goods sector, so that industrial prices may rise.

(c) Black money. Some economists have condemned black money in the hands of tax evaders and blackmarketers as an important source of inflation in a country. Black money encourages lavish spending, which causes excess demand and a rise in prices.

(d) High indirect taxes. Incidence of high commodity taxation. Prices tend to rise on account of high excise duties imposed by the Government on raw materials and essential goods.

Non-monetary Factors

There are various non-monetary and structural factors that may cause a rising price trend in a country. These are:

(a) A high population growth. Undoubtedly, the rising pressure of demand, resulting from of population and money income, will cause a high price rise in an overpopulated country.

(b) Natural calamities and bad weather conditions. Vagaries of monsoon, bad weather conditions, droughts and failure of agricultural crops have been responsible for price spurts, from time to time, in many underdeveloped countries. Agricultural prices are most sensitive to inflationary forces in India. Natural calamities also contribute occasionally to the inflationary boost in a country. Events such as cyclones and floods, which destroy village economies, also aggravate the inflationary pressure.

(c) Speculation and hoarding. Hoarding and speculative activities, corruption at every level, in both private and public sectors, etc., are also responsible to some extent for aggravating inflation in a country.

(d) High prices of imports. Inflation has also been inflicted on some countries through the import content used by their industries. Prices of petroleum products have been increased in many countries due to price-hikes by the oil-producing countries. Recently, in 2008, since fuel prices have sky-rocked, inflation has accelerated in many countries including India.

(e) Monopolies. Monopoly profits and unfair trade practices by big industrial houses are also responsible for the price rise in countries like India.

(f) Underutilisation of Resources. Non-utilisation of installed capacities in large industries is also a contributory factor to inflation.

Inflation in the country may be regarded as a symptom of a deep-seated malady, born of structural deficiencies involved in the functioning of its economic system, which is characterised by inherent weaknesses, wastages and imbalances.

Gaps and Bottlenecks

To understand the true nature of inflation in an underdeveloped country, one has to examine the bottlenecks and gaps of various types which obstruct the normal growth process, causing prices to rise with the generation of money income without an appropriate rise in real income. These gaps or bottlenecks may be enlisted as follows:

(a) Market imperfections. Market Imperfections like factor immobility, price rigidity, ignorance of market conditions, rigid social and institutional structures and lack of specialisation and training in underdeveloped economies do not allow an optimum allocation and utilisation of resources. Hence, increase in money supply and increased money income remain unaccompanied by increased supply of real output, causing a net price rise of an inflationary nature in these economies.

(b) Capital bottleneck. On account of a very low rate of capital formation and consequent capital deficiency, a poor country is caught in a vicious circle of poverty, and any excessive money supply instead of breaking this vicious circle, tends to create a chronic inflationary spiral. Thus, in a poor country, there is inflation because by virtue of its internal backwardness, it is prone to chronic inflation.

(c) Entrepreneurial bottleneck. Entrepreneurs in underdeveloped countries lack skill, spirit of boldness and adventure. They prefer trading or safer traditional investments rather than attempt risky innovations. Absence of adequate industrial capital, prevalence of merchant capital and a colossal amount of private investments in such unproductive fields as land, jewellery, gold, etc., which is a gross socio-economic waste, starves the developing economy of its much needed capital resources. Thus, increased money supply or savings in terms of money makes little impact on real output and monetary equilibrium is just attained through a galloping price rise in the various sectors of the economy.

(d) Food bottleneck. Due to slow growth of agriculture, overpressure of growing population on land, primitive methods of cultivation, defective land tenure system, lack of adequate irrigation facilities and many other reasons, agriculture output, especially food supply which constitutes a large part of wage goods, has failed to keep pace with the growing demand for it from the growing population and increased rural employment in the rural industrialisation process in these countries. This food bottleneck has created the problem of price rise in foodgrains, and it has become the cornerstone in the whole of price structure in the developing economies.

Recently, in 2008, there has been a shortage of foodgrains such, as rice and wheat. This has caused unprecedented rise in food prices that has contributed much to the rising inflation world over.

(e) Infrastructural bottleneck. These refer to power shortages and inadequacies of transport facilities in underdeveloped economies. Infrastructural bottlenecks obviously restrict the growth process in industrial, agricultural and commercial sectors and cause underutilisation of capacity in the economy as a whole. Underutilisation of resources does not absorb the full increase in money supply and reflects upon the rising prices.

(f) Foreign exchange bottleneck. Developing economies suffer from a fundamental structural disequilibrium in the balance of payments due to high imports and low exports on unfavourable terms of trade; hence, they usually suffer from foreign exchange scarcity problem. In recent years, day-to-day rising imports bills due to high oil prices have aggravated the problem further.

This foreign exchange bottleneck comes in the way of necessary imports to check domestic inflation. Again, the need to boost exports to meet the growing deficits in the balance of payments puts an extra pressure on the marketable surplus meant for domestic requirements. This eventually leads to a heavy rise to exportable commodities in the domestic market.

(g) Resources gap. When the public sector is widely expanded for industrial development in these countries, the government aggravates the problem of resources gap. Owing to the backward socio-economic political structure of the less developed country, its government always finds it difficult to raise sufficient resources through taxation, public borrowings and profit of State enterprises, to meet the ever-increasing public expenditure in intensive and extensive dimensions. As such, under the pressure of the resources gap, the government has to resort to a heavy dose of deficit financing, despite knowing its dangers. This makes the economy inflation-prone. Similarly, the resource gap in the private sector, caused by low voluntary savings and high-cost economy, presses for overexpansion of money supply through bank credit which, by and large, results in the acceleration of inflationary spiral in the economy.

11.7 Summary

- Inflation refers to a general trend of rising prices.
- During inflation, input prices would go up.
- Cost of production tends to rise causing a spiral of rising prices.
- During persistent, inflationary situation, workers will tend to demand high wages. There can be labour unrest and industrial disharmony. Human resource management (HRM) tends to be a more difficult task.

11.8 Key Words/Abbreviations

- **WPE:** wholesale prince index
- **CPF:** consumer price index
- **Inflation:** continuous rising price level
- **Moderate inflation:** upto 4% rise in prices per annum
- **Hyper inflation:** limitless rising price level

11.9 Learning Activity

1. Collect data about consumer price and wholesale price indices for the period 2001 onwards in India and present an analysis of inflation in the country over the years.

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2. Give an account of the global inflation in recent years.

11.10 Unit End Questions (MCQ and Descriptive)

A. Descriptive Types Questions

1. What is inflation?
2. Distinguish between demand-pull and cost-cash inflation.
3. How does inflation affect the production structure and income distribution in an economy?
4. What do you understand by inflation? Give its causes and effects on different sections of society.
5. Inflation can also be used for economic analysis by the organizations to price their products. Support your answer with illustrations.
6. Develop the theories of inflation and its importance.
7. Organizations are operating in the highly volatile environment and with respect to environment they need to study the business cycles. Comment on it.

B. Multiple Choice/Objective Type Questions

1. Inflation refer to:

   (a) Continuously rising price level (b) Zero income

   (c) Monetary expansion (d) Zero economic growth

2. Inflation as a monetary phenomenon was asserted by:

   (a) the communists (b) the monetanists

   (c) the keynesians (d) the fiscalists

3. Moderate inflation implies rising price level within a limit of

   (a) 4% (b) 9%

   (c) 3% (d) 5%

4. The concept of profit inflation was originated by:

   (a) Prof. Brahmananda (b) J.M. Keynes

   (c) A.K. Sen (d) J.R. Hicks

5. Cost-push inflation is regarded as a synonymous with

   (a) wage-push (b) demand-pull

   (c) deficits-push (d) none of these

Answers

1. (a), 2. (b), 3. (a), 4. (b), 5. (a)

11.11 References

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